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FISHING AND FISH MARKETING IN NORTHERN OMAN

A Case Study of Artisanal Fisheries Development

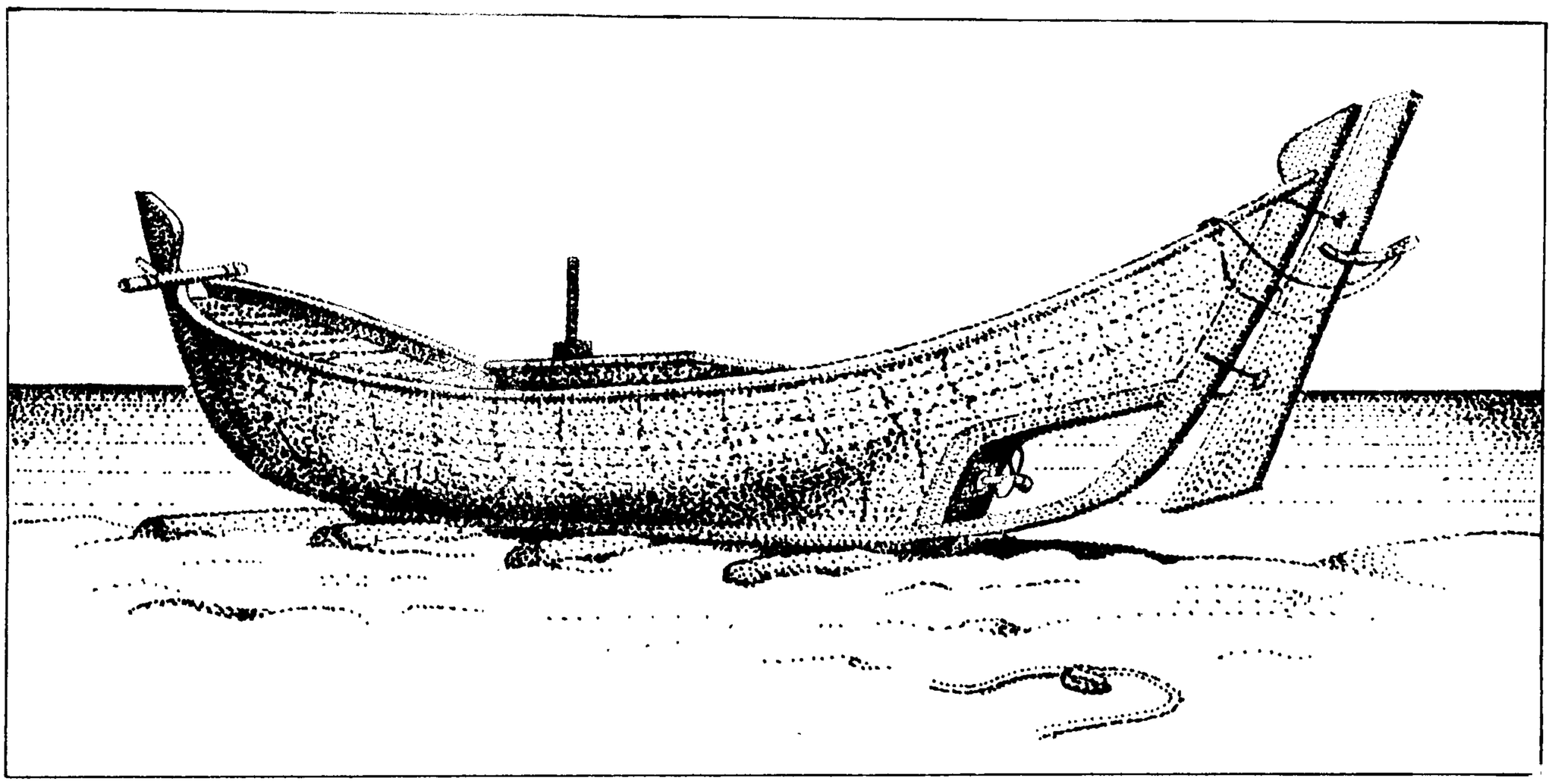
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A thesis submitted for
the Degree of Doctor of Philosophy
in the University of Durham.

September, 1979.



The large plank-built 'huri' of the Upper Batina, Oman

ABSTRACT

Since 1967 the Sultanate of Oman in southeast Arabia has derived nearly all its income from petroleum exporting, but its oil reserves are decidedly limited. If the country is to continue to develop in the future its economic base must be broadened rapidly. Bearing in mind the fact that development involves social as well as economic well-being, the fisheries of the country may offer a potential contribution to Oman's development. The thesis examines the fisheries of northern Oman in this context. It shows that assumptions made by outsiders about the developmental potential of an indigenous industry in a developing country can be misleading and the effect of the policies they prescribe may be actually detrimental.

The term 'fishery' is used to include both fishing and fish marketing. For many centuries before oil, the artisanal, or small-scale, fisheries of Oman were of considerable economic and social importance to the country. Production and exports of cured fish and fish products were very large. In recent decades however fish production has declined considerably, despite the introduction by enterprising fishermen and fish traders of improved catching and marketing equipment since the 1960s. To investigate the reasons for this and to discover the state of the artisanal fisheries in northern Oman in the mid 1970s, the present writer carried out a detailed field survey between 1974 and 1976. The methods of working and the social and economic attitudes of both the fishermen and fish traders of northern Oman were studied at

close hand. On the basis of these field data and in the light of related information from other sources, the author assesses the potential of the northern Omani fishery and the extent to which it is capable of contributing to the development of the country. In contrast to the experience of commercial fishery development in analogous areas, especially the rest of the Arabian Peninsula, the outlook for the Omani artisanal fishery is bright, given the appropriate policies on the part of the government.

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The author wishes to thank all those who have contributed to enabling him to write this thesis and to collect the data on which it is based. He gratefully acknowledges particularly the academic advice and practical assistance of Professor H. Bowen-Jones who, as Director of the Durham University Oman Research Project on which the author was employed between 1974 and 1976, has acted as supervisor for this present work. He also thanks most especially Dr. R.W. Dutton, now General Director of the Durham University Khabura Development Project who has always been ready with generous support and encouragement. He wishes further to acknowledge Professor W.B. Fisher, Head of the Department of Geography in which he has been employed since 1976, and the members of the academic staff of the Department from whose stimulating discussion the writer has benefitted.

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INTRODUCTION

The 1970s have been a period during which the Sultanate of Oman in southeast Arabia has been undergoing unprecedented social and economic change. The cause of that change, which has transformed Oman from a mediaeval tribal poverty into one of the world's fastest developing nation states in less than ten years, is its oil exports. Omani oil reserves are however decidedly limited and are likely to be exhausted long before those of many of its richer oil-producing neighbours. If the rising expectations of the Omani population are to continue to be met in the long term the economy must in the near future become much more broadly based.

The country has however not proved as yet to be particularly well endowed with other natural or man-made resources, and certainly none has been identified so far which is even remotely capable by itself of taking the place of oil as the overwhelmingly most important income source. Copper and other mineral deposits have in recent years been found, but extraction will be difficult and expensive and ore concentrations are low. Manufacturing industries are being set up, especially in the Capital Area and these are likely to increase their contribution to the economy in the future; but the local market is limited and in export markets neighbouring countries have a head start, while some (especially India and Pakistan) have the added advantage of much lower labour costs than Oman. Tourism may potentially have a contribution to make, but only in the long term, and then probably only during the winter months. Agriculture offers some promise to increase its contribution to the national income, and Oman indeed has

the largest amount of agriculture in eastern Arabia, but availability of irrigation water may well be a crucial limitation on its intensification and expansion. The fish resources of Omani waters show promise of considerable potential for increased exploitation, though there are problems in deciding on optimal strategies and in implementing them.

Thus fisheries are one resource among several which could potentially contribute to broadening the economy of the Sultanate and to filling the gap in the country's economy the decline of oil revenues will produce, though none of which is without attendant difficulties and limitations. This present study seeks to investigate the Omani fisheries, particularly in the northern part of the country, in the context of Oman's development. It is not intended to compare the relative importance of fisheries with that of the other sectors of the economy, but rather to investigate the place of fishing and fish marketing in the life and work of Oman and to assess what contribution it can make to the development of the country.

At this introductory stage, the major problems with which this thesis intends to deal and on which the conclusions in the final chapter will be structured can be put in the form of three questions as follows:

1. Is the Omani small-scale fishery physically capable of meeting local demand for fish, and of perhaps producing a surplus for export?

2. Can it contribute to fulfilling the social requirements of development?

3. Is it likely to be able to function viably and economically in view of the rapidly changing socio-economic situation in Oman and particularly in the face of potential competition from industrial fisheries? Or must it be recognised that it is likely to survive and to provide a socially valuable function only with economic subsidies?

The thesis is organised into three parts. Part I, comprising Chapters One to Four, presents the background against which the field study was conducted. Chapter One introduces relevant aspects of the question of development in developing countries, the divergences of opinion which the subject has produced, and the place of the present study in relation to current thinking in the field. Chapter Two sets the context of Omani development and the place within it of fisheries and fisheries development. Chapter Three is an historical review of Omani fisheries up to the time of the present fieldwork (the mid-1970s), and Chapter Four presents the methodology involved in that fieldwork.

Part II is concerned with the analysis and interpretation of the field survey data. Chapters Five, Six and Seven discuss the fish catching aspect of the fishery on the Batina coast of northern Oman as revealed by the survey and cover the fishermen, their methods and equipment, and their costs, takings and attitudes. In Chapter Eight the Batina fishery is considered from the point of view of the composition and size of the catch, and the productivity of the fishing manpower is compared with that of analogous fisheries. Chapters Nine and Ten deal with fish handling and marketing on the Batina coast and in the Northern Interior, while Chapter Eleven concludes

Part II by focussing on the spatial aspects of the Omani fishery.

Part III views the study in perspective. The scale is broadened in Chapter Twelve in which the record of fisheries development in Oman's neighbours in the Arabian Peninsula is assessed. In the final chapter (Chapter Thirteen) the implications for fisheries development which emerge from the study, and in particular the implications for government policy, are discussed.

The study was made possible as a result of the Durham University Oman Research Project which, under the directorship of Professor H. Bowen-Jones and with funding from Petroleum Development (Oman) Ltd. (the Omani oil consortium), began its fieldwork in 1973. The field research team included a population geographer, a hydrologist, a soil scientist and an agriculturalist, each of whom was responsible for his own specialist contribution to an integrated study of the population and potential of the field area in northern Oman between Khabura on the Batina coast and Ibri in the Northern Interior. The present writer joined the field team in 1974 and between then and 1976 was responsible for investigating the markets and the fisheries of the field area (Durham Oman Project Reports 1978 Vol. V and VI).

Details of how and when the fieldwork on fishing and fish marketing was conducted are elaborated in Chapter Four. In December 1977 and January 1978 a short return visit was paid by the present writer to Oman and to other neighbouring countries to extend and update the original field data. This visit was made possible by means of a travel grant from the Centre of Middle Eastern and Islamic Studies, University of

Durham, which is gratefully acknowledged. A further short visit was made to Oman in December 1978 as a result of funding from the Ministry of Overseas Development, London.

Problems were encountered during the study both in the conducting of the fieldwork itself and in the lack of base data. Apart from physical and logistic difficulties such as those of climate and transport (which were nevertheless real), fieldwork in areas like rural Oman which involves the collection of information from the population is made difficult by the fact that most are preliterate and are unaccustomed to thinking in terms of generalities and abstractions. The implications of this for survey methodology, particularly concerning costs, turnover and profits, are discussed in Chapter Four. As for problems of language and of social conventions, customs and attitudes, the present writer was fortunate in having already spent two years in a village in Bahrain and several months in the mountains of the United Arab Emirates (then the Trucial States) and the Musandam Peninsula before beginning fieldwork in the Sultanate. He therefore had had the opportunity already to acquire a good working knowledge of Arabic both spoken and written and an acquaintance with the social and economic attitudes and conventions of the people of the region. Without such knowledge a survey of the type he attempted would have been impossible.

Until the present study no detailed field survey of fishing and fish marketing had been carried out in any part of Oman, and accurate statistics and other data on Omani fisheries (or indeed any part of the rural economy) were unavailable. Since the early 1970s the government of the

Sultanate has greatly extended the collection of economic and social data, though even now the coverage and accuracy of these data are decidedly limited, especially in the rural sector. No population census has been taken and even accurate, detailed large scale maps showing the names and locations of places have yet to be compiled. Such official and unofficial statistics on fisheries and related subjects as are available are discussed in this thesis, though accurate cross comparisons over time or between regions of the country, such as would be possible in, for example, many former colonial countries, are impossible in Oman.

Note on units of weight and measurement

Throughout the field survey, dimensions and quantities when given verbally were recorded in the units in which they were quoted by respondents. Although Oman officially adopted the metric system in the early 1970s, traditional Omani weights and measures are still used extensively throughout the country. Details of these local units are given by the present author in Durham Oman Project Reports 1978 Vol. VI pp. 137-145. In the context of fishing the most common units of length are the ba‘ (approximately 1.8m or one fathom) and the dhira‘ (about 40-45 cm). Both are used of dimensions of nets and lengths of rope, and the ba‘ is in addition employed to measure depths of sea. On the Batina coast of northern Oman the most common unit of weight is the mann Muscat (just over 4 kg.).

In this thesis such units have been converted to their

approximate metric equivalents. It has been found more convenient however to discuss quantities of fuel and oil in imperial gallons (mainly in Chapter Seven), since until the summer of 1976 these commodities were still sold officially in gallons. Otherwise the metric system has been employed throughout.

Note on units of currency

Omani prices are quoted in Riyals Omani (RO) and baisas (RO 1 = 1,000 baisas), the official units of currency since 1971. In the 1960s the Riyal Omani was called the Riyal Saʿidi (RS) which was equivalent at that time to two silver Maria Theresa Thalers (MTT). The Maria Theresa Thaler (locally, qirsh) and the silver Indian rupee (R; locally, rubiya) were previously officially accepted coins, though their mutual exchange rates fluctuated. Prices for older boats especially were generally quoted in Maria Theresa Thalers or rupees. Goods bought now in the U.A.E. are spoken of in terms of Dirhams (Dh), the present U.A.E. currency the value of which was based on the silver rupee. The Dirham-Riyal exchange rate remained constant throughout the survey period.

For simplicity all prices derived from respondents which were quoted in these currencies have been converted to Riyals Omani at the following rates:

MTT 2 = RS 1 = RO 1; and R 1 = Dh 1 = RO 0.0875

The sterling exchange rates during the survey period were as follows:

£1 = RO 0.805 in December 1974
£1 = RO 0.700 in December 1975
£1 = RO 0.615 in August 1976.

Note on the transliteration of Arabic terms

As few Arabic words as possible have been used in this thesis, though proper nouns and specialised terms for which there is no convenient English equivalent are unavoidable. They have been transliterated into Roman characters in the text in accordance with a simplified version of the system used in Wehr and Cowan's (1971) Dictionary of Modern Written Arabic. A fuller transliteration of local Arabic terms is to be found in several of the appendices. The present modifications of the Wehr-Cowan system are considered necessary in the text for ease of typing and reading, and are as follows:

1. Place names and names of persons which have acceptable anglicised forms:
   e.g. Muscat for Masqaṭ (مسقط)
   Sohar for Ṣuḥār (صحار)
   Dhofar for Ẓufār (ظفار)
2. Omission of the distinction between long and short vowels:
   e.g. Bahla for Bahlā (بهلا)
   huri for hūrī (هورى)
3. Omission of all subscript marks and simplification of certain letters:
   dh for ḏ (ذ), ḍ (ض) and ẓ (ظ)
   gh for ḡ (غ)
   h for h (ه) and ḥ (ح)
   kh for ḵ (خ)
   s for s (س) and ṣ (ص)
   sh for š (ش)
   t for t (ت) and ṭ (ط)
   th for ṯ (ث)

4. Omission of the definite article and of tā' marbūṭa (ة), except when in compounds (i.e. the Construct Case), when they are written "al-" (whatever the case and the succeeding letter) and "t" respectively:
   e.g. Qasbiya for al-Qaṣbīya
   Hawasina for al-Ḥawāsina
   but: Qasbiyat al-Hawasina

5. Omission of the letter ʿayn (ع) when it is initial. Elsewhere it is written ʿ. Hamza (ء) is written ' when medial or final.

6. Quotations from writings by other authors, when the transliteration of Arabic names and terms is kept as in the original.

Plurals of Arabic terms are written in anglicised form (by the addition of "s" or "es" to the singular), except in the case of the term shasha which is written in its usual Omani plural form of shash.

Deviant characteristics of Omani pronunciation (e.g. "aw" as "o"; "j" as "g" or "y") are not as a rule shown.

PART I

Development, fisheries and the case of Oman.

CHAPTER ONE

Development in theory and practice : points at issue.

CHAPTER ONE

Development in theory and practice: points at issue

1.1 Introduction

Since the late 1940s there has appeared a large body of literature produced by both theoreticians and practitioners in the development field. This and the widely varying list of examples of projects in action in what have been termed the 'undeveloped', 'underdeveloped' or 'developing' countries reveal considerable shifts in emphasis over time and the emergence of differences of opinion over what constitutes the 'correct policy' for development. Much of this controversy stems from different definitions of the nature and aims of development. This is unavoidable since the term is necessarily value charged, as for example D.M. Smith (1977 pp. 201 *et seq.*) has shown. Attitudes to it depend on political, moral, cultural and ethical standpoints, though this has not always been admitted. If there is little agreement about nature and aims, there is naturally even less about means, since practical strategies and solutions depend on one's perception of the nature of the problem.

A full discussion of the nature and means of development is necessarily well beyond the scope of this present work. It has in any case been tackled extensively by others: among recent geographical contributions to the field can be mentioned particularly those of H. Brookfield (1975) and D.M. Smith (1977). Probably the only universally valid generalisations that can be made about development in the Third World context are, first, that it concerns changes of some

sort which improve people's lives (the meaning of 'improve' and the means of attaining improvement being deliberately left undefined at this stage); and secondly, that the attitudes of investigators from the already prosperous countries to both aims and means have in recent years become less ethnocentric than they formerly were.

However, as H. Leibenstein (1966) has rightly pointed out, rigorous examination of preconceptions is necessary if those concerned with development are to make any valuable contribution either to understanding development processes in developing countries or to prescribing suitable strategies which produce the desired results of development. Effective policy depends on theory firmly based in an understanding of the processes at work in Third World economies and societies. In the opinion of the present writer, much of the development theory worked out in the 1950s and 1960s failed both in explaining development processes and in suggesting effective practical policies in developing countries simply because it did not meet this requirement.

Before the question of fisheries development in Oman can be discussed, it is therefore necessary for the present writer to state at the outset his basic assumptions about development and the reasons for them. To the present writer there would seem to be three issues to be considered in the present context: first, that development is not merely a question of increasing material prosperity; second, that the means of achieving development must be appropriate for the society concerned; and third, that an appreciation of the mental attitudes of the population is crucial to understanding

development processes and to prescribing development measures. It is these three propositions that form the basis of the present author's approach to fisheries and their development in Oman, and against which the present study is to be set.

1.2 Growth and development

The first postulate, that achieving material prosperity alone does not constitute development, may at first sight seem unnecessary since all would agree (in theory at least) that social well-being is also important. The question however is rather whether material wealth can produce social well-being. Both theorists and practitioners in the field of development in Third World countries in the 1950s and 1960s, and even today, have tended to assume that it could: that in fact the growth of the economy of a Third World country was more or less synonymous with the development of that country. Increased aggregative growth was assumed to be capable of producing both material and social benefits for all the population and could in fact be used as a measure of them. Thus W.W. Rostow, one of the most influential proponents of this attitude, does not even mention the term 'development' as such, makes no distinction between 'economic growth' and 'economic progress', and says nothing of how material prosperity is distributed within a country (Rostow 1960). This notion, that increasing national economic growth produces for everyone, almost as a natural by-product, improved health, diet and housing and greater opportunities for education and employment as well as increased material possessions, has been extremely persuasive. Although its critics now have the upper hand in academic circles, its influence on those who

are actively involved in the formulation and execution of development in the Third World countries (that is, governments and their advisers, and national and international business interests) is still strong. It is interesting to note, for example, the continued importance given to indices of rise in aggregate national and domestic product as measures of development.

As early as the late 1950s the economist G.M. Myrdal came to realise (and he seems to have been the first to do so) that growth policy, far from promoting development for Third World populations, was actually widening the gulf between rich and poor countries and also between rich and poor people within the poor countries (Myrdal 1957). With mounting field evidence, numerous social scientists involved in the developing countries have since then come to the same conclusion. H. Brookfield (1975 pp. 46-50) points out for example that during the United Nations First Development Decade (1961-1970) Latin American reached its growth targets in terms of aggregative gross national product per capita as a result of foreign aid and investment, despite the increase in population over the same period, but that nevertheless income inequality widened and unemployment remained high. The United Nations recognised the imperfections of its growth-based guidelines and in its Second Development Decade (1971-1980) has concentrated attention more on income and welfare distribution. Nevertheless growth targets remain and growth is still envisaged as the engine by which development for all may be achieved (Brookfield 1975 pp. 50-51).

Reviewing various government development schemes in

Africa, U. Lele similarly shows that "on the whole they have been less than fully effective in making the process of development of the low-income sector self-sustaining" (Lele 1975 p. 176). More generally, she is of the opinion that "contrary to much of the conventional wisdom, which assumed that growth would lead to greater participation of this [rural] segment of the population in development, increased productivity in the already commercialized rural subsectors has had relatively little effect on the living standards of these low-income masses" (Lele 1976 p. 8).

E. Schumacher (1973 especially Ch. 2) has criticised growth theorists not only on the empirical ground that growth has not produced development for most of the population of the Third World, but also more fundamentally: that ever increasing growth is a logical absurdity in a finite world. He argues that if true development is required, then development should be the aim, irrespective of whether growth accompanies it or not. E.J. Mishan joins him in this:

> "Economic growth is neither necessary not sufficient for the growth of social welfare; indeed, we must be prepared to discover that further pursuit of economic growth is inimical to the good life we aspire to" (Mishan 1977 p.17).

Mishan is concerned here principally with "questioning the desirability of further economic growth in already prosperous countries" (1977 p.27), and he acknowledges that in countries of the Third World continued economic growth may be necessary to meet the population's aspirations for increased social as well as material well-being. However, as he convincingly demonstrates, growth for growth's sake in the experience of

the already prosperous countries has not always necessarily increased either, and indeed heably points out that a large measure of what has traditionally been taken to be growth (and therefore assumed by many to be 'good') has in fact been necessary merely to overcome the problems which growth itself has created and to provide for social and material needs which were often met more fully by the traditional society. In this respect the experience of the already developed countries surely has lessons for the Third World.

It is the view of the present writer therefore that increased material benefit is insufficient for development. Any theory which concentrates attention solely on material growth will prove useful neither in understanding development processes nor in suggesting strategies whereby development might be achieved. In the Third World growth may be necessary for development, but it is certainly insufficient on its own.

1.3 Modernisation, Westernisation and appropriateness

The second postulate concerns the appropriateness of policies and innovative technologies by which development may be achieved. In the dominant growth theories, the underlying assumption is that the already developed countries, and in particular those of the West, serve as the best, possibly the only, model of development for the Third World. That is to say, development is conceived of as a linear process in which there can be only one 'correct' path forward for the developing countries. In the words of a Marxist critic of this Western approach, "Development becomes a question of how '<u>we</u>' (the bearers of 'modernity') can make <u>them</u> more like <u>us</u>" (Foster-Carter 1974 p.81).

Growth is to be accomplished by rapid industrialisation, since modern capital intensive industry is regarded as more productive than the traditional agricultural sector. Relying on W.A. Lewis's (1954) model of industrial development, it is envisaged that labour for the modern industrial sector would be drawn from the underemployed rural population, and this would benefit the rural sector too both by increasing its marginal productivity and also by the transfer of more productive technology. With increasing productivity and a rising economic growth rate, first in the modern industrial sector and then in the agricultural sector, prosperity would gradually encompass the whole country. In S.N. Eisenstadt's terms, modernisation starts with the urban elite and spreads gradually to the broader masses of the periphery (Eisenstadt 1966 pp. 114-117).

Details of optimum industrialisation strategies have varied from one economist to another: for example, R. Nurkse's 'balanced growth' strategy and A.O. Hirschman's opposing plea for 'unbalanced growth' (Nurkse 1953; Hirschman 1958; Myint 1960) caused considerable controversy in the 1960s. Nevertheless, theorists and practitioners were generally agreed in the 1950s and early 1960s that development and Westernisation were synonymous and that both were concerned fundamentally with economic growth. After all, in the words of D. Lerner, "modernisation appears as Westernization by historical coincidence" only (Lerner 1964 p. viii).

Studies such as that of R.E. Baldwin (1966) have become increasingly abundant which indicate that the introduction of a modern industrial sector into a traditional economy does not

result in the supposed beneficial transfer of modern technology and increase in marginal productivity in the traditional sector. Baldwin shows that in Zambia between 1920 and 1960, no beneficial 'spread effect' was received by the traditional sector of the economy from the modern sector of mines and plantations.

The number of similar examples of the failure of modernisation theory in practice could be extended considerably if space were available. They have led J. Galtung (1977? p.20) to view the foreign 'expert', equipped with technically advanced knowledge, as being often 'directly dangerous', since he is blind to what is appropriate to meet the needs and aspirations of the population. E. Schumacher makes the question of appropriateness no less strongly: if a new economic activity is introduced which is not in tune with the recipient society, "it will remain a foreign body that cannot be integrated and will further exacerbate the problems of the dual economy" (Schumacher 1973 p.141).

A further criticism of much linear modernisation growth-based theory as applied to the Third World is the fact that the already prosperous countries are not stationary but are themselves advancing to ever high technologies and 'modernisation'. Since the gap between them and the Third World countries is still widening, it is absurd to suppose that the latter can ever 'catch up' by following the same stages of development as the modernisation theorists suppose is possible. As L. Currie has expressed it, technologically advanced societies "are also 'developing' or changing, so that we may be holding aloft as the goal to other developing countries a picture of vanishing civilizations" (Currie 1978 p.8).

In the view of the present writer, the concept of 'catching up', even if it were possible, is not what development is about, and is in fact a hindrance to effective interpretation and prescription. The problem is rather of identifying what the needs and aspirations of a society are and how they can be met most appropriately.

1.4 Mental attitudes and development

The third postulate is to do with mental attitudes found in developing societies in the Third World, and concerns specifically people's attitudes to innovations and enterprise. It is generally alleged by growth and modernisation theorists that indigenous populations of the Third World are very unwilling to adopt innovative technology. The notion is expressed by E.M. Rogers thus:

> "Peasants generally do not react to new ideas with a positive attitude... The tendency for villagers to follow the prescribed ways of their ancestors may be attributed to their lack of knowledge about available alternatives. However, even when innovations in agricultural production, health and marketing are presented to subsistence farmers, their record of adoption has seldom been enthusiastic...His life pattern inclines the peasant to follow those ways he knows will produce positive, even though small-scale, results rather than to try a new idea that might end in failure and thereby endanger his existence" (Rogers 1969 p.31).

Rogers believes therefore that it is not merely the lack of knowledge that prevents peasant farmers from adopting innovations, but rather an obstinate clinging to traditional

practices and a reluctance to take risks.

This view has been echoed widely. Y.A. Sayigh, for example, says much the same thing of the Arabs of the Arabian Peninsula: "The degree of acceptance of new ways of doing things, of new technology... is very low, and this is all the truer the further one gets from trading centres and from the oil sector" (Sayigh 1971 p. 288). In other words, those furthest from the modernising influence, and who therefore are assumed to need modernity most, are also the most resistant to change. This alleged circumstance constitutes part of the 'formidable obstacle' that Lerner sees in the way of modernisation (Lerner 1964 p. ix).

A related constraint on development, as viewed by modernisers, is the supposed lack of entrepreneurs in Third World countries. The role of entrepreneurs in introducing innovations was rightly regarded by J.A. Schumpeter (1934) as crucial in the development process (see also Brookfield 1975 pp. 88-89). To make up for the alleged lack of indigenous entrepreneurs in the Third World, modernisers have proposed that overall government planning and investment can fill the gap (Myint 1960). This would then introduce artificially from above, so to speak, the required modernisation of production, and its spread over the whole economy would be hastened to the benefit of all.

T.W. Schultz (1964) and P. Hill (1966), both economists, were among the first to criticise these assumptions and have been followed increasingly by social scientists of other disciplines. Schultz states his stance quite clearly:

"The notion that all farmers [in the Third World] are

> handcuffed by tradition, making it impossible for them to modernize agriculture, belongs to the realm of myth" (Schultz 1964 p. 162).

M. Tiffen, who has studied the farmers of Gombe, Northern Nigeria, would surely agree with Schultz. She writes:

> "The most important agent of development in Gombe Emirate has been the characteristics of its farmers. They have proved to be enterprising men who, within the limits imposed by their resources and their knowledge, have been willing to grow new crops, to invest in new inputs, and to work harder to secure future benefits" (Tiffen 1976 p. 165).

Further, it would appear that local rural development which is dependent on entrepreneurial activity and on acceptance by the population of new ideas and technologies can occur irrespective of the political outlook of the regime under which a country is governed (cf. Morawetz 1977 p.13; Brookfield 1975 p.89). Indeed, in a sympathetic review of Maoist China, J. Gray shows clearly that Maoist development "must depend to a considerable extent on the fostering of entrepreneurial abilities, albeit in a context of collectivized communities" (Gray 1974 p. 39), and according to him such entrepreneurial abilities were not lacking.

In the opinion of the present writer, supporters of the modernisation thesis have interpreted the rejection of certain innovative technology by populations of Third World countries as unwillingness to change, and thus in the words of D. Lerner, as "a formidable obstacle to modernization" (1964 p.ix), only because they have not understood, or have misunderstood, the

nature of the needs, aspirations and potentialities of those populations. There is now available however convincing evidence to show that innovations will be taken up by entrepreneurs and by the population at large, provided that they are seen by the population to meet material and social needs and aspirations and are in tune with the social conditions of the society in question.

1.5 Justification and general objective of the present study

These then are the main premises on which the present writer bases his approach. It is the general objective of the present study to investigate the fisheries of the northern part of the Sultanate of Oman in the light of these. Given that material growth is not the only aspect of development, and that innovation must be appropriate if it is to be effective and acceptable, the northern Omani fishery will be investigated from the points of view, first, of what is appropriate for its development, and second, of how ready for change are the fishermen, fish traders and others involved in it.

The investigation is a small-scale study and many of its aspects are specific to Oman and to the fisheries in Oman. Nevertheless, if Hill (1966), Tiffen (1976) and others who in the last two decades have carried out small-scale intensive field research from within indigeneous societies are correct, then such enquiries are not only justified in their own right, but are essential if high-level planning decisions and policies are to be effective in a much broader context. In Tiffen's words, "we can discover many of the factors influencing national patterns of development [in developing countries] only by close study of particular areas" (Tiffen 1976 p.1).

In this the role of the geographer is potentially particularly helpful, and indeed some would say crucial. As B.W. Hodder (1968 p.231) has rightly pointed out, it is very misleading to think of the Third World as a single homogenous unit separate from and opposing the developed countries. Even dividing the Third World into its national political units is insufficient for most purposes, whether practical or theoretical, since within national units, spatial (as well as social and economic) differences and interactions are generally so marked that national aggregative statistics, to which orthodox economists of especially the growth and modernisation school are so addicted and on which they have relied so heavily, become almost meaningless and are often indeed misleading when prescriptive policies are drawn up. Even in a relatively small country such as Oman single national aggregative statistics (even if these were accurately available) are rendered of little meaning and of less practical value by spatial differences alone: it will be shown in this present thesis that differences and interactions not only between regions within Oman, but even between localities within a single region, are large enough to warrant attention and to have implications for fisheries development policy.

Despite the importance of their potential contribution, geographers were relatively late in entering the field of development theory and tended for long in their published work at least to draw their basic assumptions about diffusion of innovations, industrialisation strategy and investment attitudes from other social sciences, notably economics (cf. Mountjoy (ed.) 1971 p.14). D.J. Dwyer (1977 p.325) sees the main reason for this in the emphasis given by geographers in the 1960s to quantifiable methodology: aspects of the developing countries

which could not be quantified or for which statistics were not available tended conveniently to be ignored, even though in the Third World these very aspects might well be of more significance in development than those which can be counted and measured using techniques based on experience in the already developed countries (cf. Hill's (1966) plea for a redirection of the same type in economics). Within this present decade geographers have come more and more to appreciate this point (see, for example, Smith 1974; Smith 1977; Connell 1971). M. Chapman (1969) indeed has seen geographers as particularly well equipped to provide a contribution to development studies by being able to view situations from other than a Euro-American standpoint.

It is perhaps directly because of the former lack of detailed studies in developing areas that modernisation theorists have drawn wrong conclusions about innovative capability and other aspects of indigenous societies. In the late 1960s, Hodder complained of the "paucity of ideas and case-study material" from tropical countries without which theories of development cannot be tested (Hodder 1968 p. 236). Many more case-studies from tropical and other Third World countries have become available in the last decade from geographers and others and their force has been largely to discredit many of the assumptions of modernisation theorists. Nevertheless, so persuasive have been the arguments of Rostow and others that Third World governments and their advisors are still unduly influenced by them, and their development policies are consequently too often at best ineffective and at worst wasteful and divisive. Further detailed case-studies are therefore essential not only to strengthen the weight of evidence in favour of a

rethinking of development theory, but also to point to strategies of practical policy in specific contexts. Fisheries development in the Sultanate of Oman is one such context.

CHAPTER TWO

Fisheries and the case of Oman.

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2.1 Introduction: the Sultanate of Oman

The Sultanate of Oman occupies the southeastern part of the Arabian Peninsula between the Straits of Hormuz in the north and the border with the Hadhramaut in the south. Its coastline, of almost 1,700 kilometres, therefore borders for part of its length on the Arabian Sea Upwelling, the belt in which cold, nutrient rich water is brought to the surface from the depths, and this feature makes the area the richest fishing grounds of any coast of the Peninsula (see Wyrtki 1971; Zeitzschel 1973; Currie et al. 1973).

The Sultanate like most of the Peninsula is mainly desert or semi-desert with temperatures which frequently exceed 40°C in the summer. Except in the extreme south in the coastal mountains of Dhofar Province which receive the summer monsoon, rainfall is spasmodic and very low. The country is very sparsely populated. In area it covers some 300,000 square kilometres, and although there has been no complete population census, the size of the present population can be placed at not more than 700,000. (The Whitehead Survey (1972) put the figure at 450,000, well below the official government estimate for planning purposes of 1.5 million (Statistical Yearbook 1976), which is however much too high (Townsend 1977 pp.17-18)).

The large majority of the population lives in the northern quarter of the country - in the Capital Area of Muscat-Mutrah-Ruwi, on the Batina coastal plain, and in the oases of the Hajar Mountains, the Sharqiya and the Interior foothills and

plains. The Batina and its seaward wadis probably account for some 200,000 people. A small proportion of the population live in Dhofar around Salala and in the mountains behind. The area between Dhofar and the north, which amounts to over half the total, is very sparsely inhabited indeed. Most of the population of Oman is settled, though the nomadic or semi-nomadic population is by no means unimportant, especially in the Interior.

Most of the population of the Batina lives on or near the coast. A string of linear settlements is built on the almost unbroken line of low coastal dunes between the sea and the cultivated strip of predominantly date-palm gardens. Other settlements lie among the date gardens and just inland of them, notably in the Sohar-Liwa area and around Musan'a, while the Batina plain proper and in particular the foothills of the Western Hajar Mountains are dotted here and there with oases of cultivation and settlement. Although these inland settlements are of significance in the marketing of fish, it is those on the very coast between the date gardens and the sea which are inhabited by the fishermen.

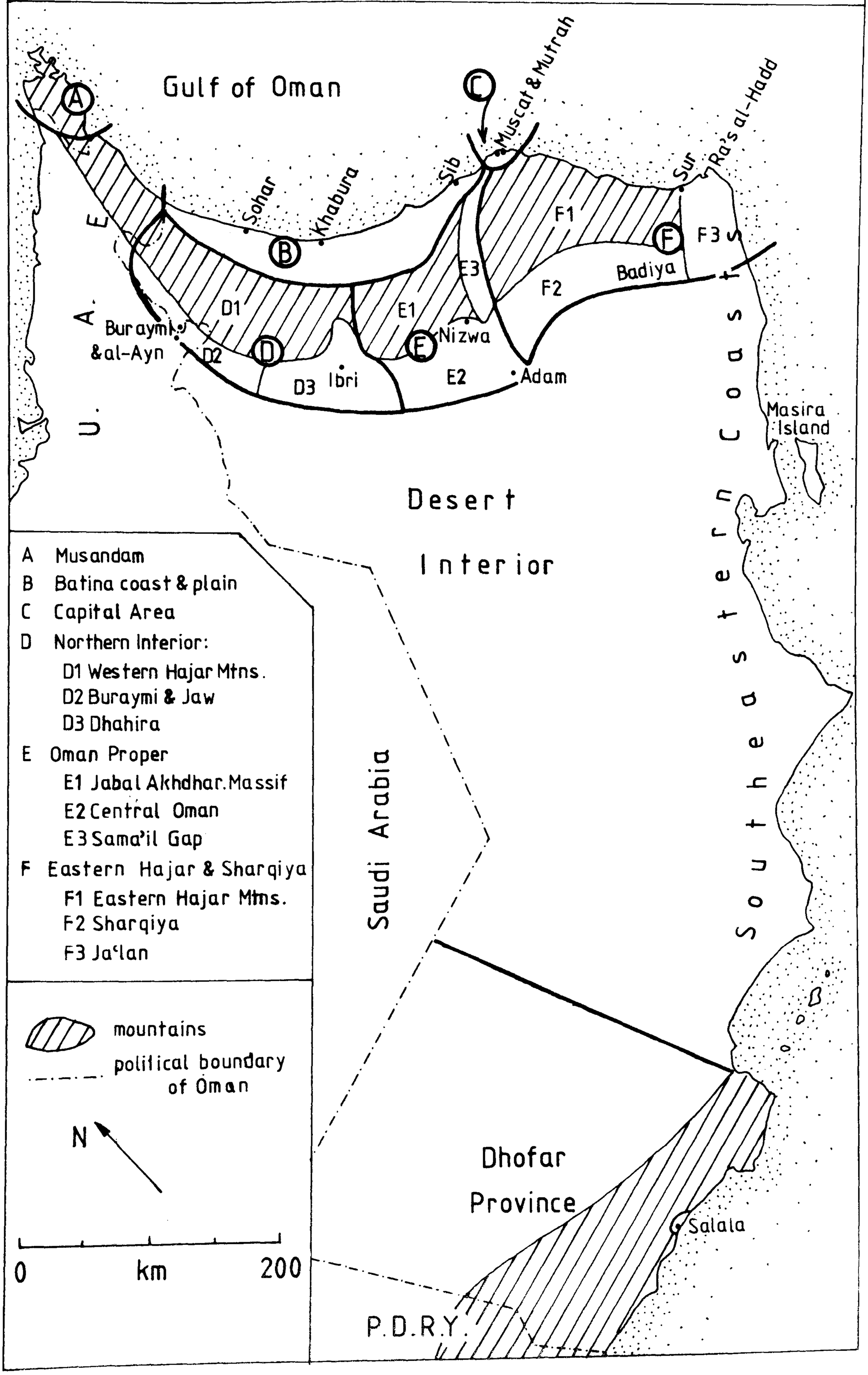
The distance of the settlements from the date gardens varies considerably. On many stretches of the central Batina in particular, the palms begin only a few metres from the high tide mark and the fishing settlements are surrounded by the gardens. In other areas, stretches of saline soils or sand dunes separate the shore settlements from the gardens. To the west of Musan'a for example, Wudam and Uwayd, both of which are built on the shore, are separated from the gardens by a two kilometre wide embayment of saline soils, while eastward of Musan'a a wide tract of dunes isolates the settlement of Suwadi from the gardens by about four kilometres.

Regionality is pronounced in Oman and in most cases local regional names (or translations of them) have been used throughout this present thesis. These names together with other important locations are shown in Figure 2.1. Of particular significance, both historically and at the present time, is the distinction between the Capital Area and the Batina Coast on the one hand (historically called 'Muscat') and the Hajar Mountains and the Interior on the other hand ('Oman'). This distinction was recognised until 1970 in the former official name of the country: 'the Sultanate of Muscat and Oman'.

For the purposes of local administration, Oman has been traditionally organised into regional 'governorates' called wilayas, each of which is under the control of a wali appointed by Muscat. At present there are forty-one wilayas including the wilaya of the province of Dhofar, and in addition the joint wilaya of the Capital Area and Sib. Since the early 1970s a further form of local government has been established in some of the larger settlements to work alongside the walis. These are 'municipal councils' or baladiyas, membership of which is appointed. The baladiyas have so far been concerned mainly with refuse collection and with market administration in the settlements for which they have responsibility.

The history of Oman has been covered in detail by several writers. Badger (1871) and Lorimer (1908-15) are classic works of reference, and more recently others have summarised the country's history: see for example Townsend (1977); while a large number of publications of varying merit have appeared in recent years discussing social, economic and political questions of Oman generally (see for example Bouquerel (1977), El Mallakh

Figure 2-1 The Sultanate of Oman : main regions and locations



(1972), Scholz (1977)). A short resume of significant aspects of the country's recent history is all that is required here.

It is more than 200 years since the present ruling dynasty of Al Bu Sa'id came to power by removing Persian domination of the country. During this period three dates stand out as being of particular significance in the development of present day Oman. These are 1856, 1967 and 1970. In 1856 the ruler Sayyid Sa'id bin Sultan, often called Sa'id the Great, died and Oman began a decline which was to last for over a century. Sa'id's empire, for Oman could be called such at that time, had grown during the previous 150 years, and especially during his ownfifty-two year reign, to incorporate much of the coast of East Africa, including in particular Zanzibar, and parts of the Persian coast, while trading links with India and further east were already long established. This reflects the outward looking nature of the Oman of that period. On Sa'id's death however the empire was divided between two of his sons, one of whom ruled the East African province from Zanzibar, while the other was left with Metropolitan Oman, ruling from Muscat. At the insistence of Great Britain with whom Oman (and the Arabian Gulf shaykhdoms) concluded defence treaties in the nineteenth century, Oman was forced to give up slave trading on which much of its prosperity had been built, and this probably contributed to Metropolitan Oman's decline during the second half of the nineteenth century. It is nevertheless evident that the amputation of its East African provinces was the fundamental cause of the Omani Sultanate's demise, and resulted in more than a century of economic, political and social stagnation during which its only major exports of dried dates, cured fish and, from about 1900, dried limes were insufficient to keep successive sultans out of

debt.

The year 1967 saw the beginning of the end to this period of Oman's history. After a long and difficult search, petroleum in commercially exploitable quantities was at last found in Oman near Fahud in the northern desert Interior by the oil consortium Petroleum Development (Oman) Ltd. A pipeline was built from Fahud to the coast near Muscat using the Sama'il Gap through the mountains, and exports began in August 1967. For the first time for over a century Oman's income exceeded its expenditure, and then by a considerable amount.

It was not until 1970 however that oil revenues began to be invested on a large scale for the development of the country. In July of that year Sultan Sa'id bin Taymur, who had ruled since 1932 like a mediaeval despot, was ousted from power and replaced by his Sandhurst educated son Qabus. It is from the accession of Sultan Qabus that a new era in the history of Oman began.

Under Sa'id bin Taymur no innovations in the life or work of the Omani population were permitted, and consequently all mechanical devices which were not traditional (including motors of all kinds) were not allowed into the country (except for the use of the sultan and his army and the petroleum company, though a slight concession was made about 1963 to enable fishermen to buy small outboard marine engines). All such restrictions were swept away in 1970. Other restrictive conditions were removed at the same time, including the complicated and onerous government taxes on market sales, fishing craft and other aspects of the rural economy.

Sa'id bin Taymur's determination to preserve traditional practices and to exclude foreign influences from the Sultanate

was entirely successful in a material sense. However he was unable to prevent changes taking place in neighbouring countries, particularly in the Gulf states. Starting with Bahrain in the 1930s, one by one the Gulf states - Kuwait, Saudi Arabia, Qatar, and then Abu Dhabi and Dubai by the mid 1960s - were transformed by the changes that oil exporting brought. Pressure on Oman to change similarly had become strong by 1970.

Although no development was permitted at home during Sa'id bin Taymur's reign, Omanis were to a large extent aware of what was taking place in neighbouring countries, and specifically what achievements were possible with the use of oil revenues. This was so since for many decades Omani men had worked as pendular migrants in the Gulf states, first seasonally as pearl fishers in Bahrain and the Trucial States, and then more numerously and extensively either in the developing industries of the oil related boom or else in traditional industries whose original workers had been drawn away by the prospect of an easier living elsewhere in the economy. When therefore the change of ruler and the new spirit thus engendered came in 1970, Omanis were to a large extent already prepared to accept change, and indeed to become agents of it.

There has been in addition a second Omani migration which has also assisted the process and speed of development since 1970. This consists of the return of Arabs of Zanzibar and East Africa whose parents or forebears had migrated there from Metropolitan Oman in search of a better life. The independence of Tanganyika in 1961, the overthrow of the Arab sultan in Zanzibar and the incorporation of that country into Tanzania in 1964, the discovery of oil in Oman, and the deposing of Sa'id bin Taymur, all combined to attract back to Oman these

'Zanzibaris', many of whom, having benefitted from the British colonial education system of East Africa, returned with high levels of skills and abilities. It has been on these that both the oil company and the newly erected civil service in Oman have heavily relied.

In terms of both income and proven reserves Oman is relatively poorly off compared with most of its oil producing neighbours. Nevertheless as far as revenue is concerned there can be no doubt that, since 1967 and especially since the oil price rises in 1973, the Sultanate has very definitely been an 'oil state': oil accounts for some ninety-nine per cent of its recorded exports by value according to the country's official figures - RO 454.7 million for oil out of a total of RO 456.1 million in 1976 (Statistical Yearbook 1976). Of the non-oil exports, dried limes constitute the largest part (again by value). Even if the non-oil exports are underrecorded (as is virtually certain in the case of at least limes - see Durham Oman Project Reports 1978 Volume VI), they are still to be measured in terms of only a few millions of riyals compared with the hundreds of millions of riyals for oil. When viewed in this light, the task of replacing oil as the source of revenue appears great. Nevertheless this must be done soon, since Oman's oil reserves are decidedly limited, and at present rates of production proven deposits will be exhausted before the end of the century.

Important as oil is to the economy of Oman as a source of revenue, it is of much less significance as an employer of labour: only 5,700 Omanis were directly employed in the petroleum and mineral sector of the economy in 1975 (Statistical Yearbook 1976). A large proportion of these are men skilled in

modern industrial techniques, but in relation to the total Omani workforce they form numerically only a tiny part. Even if the whole of the modern sector is added, and also the civil service, the police and the armed forces (since all these jobs depend to a large degree directly or indirectly on the oil income), it is unlikely that more than one-eighth of the total Omani adult workforce would be accounted for. Since no population census has yet been carried out in Oman and since published employment records are only estimates, accurate data to support this are not available. Even so, it can reasonably be judged from such information as is available that by far the majority of the Omani working population are in what has conventionally been called the traditional (as opposed to the modern) sector.

The two sectors are largely locationally separate: the modern sector is concentrated almost wholly in the Capital Area and at the oil bases, whereas the traditional sector is distributed throughout the country. A major issue in Omani development therefore is not merely one of sectors but one of spaces. The so-called traditional sector consists of agriculture, which in northern Oman is more extensive than in any other part of eastern Arabia, and a number of other rural occupations which have an importance out of all proportion to the numbers of people engaged in them. These include shopkeeping and trading, various local crafts (in particular metal working), and fishing and fish marketing.

2.2 Fisheries and development

Several terms have been used to identify the 'non-modern' sector of a fishing industry. The term 'traditional' is not

ideal and is generally out of favour in the literature at present, with good reason. Over the decades and centuries fisheries change under a variety of both internal and external socio-economic forces, and the identification of what is traditional and what is innovative is largely an academic question of little practical value. Even in Oman where major development was artificially halted for a century, certain economic and technical changes occurred even before 1970 as will be seen, while the changes that have taken place since that year have been very great indeed. Instead, the term 'small-scale' has recently assumed dominance in the literature (see for example Day 1976) and has much to commend it since it focusses on the scale of the operating units, drawing a contrast between these and the large capital intensive units of industrial fisheries. For the present writer however the term 'artisanal' is to be preferred since it stresses the importance of human skills which are already invested in that sector, and it is readily understood by those concerned with fisheries development. The fact that artisanal fisheries, as opposed to industrial fisheries, are generally composed of small-scale units which are labour intensive rather than capital intensive is subsumed in the term, and yet it does not preclude or obscure the possibility that some of those units may eventually grow in size under their own initiative.

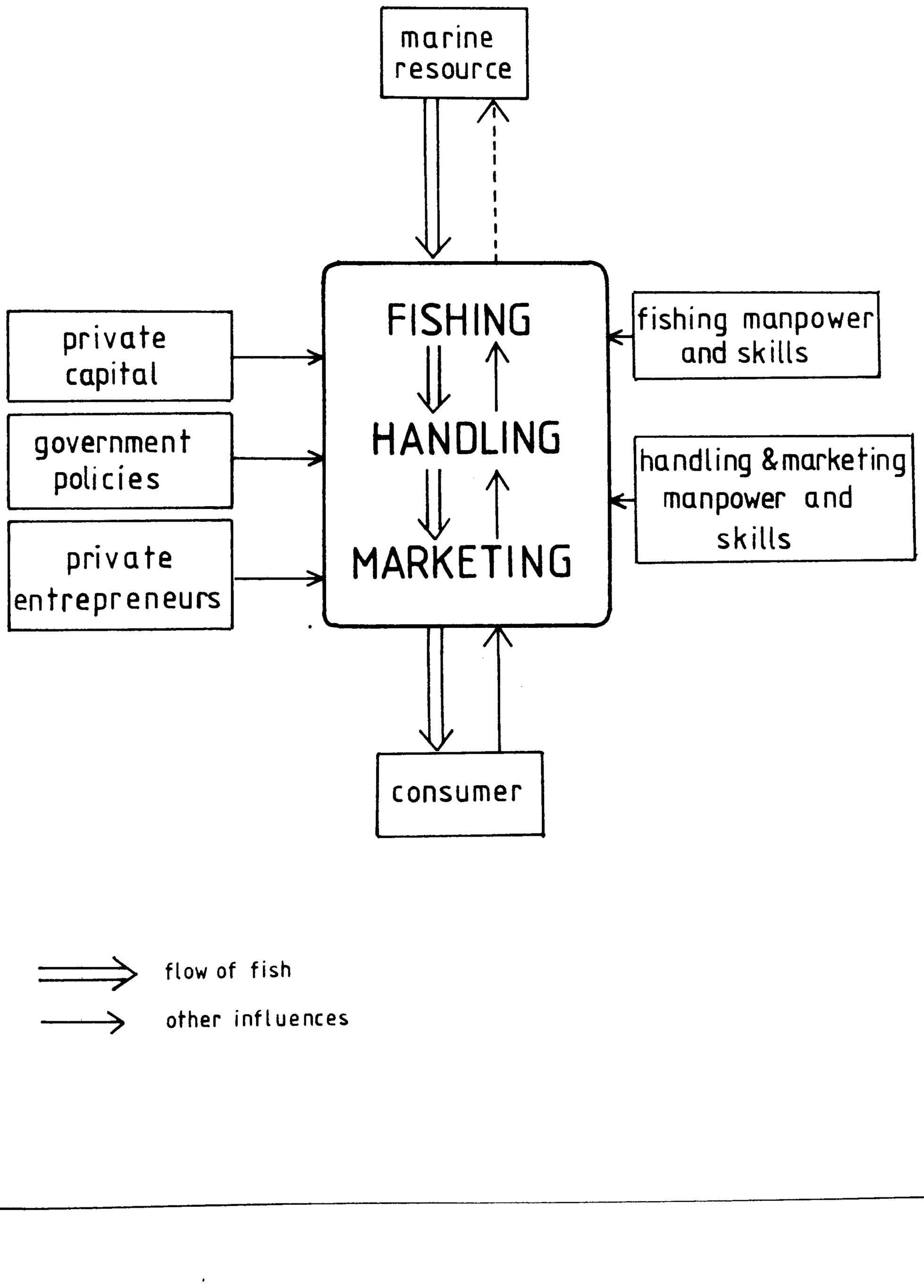
It is the artisanal fishery which is the primary concern of this thesis since, in the 1970s, industrial fishing has yet to make a significantly large contribution in Oman and the artisanal fishery is the dominant form in terms of both production and manpower.

Figure 2.2 illustrates the mutual relationships of the main elements of and influences on a fishing industry. It seems to the present writer that the fishing, the handling and the marketing operations are so closely related that they must be considered together. For this reason the term 'fishery' (or 'fisheries') in this present work will be used to include all three elements and not merely the fish catching operation. As will be shown at several points in this thesis, a change in one of the three elements of the fishery will affect both of the other two in some way. Further, the level of efficiency of the fishery depends on the degree of equilibrium between these three elements.

In the present context of the western Indian Ocean, the marine resource can be taken as fixed but extremely large. It is true that some types of fishing, and particularly methods employed by industrial enterprises, can if intensive deplete stocks so much that permanent damage is done to the resource. In the case of the Omani coasts, it can be safely said that this is not an immediate danger. Conversely, fish stocks can be increased by the introduction of artificially reared fish fry into the sea. This however can be successful only on a small scale and preferably in a relatively enclosed area of water, and does not concern the case of Oman, at least at present. In the present context therefore the marine resource affects the fishery but is not affected by it.

The fishery is also acted on by a number of other forces which are to a greater or lesser degree outside the system. The most important of these are the availability of private capital and of entrepreneurs, the influence and degree of government action, and consumer demand. If any of these factors

Figure 2-2 Diagram to illustrate interrelationships within a fishery and influences acting on it



might be said to be prime in their importance it is undoubtedly the last mentioned, that is, the demand factor: without a demand for fish the raison d'être of the fishery disappears. (Compare Schumpeter's (1934) circular economy model in which the driving force which keeps production running is the consumer). The other factors, together with demand, become important when the fishery begins to develop.

Until recently general attitudes to artisanal fisheries have tended among fishery developers to reflect the notions of the modernisation theorists described in Chapter One. They are most noticeable in two points: first, the insistence that artisanal fishermen, like peasant farmers, or perhaps even more so, are backward in outlook and reluctant to adopt innovations; and second, the stress laid on aggregative size of production and on 'modern'ways of increasing that production to the relative exclusion of other aspects of fisheries development.

Gross generalisations and simplifications have frequently been made about fishermen's attitudes and motivations. Thus Kirby and Szczepanik for example in their paper which purports to deal with the problems of artisanal fisheries of all the less developed countries, confidently and baldly state that: "Fishermen in poor countries are heavily ridden by superstition, custom, convention and prejudices" (1957 p. 94). Whatever the truth of such statements in describing individual fishermen or even specific fishing communities, global generalisations of this nature are of little value in analysing and remedying specific problems at a local scale, and indeed must be suspect simply because of the great variety of socio-economic and physical environments in which fishermen in the Third World

live and work. In many cases indeed field studies show that conservatism and convention do not always prevail. R. Firth for example in his comprehensive study of Malay peasant fishermen shows that between his first fieldwork in 1940 and his return in 1963 many of the fishermen had spontaneously invested in marine motors for their fishing craft (Firth 1966 pp. 304 et seq.).

Other common notions about fishermen, for example that they are frequently in debt to merchants (which Kirby and Szczepanik see as a major evil afflicting artisanal fisheries), must be questioned for the same reason. As R. Lawson has shown in Ghana (Lawson and Kwei 1974) and southeast Asia (Lawson 1977a. and 1977b.), the relationship between fishermen and fish traders though close is seldom exploitative to the detriment of the fishermen, and must be well understood if any benefit is to materialise from the measures of the would-be developers.

Studies to promote the development of fisheries in the Third World, including some of the most recent, tend to begin by attempting to justify themselves on the ground of global production and global potential (for example Hart 1972; Lampe et al. 1974). Statements like the following are common: "We are facing a situation in which the prospects for increased exploitation of capture fishery resources are brightest in those areas of the world where the nutritional need and potential demand for fish are the greatest" (Lampe et al. 1974 p.7). This may well be so: the Third World countries may indeed (and probably do) share between them the greatest fishery resource as well as the greatest demand for fish. But such global statements are not very helpful in any practical sense, since regional variation is considerable (cf. Hodder 1968 p. 231), and

such generalisations can even be misleading. Even within a single country the potential fish resources can vary considerably along the coast: in India for example Panikkar (1969) points out the large difference in resource abundance between the east coast (relatively poor in fish) and the west coast (relatively rich). Similarly, demand and potential demand patterns also vary spatially. When the demand distribution and the supply distribution do not coincide the problem becomes one of how to move fish from the latter area to the former. Since several of the factors that influence supply distribution patterns are totally different in nature from those affecting demand patterns, any coincidence that may occur between areas of high supply and of high demand must be regarded as fortuitous, and it would seem more likely that the non-coincidence of such areas would be the usual case. As will be shown in later chapters, this particular problem is of great concern not only in Oman but in the Arabian Peninsula as a whole.

Further, fisheries studies which have been directed principally to the practical problem of how to develop a country's fishery (and these have been in the majority) have tended until very recently to concern themselves almost wholly with technological questions: the design and building of new larger types of boats, the introduction of new types of gear, the construction of ice plants and of new market facilities, and the introduction of refrigerated lorries. Their main object has been to increase fish production by modernising the industry - or rather, by replacing the existing artisanal fishery with a modern one. Once expanded and modernised, the fishery would contribute to the general economic growth of the country by providing increased fish production, with, ideally,

some for export, and, in addition, forward and backward linkages for other domestic industries. Socio-economic improvement for the fishermen and other members of the artisanal fishery could be assumed to follow. The problem has thus been conceived as basically one of technology, with the modernising solution bringing socio-economic benefits for all. This has underlain most fisheries development thinking since the 1950s. One early example from the many which could be quoted is Kirby and Szczepanik(1957), while Panikkar (1969) and more recently Chidambaram (1976) (both in India) show the same underlying assumptions.

There have however been a number of more critical studies which have questioned the assumption that a larger production of fish through improved technology will necessarily lead to an improvement in the living standards of those involved in the fishery. J. Galtung, for example, has shown convincingly that the Indo-Norwegian industrial fisheries project in Kerala (which began in the 1950s) was a complete failure as far as its main goal was concerned: to improve the living conditions of the coastal poor. The fish catch did indeed rise, but the standard of living of the fishermen did not, and there are indications that it even declined. Galtung concludes that "'Industrial fishing' as it is conceived of today does not in and by itself constitute a solution to the problem of the poor fishermen" (Galtung 1977? p. 20). Similarly, R. Lawson (1972) has shown that in southeast Asian fisheries fishermen have rarely benefitted from schemes to increase production by the introduction of modern methods and equipment. The inadequacy of the modernisation of technology approach is becoming increasingly apparent in fisheries development as in rural development generally (cf. Anon. (F.A.O.) 1972; Day 1976; Lawson 1977b), but as will later be seen in the case of

the Arabian Peninsula it still underlies much government thinking and policy making.

2.3 The potential importance of fisheries in Oman

The developmental potential of fisheries to a country was recognised as long as a century ago by G.L. Faber (1883 pp. 41-42) in his study of Adriatic fisheries which were then on the threshold of major development possibilities in a way analogous to those of Oman today. Much of what Faber says still holds true in the 1970s. There would appear to be prima facie several excellent economic reasons why the Sultanate of Oman should seek to develop its fisheries. In the first place the coasts of Oman, particularly the southeast coasts, are generally acknowledged to be an extremely rich fishing ground, and yet are at present underutilised. In the past Oman was an important exporter of cured fish, as will be shown in Chapter Three, and there is no reason in principle why it should not regain its position as an exporter of fish. Indeed within the next two decades when oil revenues will be much reduced, fisheries may offer an important potential contribution in the replacement of those revenues.

Fisheries in Oman have therefore the potential of contributing in a major way to the country's economy on a national scale. The social benefits on a more local scale which fisheries can potentially contribute to Omani development are in the opinion of the present writer equally important. In the absence of plentiful supplies of animal meat, the main source of protein for the majority of the population of Oman has for long been fish, either fresh at the coast or cured inland. Even

fish however is at present relatively expensive and this, coupled with other indicators, strongly suggests that the demand for fish is greater than the present supply. Since an increase in the well-being of the population as a whole should be the primary aim of any development, to seek to increase the fish supply for local (i.e. Omani) consumption would therefore seem to the present writer to take precedence over building up exports of fish before local demand is satisfied. The two are however not necessarily incompatible or mutually exclusive.

The point has already been made above that large scale, capital intensive industrialisation as conceived by modernisers has not been notably successful in improving living standards of the bulk of the population in Third World countries. In Oman both public and private capital available for investment is not at present in as short supply as in most of the developing world, thanks to the oil income. As a result, there is a greater temptation to think in terms of capital intensive projects, and this applies to fisheries as to other sectors of the economy. It will be discussed later (Chapter Twelve) how unsuccessful most of such investment in industrial fisheries in Oman and neighbouring countries has so far been.

The alternative is Oman's artisanal fishery and there are several prima facie reasons why the artisanal fishery should receive investigative attention as the potential primary basis for the country's fisheries development policy in preference to industrial fisheries, at least in the short to medium term. These will be investigated in this thesis. On the basis of the experience of fisheries development elsewhere the artisanal sector can potentially score in five ways.

First, an artisanal fishery is physically more flexible in that it can exploit certain fish resources more easily than an industrial fishery. As will be noted in Chapter Eight, the number of edible species available in Omani waters is very large and moreover many of the major species are markedly seasonal in their occurrence. Because of its small operating units an artisanal fishery has the prospect of coping with such great heterogeneity of fish types and with seasonality, whereas an industrial fishery can work most efficiently only where a limited number of species are involved which preferably occur throughout the year. Further, artisanal fishing can exploit areas too shallow or too broken by rocks and coves for industrial vessels and gear (cf. Cole 1977 p.133).

Second, an artisanal fishery is more likely to be responsive to local needs and social conditions since it has evolved over time as a result of those needs and conditions. An industrial fishery on the other hand must necessarily be an introduction from outside, and the risk of its being out of tune with local needs and conditions cannot wholly be eliminated by forward planning.

The third point in favour of supporting the artisanal sector concerns the utilisation of rural resources to the full. U. Lele (1975 and 1976) has stressed that in her experience in Africa and elsewhere real development for the rural masses relies on the full use of all rural resources. Y. Sayigh (1971) has warned against the tendency (in the Arabian oil states) to leave vital tasks to expatriates: in Oman the provision of fish for local consumption is a vital task. T.S. Schultz (1962) has emphasised the crucial importance to

development of investing in what he has called 'human capital'. M. Tiffen's (1976) conclusions from her study of farmers in northern Nigeria point to the advisability of fostering local enterprise. In short, there is a strong body of opinion among workers in the development field that investment should be made in local resources, and in particular local skills which already exist, where these are seen to be viable and show promise. In Oman, artisanal fishing and fish marketing arguably hold one such local resource in their skills and equipment.

Related to this is the question of rural employment. In Oman the social forces which tie men to their nature settlements and communities are still strong. Even though, as has been said above, most of the adult male population has at some time worked in the Gulf states, the tendency has been for them to return periodically to their home settlement in Oman, eventually for good. If however these social forces are to remain active and if permanent migrations to the Gulf states and to the Capital Area, with the consequent rural depopulation of the rest of Oman, are to be avoided, then there must also be economic reasons to enable the population to remain rural. That is to say, the rural population will remain rural only as long as there are means of livelihood to be found in the rural areas. Artisanal fisheries can potentially form one contribution to employment in the rural areas, not just in fishing at the coast, but also in fish handling and marketing in the Interior.

Finally, supporting artisanal fisheries has the advantage that in financial terms the cost of direct investment on the part of the government is very small compared with setting up industrial ventures.

The foregoing chapter and Chapter One have set out the main issues with which this present work is concerned and the broad context in which they are placed. Before the present fieldwork can be discussed it is necessary to review the state of the Omani fishery up to the time when the field-work was begun. This is the subject of the following chapter.

CHAPTER THREE

Omani fisheries in the historical context : tradition and transition.

CHAPTER THREE

Omani fisheries in the historical context : tradition and transition

Until recent years descriptions of fishing and fish marketing in Oman were fragmentary, scattered and rare. In early 1948, however, Dr. G.C.L. Bertram, an expert on Middle Eastern fisheries, was commissioned to report on the condition of the fisheries of the Sultanate, and his report (Bertram 1948) is the only detailed systematic and comprehensive account of Omani fisheries before the 1970s and the new regime. It is clear from the combined corpus of evidence that Bertram was reporting on a situation that had remained relatively unchanged for many centuries.

3.1 Pre-1948 references to Omani fisheries

Recent archaeological work indicates that fishing communities existed in Oman as early as the third millennium B.C. M. Tosi (1975 pp. 194-196) has found fish bones, mollusc shells and grooved stones (probably net weights) in and around an ancient shell mound at a site near Muscat which although as yet undated are associated with burial cairns similar to third millennium cairns elsewhere in Oman. A. Hastings *et al.* (1975 p. 14) have discovered evidence for a trade in at least shellfish (and probably other seafish) in seventeen third millennium sites throughout the Interior of the country.

The earliest written references to fishing in Oman and contiguous parts of the coast come from Greek sources, and in particular the voyage of Nearchus in the fourth century B.C. in Arrian's *Indica* (transl. Robson 1933), and the *Periplus of the Erythraean Sea* (transl. Schoff 1912) of about 60 A.D. Both

works call certain communities of the coasts of south and southeastern Arabia and the Gulf of Oman the Ichthyophagi, that is, the Fish-Eaters. Since it is by no means remarkable that coastal dwellers should eat fish, the fact that communities should be referred to specifically as 'fish-eaters' suggests that fishing was an outstandingly important aspect of their livelihood. Much later travellers have commented on the similarities of the classical descriptions of the fishing of the region with the situation they witnessed. Thus for example Sir A.T. Wilson (1928 p.20) compared Nearchus' Ichthyophagi of the Makran coast with the Shuhuh of Musandam in their primitive dependence on fish in the early twentieth century. A century earlier Lt. G.B. Kempthorne (1835 pp. 273-4) was struck by the similarity of the canoes he saw, which were often sewn with palm fibre string and propelled by paddles not oars, with those described by Nearchus (Arrian transl. Robson 1933 pp. 386-7; cf. Periplus transl. Schoff 1912 p.36). In Arrian's account Nearchus also described the catching of anchovies and sardines by castnet and a 'flour' made from ground dried fish, and seems to have been the first to record the practice of feeding animals with fish (Arrian transl. Robson 1933 pp. 382-3, 388-9, 392-3).

The earliest detailed descriptions of types and uses of fish in southern and southeastern Arabia were given by Marco Polo (Travels transl. Latham 1958 esp. pp. 68 and 309 ff) who visited the Hadhramaut and places further east on the coast in the late thirteenth century. His descriptions and comments, like those of Nearchus and the author of the Periplus, indicate that fish was a mainstay of life in the region. He provides in addition a number of important and interesting facts about fish and fish handling in his day. First, 'tunnies' (that is,

the tuna and tuna-like species) and sardines and anchovies were caught in considerable quantities. Secondly, seasonally variable catches could be utilised throughout the year by means of at least two methods of preservation, namely, by sun-drying and by salting. Sun-drying was carried out in the case of sardines which were then used as fodder for livestock, while a 'biscuit' of chopped, sun-dried fish (of unspecified type, but possibly shark) was made for human consumption. 'Tunnies' were cured by salting. Thirdly, in Hormuz at least, one by-product of fish was a type of oil (probably shark liver oil) which was used to preserve ships' timbers. Fourthly, fish formed a major item in the diet of the majority of the coastal population, though not for preference by those who could afford animal meat.

Certain mediaeval Arab geographers and travellers either themselves visited the southern and southeastern coasts of the Arabian Peninsula, or else described the area using the accounts of others. Among them were Ibn Battuta and Ibn Khaldun, both of whom testify that fish were plentiful and formed the staple of the population in the fourteenth century and that they were also used as fodder (Ibn Battuta transl. Gibb 1929 pp. 113 ff; Ibn Khaldun quoted by Schoff 1912 pp. 129-30). On the whole, however, Arab authorities of this period (like later Western accounts) generally record aspects of fisheries rarely and unsystematically, and then only when they differ markedly from those in their native areas.

In the 1760s C. Niebuhr visited Muscat and recorded either from personal observation or from informants that fish in Oman were so abundant and so easily caught that they were

used not only as fodder "but even as manure to the fields" (Travels transl. Heron 1792 vol. II p. 114). He too remarked at the similarity of the Arabs of the southern Persian coast with the Ichthyophagi of Classical times (ibid. p. 138).

In the nineteenth century Europeans began to penetrate Oman and record their experiences with greater frequency. At first, members of the Indian army and navy were particularly prominent. Their reports of the journeys they made frequently contain references to fish, fishing and fish trading. In 1828 for example Lt. G.B. Kempthorne followed Nearchus' route along the Persian coast. He noted that its inhabitants and those of Arabia subsisted largely on fish which they also fed to their animals (Kempthorne 1835 p.270), an observation repeated by Lt. F. Whitelock some ten years later. Whitelock also noted that fish off Khasab in Musandam, and especially mullet, kingfish and various 'rock fish', were caught in considerable quantities (Whitelock 1838 p.183). About the same time Lt.J.R. Wellsted listed among the port of Muscat's principal exports shark fins destined for China and salt fish (Wellsted 1837 p. 103). Similarly, Lt.Col. L. Pelly stressed the importance of the export of salt fish and also of pearls to the economy of what is now the coast of the United Arab Emirates (Pelly 1863 pp. 66-67). According to Pelly, the main export markets for the fish were Zanzibar and the East African coast on the one hand and the Malabar coast of India on the other.

An early account of the Batina coast was given in 1860 by W.M. Pengelley, the then British Agent at Muscat. He noted that although the mass of the people on the Batina subsisted solely on fish and dates, and that therefore the demand for fish

could be presumed to be high, fish was nevertheless "taken diurnally in the vicinity of the beach in such abundance as occasionally to exceed even the magnitude of the demand" (Pengelley 1860 p.31). He also gave what appears to be the earliest written description of the shasha, the palm-frond raft-boat which, as will be seen in later chapters, is so characteristic of the Batina (ibid p.32). His account rightly testifies to the great utility of this craft and its suitability to local conditions, particularly in that the fishermen can take it to sea in almost all weathers because of the considerable buoyancy of its materials and the flexibility of its construction.

The records of the British Persian Gulf Political Residency and the Muscat Political Agency provide valuable information on Omani fisheries towards the end of last century. In the Administration Report for 1880-1881 I.MacIvor gave a list of 337 fish names, the longest to have appeared at the time. He also put forward estimates of the numbers of boats and fishermen for the coasts of the Arabian Gulf and the Gulf of Oman (MacIvor 1880-81 pp. 54-77). These are given in Table 3.1. Of special note is the fact that MacIvor ascribed over half the estimated total of boats (3,500 out of 6,660) and two-thirds the total men (30,000 out of 46,380) to the stretch of coast between Ra's Musandam and Ra's al-Hadd, which is actually only about one-sixth of the total coastline with which he was dealing. It will later be argued that he over-estimated the numbers involved on this stretch of coast. Nevertheless, if his figures are at least internally consistent, by far the densest concentration of both fishing boats and fishermen in the

Table 3.1: Numbers of fishing boats and fishermen in the Arabian Gulf and Gulf of Oman, as estimated by MacIvor in 1880 - 1881.

	boats	men per boat	men
Ra's Musandam to Abu Dhabi	810	5	4,050
Abu Dhabi to Bahrain	400	4	1,600
Bahrain	250	5	1,250
Qatif to Kuwait	350	5	1,750
Kuwait to Bushire	220	5	1,100
Bushire to Daiyir	200	4	800
Daiyir to Linga	400	4	1,600
Linga to Bandar Abbas	350	5	1,750
Bandar Abbas to Gwadur	180	6	1,080
Men without boats including hadhra[1] fishermen			1,400
Total in Arabian Gulf and on Makran	3,160		16,380
Ra's Musandam to Ra's al-Hadd	3,500		30,000
Total in both Gulfs	6,660		46,380

Source : MacIvor 1880-81 p.76

(1) The hadhra is the fixed fence trap of horseshoe or arrow shape set between the high and low tide marks and still used extensively in the Arabian Gulf (e.g. at Bahrain and Kuwait), though not in Oman.

two gulfs was along the northeastern coast of the Sultanate which includes the Batina.

MacIvor then used his estimates of the numbers of fishermen as the basis for calculating the annual production of fish on the coasts of the two gulfs. He arrived at a figure of 56,160 tons per year for the Arabian Gulf and Makran coasts, and 'almost double' that quantity for the Ra's Musandam to Ra's al-Hadd section. The total production of the two gulfs as 'a very rough estimate' would be around 160,000 tons per year in his view. As will later be discussed, this estimate also is probably rather too high.

In 1908 and 1915 appeared the two volumes of J.G. Lorimer's classic Gazetteer of the Persian Gulf, 'Oman and Central Arabia. On the subject of fisheries he refers the reader back to MacIvor's 1880-81 report for detailed information, and summarises much of what had been written before by several sources (Lorimer 1908-15 Part II pp. 2308-2318). His main points are as follows : that fish of various kinds were very plentiful off the Omani coasts; that the surpluses (which were common) were preserved either by sun-drying (sardines and anchovies) or by salting (tuna and kingfish); that sardines and anchovies were commonly used as animal fodder and as fertiliser; that shark oil was used to preserve boats; and that cured kingfish and shark fins were exported, the former to Mauritius and India and the latter to China.

Although post-dating Lorimer's Gazetteer in publication, Col. S. B. Miles'extensive work, The Countries and Tribes of the Persian Gulf, published posthumously in 1919, is based almost entirely on the author's personal knowledge of eastern Arabia

derived some three to four decades earlier when he served as British Political Agent and Consul in Muscat (Kelly 1966 pp. 14-15; see also Miles 1885-86 and Miles 1896). Despite its title, Countries and Tribes is concerned almost wholly with Oman, and as such contains some detailed information on Omani fisheries.

Miles reaffirmed that very great quantities of fish were caught despite the primitive methods and equipment available to the fishermen. The absence of great land wealth, Miles noted, forced the coastal population to take advantage of the country's long coastline and exploit the rich sea fauna (Miles 1919 pp. 400-401 et passim). Moreover, fish was important not only as a source of food; as Miles observed, fishing gave employment to large numbers of people in net-making, boat-building and fish curing as well as catching (ibid p. 403).

Fish curing in particular was, Miles observed, 'a big industry', especially on the Batina, because of the great abundance of fish and also the cheapness of salt, so that "immense quantities are caught and salted, both for home consumption and export." He went on to note, however, that "as the process [of curing] is very crude and imperfect neither the quantity nor the quality are [sic] equal to the demand" (ibid. p. 403).

Miles wrote of the shark as being probably the most valuable fish (in terms of quantity) for the Omani population at large (ibid pp. 404-405). He noted that although the 'better classes' did not eat it, shark nevertheless formed the staple diet of the poor, and in dried form it was sent inland for the nomadic populations of the Interior. In addition, he described shark livers as being the source of oil for painting the local

wooden craft, and that this oil was superior for this purpose to that derived from sardines. He also mentioned the export trade in shark fins to China via Bombay.

Miles also described the local boat-building industry (ibid. pp. 412-413). According to him, the timber came mainly from the Malabar coast of India, as did the ready dug out canoes called huris. He expressed a high regard for both the Omani plank-built craft called the badan and the palm-frond shasha, both of which he described as being perfectly adapted to local conditions and requirements.

The impression Miles gave of the Batina fishermen was one of comparative prosperity (ibid. p. 380), and he draws a distinction between them and the much poorer fishermen of the southeastern coasts of Oman (ibid. pp. 491-92). He nowhere mentions any suffering on the part of fishermen caused by indebtedness to traders and middlemen, though he was entirely aware of the potential power of merchants over primary producers. In the pearl fishing of the Arabian Gulf, for example, Miles noted that the pearl fishers were wholly at the mercy of Indian merchants of Bahrain (ibid. pp. 415-416). He made no such observation about the fishermen of Oman.

Between the publication of Miles' Countries and Tribes in 1919 and Bertram's 1948 report on the fisheries of the Sultanate, several travellers in Oman commented on aspects of fishing, but with one or two exceptions they do little more than confirm the descriptions of earlier writers. Cox (1925 p. 198) noted the importance of sun-drying shark flesh as an industry on the Batina and the transport of the dried shark inland where, he stated, it was a staple food. Thomas (1929a;1929b)

described his journey along the southeast coasts of Oman from the Ja'lan to Dhofar and confirmed much of what had already been written or supposed about fishing in that area. In addition he noted the trade in salted fish from these southeast coasts by camel to the settlements of the Sharqiya, and that on these coasts fishing was carried out for the most part only in winter. In summer, he recorded,"the entire population of South Arabia" from the Ja'lan to al-Jazir [midway between Masira Island and Dhofar] migrate northwards to the oases for the fruit harvest (Thomas 1929a p. 197). According to him, the two main tribes concerned were the Wahiba and the Janaba. The former migrated to the Sharqiya and the latter to the Ja'lan.

It is likely that Miles had this same seasonal migration in mind when he wrote that "during the gathering of the date harvest in August and September a large section of the fisher class find employment in the interior and are thus drawn away from the sea in the height of the monsoon" (Miles 1919 p. 401). Although he did not specify, it is unlikely that Miles was here talking of the Batina fishermen. In the first place, during the present survey no vestiges or even memory of such a seasonal movement was found on the Batina, whereas the pattern of winter fishing and summer migration inland for the date harvest is still in force on the southeast coasts. Secondly, Miles' mention of the monsoon suggests the coast of the Arabian Sea rather than the Batina where the effects of the monsoon are virtually absent.

The main features of the pre-1948 state of fishing and fish-marketing in Oman as derived from the various scattered sources can be summarised as follows. Fish was plentiful and fishing of long standing. Large quantities were caught and the

demand for fish for local coastal consumption was more than met by supply. Seasonal surpluses to local demand were cured by drying or salting (depending on the type of fish), and large quantities were used as animal fodder and as fertiliser (sardines), sent inland, or exported (tuna, kingfish, shark and shark fins). In general however travellers more or less took fishing for granted and with one or two exceptions commented only when fishing practices or fish uses differed markedly from European methods - for example, the use of shark liver oil instead of pitch for waterproofing vessels, or the feeding of dried fish to domesticated animals.

3.2 Bertram's report of 1948

It was not until 1948 that a systematic and comparatively comprehensive study of Omani fisheries was made by a fisheries expert. Dr. G.C.L. Bertram was commissioned by Sultan Sa'id bin Taymur "to enquire into the present circumstances in the fisheries [of Oman] and to make proposals for the future" (Bertram 1948 p.3). For this purpose he visited the Sultanate, including Dhofar, in January and February 1948.

From his extensive knowledge and experience of the fisheries in Palestine, the Red Sea and elsewhere (see ibid. p. 38, and Bertram 1953), Bertram was able to view Omani fisheries in the context of the fisheries of Arabia as a whole, and his report contains the first attempt at proposing measures for the development of the Sultanate's fisheries. He rightly pointed out that the fish resources in the Arabian Peninsula were richest off the south and southeastern coasts (that is, the coasts of the Sultanate and the (then) East Aden Protectorate) on account of the upwelling of cold nutrient-rich water from the depths at

the edge of the continental shelf. The prospects for fisheries development were therefore greater in the Sultanate than in the Arabian Gulf and the Red Sea (ibid. p.4).

The significant points of his report can be summarised under five headings:

1. 'Rock fishermen' and 'sand fishermen':

Bertram distinguished two types of fishery in Oman. 'Rock' fishermen were found along the mountainous coasts from Muscat to Ra's al-Hadd, in Musandam and in most of Dhofar Province. 'Sand' fishermen were typified by those of the Batina and were also found around Salala in Dhofar. As will be seen in Chapter Eleven and elsewhere, this division is still broadly speaking useful today, since significant differences in fishing techniques, types of species caught, and to some extent handling and marketing methods still accord with Bertram's categories. He also gave an estimate of the numbers of Omani fishermen which will be discussed in due course (Section 3 below).

2. Backwardness of fishing methods and equipment:

In 1948 the fisheries of the Sultanate were very primitive even by the standards of the time. Motive power was confined to sail, oar and paddle, and all nets were laboriously made up by hand locally from imported cotton yarn. The 'rock' fishermen used mainly lines and gillnets for sharks and various other medium sized fish, while the 'sand' fishermen worked chiefly beach seines, often of considerable length, for sardines and anchovies. The dugout huri was characteristic of the 'rock' fishermen, while the 'sand' fishermen of the Batina used the palm-frond shasha. Both 'sand' and 'rock' men also employed the uniquely Omani plank-built badan for working

the larger nets.

3. Large production

Despite the primitive equipment, the fishery of the Sultanate in the late 1940s succeeded in producing large quantities of fish surplus to local needs and a sizeable export of fish and fish products. Bertram remarked indeed that the south and southeastern coasts of the Peninsula "afford one of the few examples in the world of a primitive fishery supporting a large export trade" and that on the Batina in particular the abundance of fish had given rise to "a moderately efficient collecting scheme and a large centralised system of overseas export" (ibid. p. 6). On the basis of the meagre statistics then available on the export trade in fish and fish products he estimated that the annual live weight catch of the Sultanate as a whole must be "not less than about 100,000 tons", of which some 40,000 tons (live weight) were exported in one form or another, and rightly comments that this was a remarkable achievement for a primitive fishery(ibid. p. 17). In Section 3 below Bertram's production estimate will be compared with that of MacIvor in 1880-81 already referred to. Although the actual quantities caught and exported doubtless varied from year to year, and it is quite possible that the years for which Bertram quotes figures (1945-46 and 1946-47:ibid. p.13) were particularly good seasons, it is nevertheless clear from earlier references that the tradition of exporting fish and fish products was long established and the quantities over a period must have been on average of sufficient magnitude to warrant the development and continuance of the trade.

4. Interrelationship of fishing, agriculture and animal husbandry:

Bertram noted, as others had done before him, that fish (especially sardines) were used extensively as animal fodder and as fertiliser both on the Batina and in Dhofar (ibid. pp. 10-11). In the case of the Batina, whole dried fish were employed for both uses, whereas in Dhofar oil had generally been extracted from the sardines beforehand so that it was the oil-deficient residue which was used. When used as fodder the oil-free fish would be inferior to whole fish, while as fertiliser it should be better for the soil than oily fish.

Bertram quotes in detail on this subject from a report by B.J. Hartley to the sultan on the land resources of Dhofar (Hartley 1948). Hartley concluded that the fishery of Dhofar "is bound up with the fertility of the soil and the growth of crop plants, and provides an important link in the chain of human and animal nutrition". Writing more generally of the country as a whole, Bertram states that "there is an extremely close and unusual linkage between the fisheries, the agriculture and the animal husbandry of Muscat and Oman" (Bertram 1948 p. 3).

5. Proposals and recommendations:

Although acknowledging that technical guidance from abroad would be necessary if Omani fisheries were to be developed, Bertram believed, probably rightly, that none of the sixteen proposals he put forward was otherwise beyond local capabilities. For convenience his sixteen proposals can briefly be discussed in three groups.

a) Administrative proposals:

Bertram recommended that Fisheries Officers, at first three in number, be appointed and employed by the government to

demonstrate to the fishermen new equipment and techniques and instruct them in their use. One he envisaged would be responsible for Muscat and the Batina and a second for Dhofar, while the third would be senior organiser. Pakistan would be the most likely source of such men. Further, the statistical recording of quantities and kinds of fish caught should be greatly improved. The advantages of having accurate statistics would be seen not only in the more accurate collection of taxes on fish, and in Bertram's view would probably best be divorced from any tax collection, at least initially.

b) Recommendations on fishing techniques and equipment:

Improved fishing techniques, for example the lampara method of sardine fishing, should be tested under local conditions and if suitable be introduced to the fishermen by the Fisheries Officers. Improvements to present equipment, in particular the proper preservation of nets and eventually the introduction of motor power, should be considered in conjunction with innovative techniques. In Dhofar he suggested that fish farming using the khawrs (i.e. marine creeks) might be feasible, and if so could be an important additional source of fish, particularly during the monsoon season when sea fish was in short supply. In the wider sphere, Bertram encouraged the Sultanate to hear favourably any proposal made by a concern or agency from a developed country to establish a joint fisheries venture in Omani waters, provided that the interests of Oman were rigorously protected, particularly concerning the fish supply for the local economy. A further matter which needed investigation was biological research into the habits, movements and growth rates of the fish of the area. However, as far as the Sultanate

was concerned, Bertram rightly considered this a long term project. In the short term the country could safely leave such research to its neighbours.

c) Recommendations on fish handling improvements:

It would seem that in Bertram's opinion, improvement of fish handling methods would be at least as important in increasing the effective supply of fish as improving fishing techniques. He observed that wastage in handling, processing and storing was unacceptably high as a result of the primitive methods and conditions then in force. This recalls Miles' observation of over half a century before which has already been referred to. Bertram estimated that as much as one quarter of the total weight of dried sardines was frequently lost during storage through the action of insects, particularly Dermestes beetles and their grubs, a common pest in the tropics. To combat this he proposed that the traditional godowns in which the fish were stored be gradually improved and eventually replaced by modern stores which would be more easily kept free of pests, and secondly that insecticides, under proper control, be used to reduce infestation. In Dhofar he recommended that the crude method of oil extraction from sardines by rotting in piles on the beach be replaced by a simple oil press which would not only very easily increase the quantity of oil produced but also its quality.

Bertram also remarked on the prospects for establishing a sardine canning factory. His feeling was that no such project should be undertaken by the government, and in view of the difficulties encountered by such projects in the (then) Aden Protectorates and elsewhere, which will be reviewed in

Chapter Twelve below, Bertram's advice was probably sound. Despite the large size of the sardine catch, the constraints imposed by the physical location and environment, by the marked variability and seasonality of the catch, by the already large needs of the home market, and by the lack of expertise in the technicalities of quality control (particularly important where an export market was envisaged), would most likely have prevented a fish cannery from being a feasible proposition.

In retrospect it is both astonishing and regrettable that no action whatever appears to have been taken as a result of Bertram's comprehensive report, either by the government or by private enterprise. One is tempted to wonder whether Sa'id bin Taymur's interest in the development of his country's fisheries which prompted him to commission Bertram's report did not stem from a desire merely to increase the size of the taxes he levied on fish and the efficiency of the system for collecting them. When he realised that rather more was involved in fisheries development than merely increasing the size of taxable production, and that change in the fisheries sector could not but herald changes in other aspects of Omani life, it is possible that Sa'id bin Taymur forbade action to be taken. Bertram's insistence that taxation and the collection of statistics should (at least initially) be separate concerns certainly suggests that to increase the efficiency of the taxation system had possibly been put to him as an objective by those who had commissioned the report.

This is largely speculation. Nevertheless the fact remains that no steps at all seem ever to have been taken to implement any of Bertram's very realistic proposals. It was

not until the mid 1960s that any material change for the better occurred in Omani fisheries. Then, as a result of governmental action in relaxing restrictions on certain non-traditional imports, small outboard marine engines and ready-made nylon netting began to make their appearance among the fishermen. This will be discussed later in this chapter. The reason behind this relaxation is however unlikely to have lain directly in Bertram's report of almost twenty years earlier.

3.3 Omani fisheries before the mid 1960s

The available historical references to the fisheries of Oman and the contiguous coasts can be augmented to some extent by field data. Here the memory of the older present day fishermen is important, as are also field observations of relict patterns of fishing and fish trading. During the present field survey opportunities were taken to enquire into past methods of fishing, the equipment used and how the catches were handled and marketed.

3.3.1 The size of the fishery before the 1960s

Although observers have almost always expressed amazement at the large quantities of fish caught in Oman, only two numerical estimates are available on the size of the catch and the numbers of fishermen present before 1970: those of MacIvor and Bertram which have already been mentioned. MacIvor arrived at the figure of about 100,000 tons per annum for the stretch of coast from Ra's Musandam to Ra's al-Hadd on the basis of an estimate of the number of fishermen and an assumed catch per man (MacIvor 1880-81 p. 77). Bertram's independent estimate of "not less than about 100,000 tons of fish" per year

for the whole of the Sultanate including Dhofar and the Omani enclave of Gwadur on the Makran coast was arrived at on a totally different basis, having been derived from available customs returns for cured fish exports, assuming a ratio of wet weight to dry weight of 4:1, to which was added an estimated amount for that not exported (Bertram 1948 pp. 16-17).

The magnitude of MacIvor's estimates can be challenged in the light of data deriving from both Lorimer's Gazetteer and the present field survey. Lorimer gives 152 named permanent settlements (or specified neighbourhoods of named permanent settlements) between Ra's Musandam and Ra's al-Hadd which lie on the coast and are noted by him to have fishing boats (Lorimer 1908-15 Part II passim). (Muscat and Mutrah are here excluded). This is the same stretch of coast as MacIvor was concerned with. When totalled, Lorimer's estimates of the number of 'houses' in these 152 settlements come to just short of 21,000, making an average of about 138 'houses' per settlement. Although all of these settlements will have contained fishermen, they include in their number the larger settlements of Sur, Sib, Barka, Khabura and Sohar, most of whose inhabitants would not be fishermen. Indeed, few settlements would have been composed mainly of fishermen, and then only the smaller settlements: very few of Lorimer's fishing settlements were recorded by him as having more than twenty wooden boats or shash. This accords with observations made during the present field survey.

It is considered unlikely therefore that more than one-third of Lorimer's 21,000 households would be fishing families. Even if each household provided two adult fishermen, the total

number of fishermen on the stretch in question would be no more than 14,000. This is of the order of only half MacIvor's estimate of 30,000.

It is possible that Lorimer undercounted the number of fishing settlements between Ra's Musandam and Ra's al-Hadd. Indeed the present field work in conjunction with the largest available maps (D.O.S. Series K668, 1:100,000) indicates that there are now some 185 fishing settlements on that stretch of coast compared with Lorimer's 152 (see Chapter Six Section 1 below). Spread between 185 settlements MacIvor's estimate of 30,000 fishermen would give an average of 162 fishermen per settlement. The evidence of both Lorimer and the present survey suggest that very few indeed of the settlements could boast such a large active fishing force either then or now. The average is more likely to have been half this figure or even less - perhaps eighty fishermen per settlement at the very most. Even this is about twice the present average. The total for the coast could therefore similarly be reduced, to probably no more than 15,000, which would be in line with the estimate derived above from Lorimer's data. Since MacIvor's estimate of total catch is derived from his figure for the number of fishermen (and assuming that his basis for conversion is correct), then the catch would also fall - to perhaps no more than 50,000 tons per annum. If the production of a stretch of coast can generally be taken to be proportional to the number of fishing settlements on that stretch, then the share produced by the Batina could perhaps be placed at around 30,000 tons per annum at most.

Bertram's suggestion that the number of fishermen in

Oman in 1948 was some "25,000 or less" in the northern part of the country plus a few hundred in Dhofar should perhaps also be revised downwards like that of MacIvor's, in view of the settlement counts discussed above. In the view of the present writer a figure of 15,000 would have been a more realistic maximum estimate and even this may well be much too high.

The accuracy of Bertram's estimate of 100,000 tons per year for the fish production of the whole of the Sultanate cannot be assessed on the same grounds since it is based on entirely different premises, as has been mentioned. Neither is it strictly comparable with MacIvor's figure since the coasts they each covered are not coincident. MacIvor was concerned with only the northeastern coast, while Bertram gave an estimate for the whole of the Sultanate which at that time included not only Dhofar but also the Makrani enclave of Gwadur. Considering the fact that the production of both Dhofar and Gwadur are known to have been very large (Gwadur by itself had a substantial export trade in cured fish to Ceylon), probably not much more than half of Bertram's estimate could be assigned to the stretch between Ra's Musandam and Ra's al-Hadd, that is, some 50,000 tons. This would then be of the same magnitude as the revised estimate of MacIvor, despite the half century that separates them.

When viewed in this light, the number of fishermen between Ra's Musandam and Ra's al-Hadd at the end of the nineteenth century and in the mid twentieth century is unlikely to have exceeded 15,000, while the catch could perhaps be placed at 50,000 tons per year at the most. In the opinion of the present writer, maximum estimates for the Batina coast alone

could be put tentatively at 10,000 fishermen and 30,000 tons. Although lower than the estimates of MacIvor and Bertram, even these figures may well be too high.

3.3.2 The types of fish caught before the 1960s

Whatever the precise size of the catch, it was certainly large when considered in the light of the methods and equipment in use. The Omani coast was (and is) extremely rich in the number of species, though only a very few kinds seem ever to have been caught in large numbers. The fishery was geared to catching in particular pelagic shoaling species, especially the Scombridae (kingfish, tuna and tuna-like species) and sardines and anchovies, and also sharks.

Pelagic shoaling species are very unpredictable in their abundance and movements from year to year and tend in any case to be seasonal. This has been reflected in the Omani fishery in that methods of preserving and using throughout the year the large surpluses available only at certain times were early developed. Sharks on the other hand seem to have been available, at least in northern Oman, irrespective of season. Curing of these fish was nevertheless important, especially in the supplying of fish to the Interior and in the production and export of shark products, notably the fins. Miles (1919 p. 404) went so far as to say that sharks were indeed the most valuable of the fish caught, probably as much on account of the fins, liver oil and other products derived from them as the flesh itself. In the region shark flesh has always been a low class food, not only with the Shi'a sect (who abstain from eating it at all) but with the settled coastal population generally, and this attitude combined with its abundance has made it a cheap food. In dried form however it has been and indeed still is

an important constituent in the diet of the Interior population, in particular the nomadic bedu, being nutritious, resilient and portable.

Several observers have mentioned other fish caught in quantities, notably mullet (e.g. Whitelock 1938 p. 183; Miles 1919 p. 404; Cox 1925 p. 195). Flatfish, however, seem never to have been liked in the area, though several species of soles and flounders are known locally (cf. Miles 1919 p. 410).

As well as fish proper, other sea life was also caught including porpoises (Miles 1919 p. 403), and probably also turtles, at least on the southeast coasts (see for example Thomas 1929a). Much more important than these were however molluscs, including in particular oysters and cockles. Oysters have been noted in abundance on the rocks of the Musandam promontory where they were eaten by the Shuhuh tribe (Whitelock 1838 p. 183; Cox 1925 p.199) and also on the Makran coast (Kempthorne 1835 p. 270). On the sandy Batina coast, burrowing molluscs, especially cockles (locally called duk), have long been gathered at low tide in considerable quantities. The remains of large mounds of their discarded shells are still a feature of the Batina shore settlements, and are found also even in settlements some kilometres from the shore. Some were used as bait, but most were gathered for human consumption, in which case the flesh was boiled in water and then dried on mats in the sun. Over half the dried boiled cockles, it is said, were eaten by the fishermen and their families in the fishing settlement, and the remainder were sold, often in the nearest market if it was close enough. From what the fishermen and others say and from the remains of the large mounds of shells,

it is clear that cockles were once extensively gathered and provided an important constituent in the food intake of at least the poorer elements of the population not only on the coast but also in the Interior.

3.3.3 The way of life of the fishing population before the 1960s

With the exception of the fishermen of the southeast coasts of Oman, the fishing population has traditionally been sedentary but largely separate from the cultivators. Bertram saw the fishing communities of the Batina living as neighbours with the cultivators but being "mainly separate in work and interests" from them, even though both communities were "largely dependent for their well-being each on the product of the other's industry" (Bertram 1948 p.7). Conversations with the fishermen during the present survey tend to support this view. Although the occupations of the fishermen in past decades often, or perhaps even generally, included at least some cultivation as well as fishing (frequently men spoke of having subsisted on fish and shellfish from the sea and dates from their own gardens), nevertheless those who fished called themselves 'fishermen' first and foremost, and cultivated only as a subsidiary occupation, while those who called themselves 'cultivators' rarely if ever did any fishing.

On the southeast coasts a rather different situation obtained. There, little if any fishing was done during the summer months because of the monsoon. Then the fishermen and their families moved inland to the oases of the Sharqiya and the Jaʿlan for the date harvest, as was noted by Thomas (1929a p. 197). The present fieldwork indicated that this pattern is still in force today.

Other groups of fishermen are known to have migrated seasonally, often to fish in waters distant from their home for months at a time. Thomas (1929a p.202) noted nearly fifty fishing badans of the Janaba tribe off Jazir some five hundred kilometres southwest of their home in the Ja'lan. Cox (1925 p.195) observed that fishermen from Socotra fished off Muscat every summer. Whitelock (1838 p.182) noted that 'a friendly intercourse' was maintained across the Straits of Hormuz between the fishermen of Larak Island and the Shuhuh fishermen of the Musandam Peninsula, while the present survey revealed that other fishermen of the Shuhuh have traditionally fished off the northern Batina during the summer months, some 150 kilometres from their home settlements in Musandam.

As Miles noted, the fishery gave employment in net-making, boat-building and fish curing as well as fishing itself (Miles 1919 p. 403). Boat-building appears always to have been a specialist activity, and boat-builders rarely fished themselves, or if they did, they did so only as a subsidiary occupation. Even constructing the palm-frond shash was often carried out by a specialist builder rather than by the fisherman himself. Similarly, date frond traps tended also to be made by specialists. Curing was carried out both by fishermen and fish traders, depending generally on how distant was the nearest market. Net-making on the other hand was done wholly by the fishermen and their families. Women took part in the twining and doubling of the imported cotton yard of which the nets were made, but the actual work of knotting the nets and preparing them for use by soaking in water and lime was done by the fishermen themselves. In fact with the exception of preparing the yarn, women seem to have taken no part in fishing

and very little part in fish trading. The fishwife of West Africa and elsewhere had no counterpart in Oman.

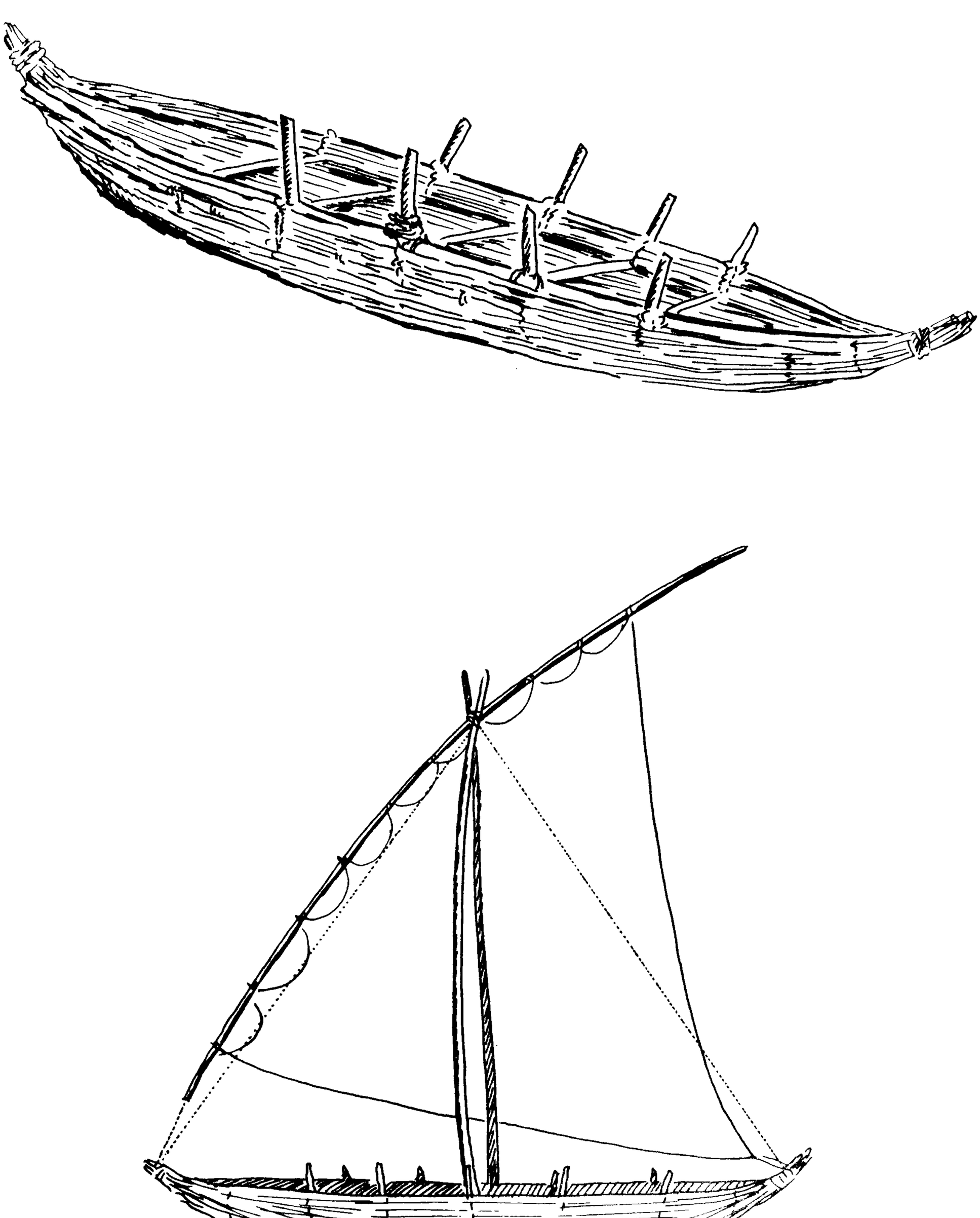
3.3.4 Fishing methods and equipment before the 1960s

The three main types of craft used for fishing in Oman were the palm-frond raft-boat (shasha), the dugout canoe (huri) and the plank-built badan (or variants of it), all of which have been mentioned above. All three are still in use, though as will be seen in Chapter Five, the badan was rapidly losing ground by the mid 1970s for a number of reasons which will later be discussed.

In Oman the shasha (Figure 3.1) was found only on the Batina and not on the southeast coasts or in Dhofar. Made of stripped date-palm fronds (zur), filled with palm-frond butts (karab), and tied with palm fibre twine (lif), it is by no means watertight and floats by virtue of the lightness of the materials of which it is constructed rather than its water displacement. Oars and sails have been the modes of propulsion. Since it is not waterproofed in any way, it absorbs water when at sea, and for this reason most fishermen have owned two (or more): while one was in use the other was dried on the beach. The main advantage of the shasha is its cheapness which stems from the fact that it is made wholly from locally available materials. This is especially important in a region where wood is scarce. The shasha is adapted to local conditions in other ways too. It can be launched much more easily than any wooden boat, and despite its apparent fragility it can be used in higher seas, because of both its high stability and also the pliable resiliance of its construction. Further, it can be worked effectively by only one man if need be, and beached without much effort.

Figure 3-1

The shasha



For many centuries the dugout canoe, locally called huri (Figure 3.2), has been the most numerous and widespread of the craft used by the fishermen of the whole Arabian Peninsula, though not, Bertram notes, by those of the Batina (Bertram 1948 p.5). The Malabar coast of India has been the chief origin of the huris. Basic huri shells, already dug out, were received by the fishermen in Northern Oman via merchants of Muscat and Mutrah. They vary in length from about four metres to over seven metres, and were traditionally propelled by paddle rather than by oar.

The badan (Figure 3.3) has been noted by several observers as typically an Omani craft (e.g. Hornell 1942 p.29; Bowen 1949 p. 48). Rowand (in Lorimer 1908-15 p.2325) and Kindermann (1934 p.6) record its range as extending respectively to Kuwait and to Aden. That it was used over this whole coast is not in question, though whether it was constructed or owned over so extensive a stretch can be doubted. Burton (1872 vol. 1 p. 74) records transport badans arriving in Zanzibar, though notes that they were "from Sur, Sohar and Muscat".

Like other plank-built Arab craft of the region the badan was originally constructed by sewing with coconut fibre. Miles (1919 p. 413) stated that by the time of his observations (the late nineteenth century) nails had become the customary method of constructing the badan. Even as late as 1948 however Bertram (1948 p.8) wrote of the badan on the Batina as "the sewn boat", while vestiges of sewing are still present on some of the Batina badans of today.

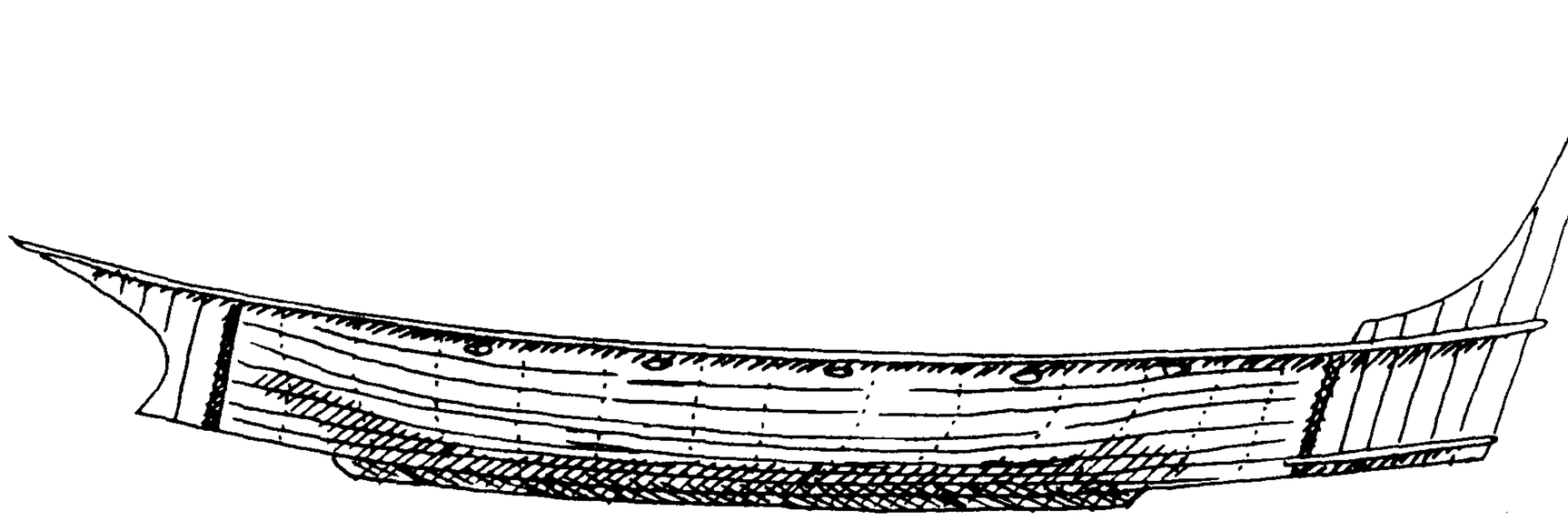
The badan is characterised by its extremely tall and elegant sternpiece and by its narrow prow with concave,

Figure 3-2 The dugout huri



overall length 7m

Figure 3·3 The badan



overall length 14m

Figure 3·4 The shahuf or baqqara

overall length 12·5 m

schooner-like profile. Both features make it unique among Arab craft (see Hornell, 1942 p. 29). Even on the smaller badans the tip of the sternpiece frequently reaches three metres or more above the keel.

The larger badans were transport craft for coastwise trading, while the smaller were used on the Omani coasts as fishing boats. The latter were employed chiefly in conjunction with beach seines in which case they were generally, or perhaps always, rowed rather than sailed. Overall lengths of fishing badans range from about ten metres to over fifteen metres. The number of oars per vessel varies. Those on the Batina commonly had more than twelve oars (i.e. six aside), and cases of twenty-four or even twenty-eight oars (twelve and fourteen aside respectively) are known. The total crew of the fishing badan when beach seining would normally have been between twenty and thirty men when those paying out the net and the steersman were included. Since a shore party of ten or more men is required in addition for the working of the traditional beach seine, this method of fishing clearly gave employment to large numbers of fishermen. If two or three beach seines were working at the same time from the same settlement the manpower resources of the community might even on occasions have been strained.

Related to the badan in both design and use is another, usually smaller, plank-built craft (Figure 3.4). No agreement exists about its name which varies both in the accounts of foreign observers (see e.g. Paris 1841 Plate 5; Folkard 1901 p.429; Australian Professional Group 1975 p.132), and among the present-day fishermen. Hornell (1942 p.27) sees it as a hybrid

type which includes at least some of the features of the badan. Its use on the Batina at least has been identical with the badan. There it is generally called either shahuf (Middle Batina) or baqqara (Upper Batina).

In Dhofar and on the Hadhramaut coast were found the huri and also a small plank-built sewn boat locally called simply sambuk or sanbuq. It was completely different in style from the much larger transom sterned sambuks of the Red Sea as described for example by Moore (1925) and Hornell (1942). The Dhofari fishing sambuk (Figure 3.5) bears a close resemblance to the Masula surf boat of India described by Folkard (1901 pp. 447-48) to which it is probably related (cf. Craufurd 1919 pp. 99-100). Its stem and stern are straight and raked at approximately the same angle, and it is still in use at Salala and elsewhere. Propulsion is by two oars and steering is done with an oar-like rudder.

It would seem that for most of Oman the large majority of the fishermen owned at least a share in a craft of some kind, even if only a shasha or two on the Batina or a small dugout huri elsewhere. Only a few fishermen, the relatively rich ones, would possess a badan, however. Those too poor to own even a share in a boat would, as Miles (1919 p.401) noted, use a castnet. On the southeast coasts several observers have described the poorer inhabitants using inflated skins as floats or rafts when shark fishing (Wellsted 1838 ch. 5, quoted by Hornell 1946; Bent and Bent 1900 p. 230; Miles 1919 p.401; Thomas 1929a p. 197), though this method does not appear ever to have been recorded in other parts of Oman.

Concerning actual techniques of fishing, a variety of methods was used, including nets, traps and lines. As Miles

Figure 3-5 The Dhofari sewn sambuk

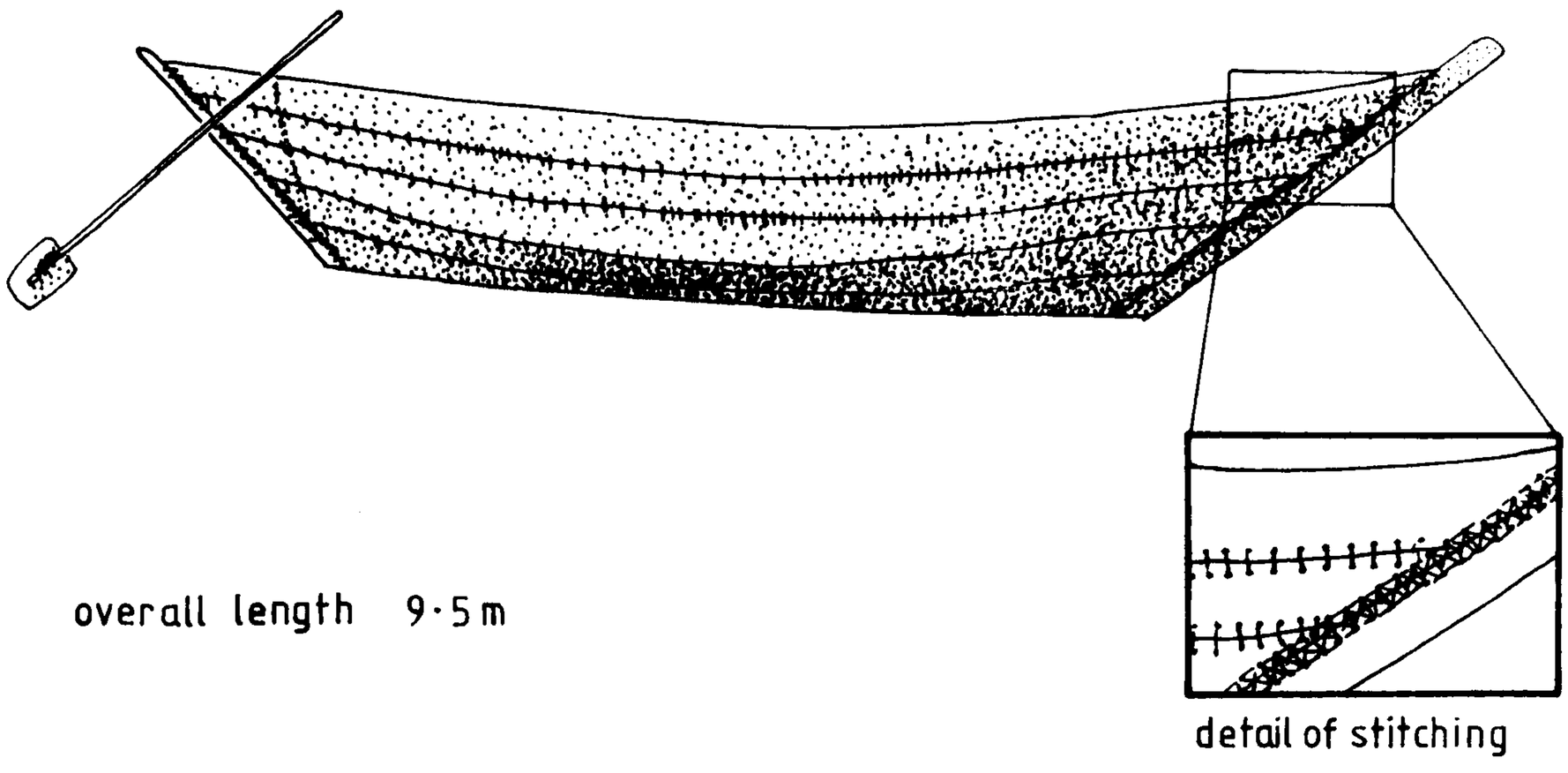
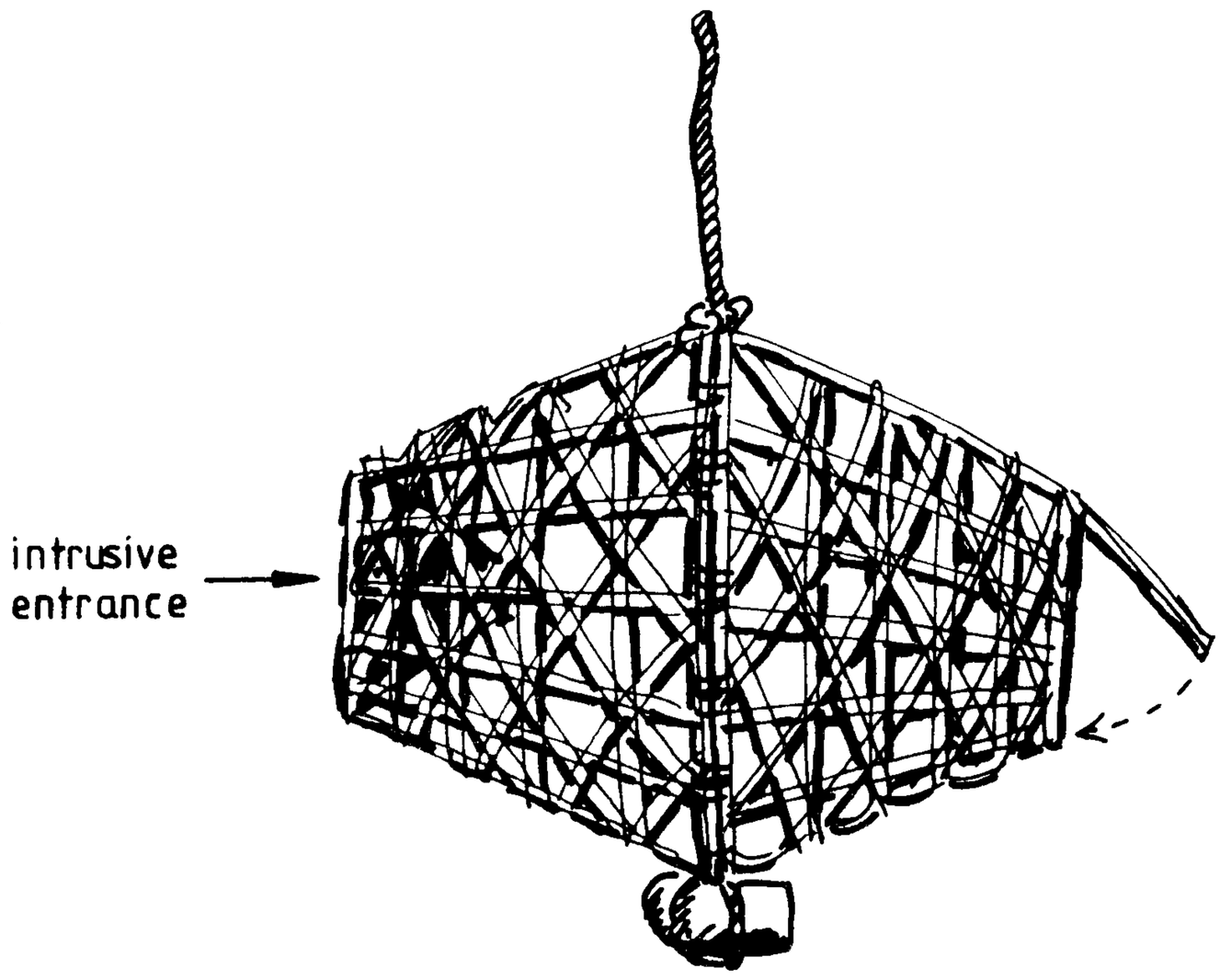


Figure 3-6 The Batina date-frond trap (reconstruction)



(1919 p.401) correctly noted, the mode chosen varied with the type of fish sought and the seasonal movements of the fish, and these variations showed themselves in different methods on different parts of the coast.

Nets included castnets (with and without internal draw-strings), beach seines, offshore seines, and drift and set gillnets. Neither purse seines nor trawls were used. All netting was made up locally by hand by the fishermen from imported cotton yarn. Before being used a new net was steeped in a solution of slaked lime and water, a process repeated every few days of use. Although not as effective as other methods of preservation available elsewhere, such as cutching, liming in this way would probably extend the life of the nets somewhat. Considering the effort involved in making up the nets, however, a more effective preservative might be considered to have been more appropriate.

Considerable labour was also involved in making the ropes, weights and anchors used in association with the nets. Ropes were made from local palm fibre or imported coconut fibre, which was twisted and retwisted by hand until the required thickness and strength were achieved. Iron anchors were not common, stones with holes laboriously drilled in them, again by hand, being substituted. Net weights were similarly made from stones, and floats were either wood or more usually palm frond butts.

The labour and effort involved in making ready even a small net was thus considerable in the extreme. Nevertheless, nets measuring several hundred metres in length by five or more metres in depth were in common use as beach seines. On the Batina at least fishermen often attained nets of great length

by clubbing together and joining their nets, as Miles (1919 p. 380) recorded.

Traps were also in general use. On the Batina they were traditionally of oval shape, with an intrusive entrance at one end and a trap door (for removing the fish) at the other, and were made of stripped palm fronds (Figure 3.6). On the southeast coasts the trap was found less often, and when present it was of rectangular or polygonal form (Bertram 1948 p.5; Hay 1947 p. 280). The large staked fence trap (hadhra), so common in Bahrain and elsewhere in the Arabian Gulf, has never been observed in Oman, probably on account of the frequency of storms and the unstable nature of the mud shore.

Although longlines seem not to have been commonly used by Omani fishermen, probably for the reasons Miles (1919 p. 403) gives, handlines have traditionally been very important, especially among the 'rock' fishermen and in Dhofar. Yet another method, that of spearing, has been mentioned by several observers, but seems to have been found only on the southeast coasts.

The fishing regime, as Miles noted, would vary. Sometimes fishing would take place during the day and catches be landed in the evening; at other times fishing was done at night, landing the fish in the morning (Miles 1919 p. 401). The present field work indicates that the preferred time of fishing was different on different stretches of the coast. Thus on the Lower Batina night fishing seems to have been preferred, while on the Middle and Upper Batina most fishing was done in the morning and early afternoon and the bulk of catches landed in the mid to late afternoon.

Significant differences in the equipment and methods occurred on the Batina within short distances. One settlement would traditionally have preferred traps, nets being only rarely used there. In a neighbouring settlement the position would be reversed: nets would be common and traps rarely seen. The most noticeable distinction on the Batina however occurred between the Upper Batina and Lower Batina. This will be discussed in detail in Chapter Five (Section 4).

3.3.5 Handling and marketing before the 1960s

Once the catch was landed, how it was handled and marketed depended partly on the type of fish caught and partly on the location of the fisherman's settlement.

In the case of sardines and anchovies on the Batina, the catch would be dried by the fisherman himself at his settlement. The method of drying consisted of spreading the fish out in a thin layer in the sun. For this purpose an area of upper beach would have been previously prepared with a covering of dried clay and often surrounded by a rough fence to keep animals off. The fish were raked over periodically and would within about three to five days be dry enough to be packed into sacks made of woven date palm leaves. If the fishing settlement was in easy reach of a coastal market, the sacks of dried fish would be taken there on donkey-back and sold by auction. Settlements distant from markets would often be visited by itinerant merchants or their agents. The dried sardines so prepared were used both as fodder for animals and as a fertiliser, while dried anchovies were eaten by human beings.

In Dhofar, though not on the Batina, it was customary to pile fresh sardines in stacks in order to extract the oil

by rotting. The oil was collected in trenches in the beach, and either used locally or else exported originally in shark stomachs via traders and merchants. This method of oil extraction was noted by both Bertram (1948 p.11) and Hartley (1948 p.16) to be a wasteful process, but despite their recommendations to introduce a simple but effective oil extraction plant no action at all appears ever to have been taken to install one.

On the Batina the bulk of all other types of fish were eaten in a fresh condition on being landed. A proportion of a catch would be consumed locally by the fisherman, his family and relatives. If distant from a market, the rest would be sold in the settlement and its immediate vicinity to non-fishing families by direct bargain sale. Any part left over would be salted and dried or merely salted. In the case of sharks and rays the flesh, being firm, could be dried without salting, while kingfish and the tunas would generally be salted but not dried. This curing would normally be carried out by the fishermen themselves.

Fisherman on the Batina living within a donkey ride of an hour or so from a market would ordinarily take most of their catch, if sufficiently large to warrant the trip, to the market for sale, having kept back enough for their own needs. In this case the sale would be compulsorily by open public auction. The buyers could be either consumers themselves or the resident fresh fish traders of whom each coastal market had roughly ten or a dozen. These fish traders were generally distinct from the traders in the same market who dealt in dried sardines and anchovies.

Among the fresh fish traders there was frequently a

certain degree of specialisation where sharks were concerned. As a rule, all traders would deal in any type of fresh fish and sell either in fresh condition or cure the quantities in excess of immediate demand. However, in each market one or two would often specialise in sharks and carry out most or all of the shark flesh curing, shark fin drying and liver oil making of the settlement. The oil was made by pounding and boiling the livers for a period in an earthenware jar, and much was sold back to the fishermen for coating their boats. After being cut from the shark with as little flesh as possible, the fins were dried on wooden racks in the sun, the severed ends having first been salted. The dried skins were often used as an abrasive and were also cut into strips and twisted to make rodent-proof rope for well buckets and the like.

On the southeast coasts however it would appear that because of the sparse local population, most of the fish caught were cured by the fishermen and sent inland. Thomas (1929a p. 197) noted that fish larger than sardines were salted there and taken northwards by camel to the settlements of the Sharqiya, a journey which, he said, took four days. The fish he referred to were most probably kingfish and shark. The present research has revealed that salted kingfish and also dried shark have for long followed this trading route and the fish requirements of not only the markets of the Sharqiya but also those further north - Nizwa, Bahla and Ibri - have traditionally been supplied largely from this source. The cured fish so traded commonly changed hands two or three times, being auctioned in one market before being transported on to the next. Thus the oases of the desert edge of the Sharqiya - Muntarib, Mudhaybi, Sanaw and Adam - became and remained important

intermediate stages in the trade in cured fish from the south-east coasts to the settlements and bedu population of the Northern Interior.

3.3.6 Government taxation:

Government taxation on the traditional fishery until 1970 was felt as a major burden by many fishermen. In the northern part of the Sultanate at least, and possibly in Dhofar also, taxes were levied on the fishermen in two ways: on boats and on fish sales. A further tax on fish exported was also exacted which Bertram stated was 7½ per cent of its value as assessed by the Department of Customs in the capital (Bertram 1948 p.14). This however was payable by the exporting merchants and therefore did not fall on the fishermen directly.

Taxes on fishing boats applied only to plank-built craft. Shash were exempt as also seem to have been dugout huris. The owner of each badan was required to pay thirty Maria Theresa Thalers annually, while each of the smaller plank-built craft, including the shahuf or baqqara, was liable to an annual tax of half this amount. Latterly (in the 1960s) the conversion was two Maria Theresa Thalers to the Riyal Sa'idi. These sums were collected locally by agents of the wilaya (or 'govern-orate') in which the fishermen lived, in a similar way to the collection of the agricultural zakat, and failure to pay resulted in incarceration in the local fort of the wilaya.

In the fisherman's own settlement such fish as were excess to his needs could be disposed of at will by direct bargain sale or by any other means. If taken to the market, however, all fish and shellfish were compulsorily sold by

auction, in common with all other local products. Auctioning carried a tax of 13 per cent of the sale price (some fishermen say 14 per cent). This amount was deducted from the sum received by the seller, usually in the case of fish, the fisherman.

It is virtually impossible to calculate with any certainty the total value to the government of the revenues derived in these ways from the fishery. However, bearing in mind the large production, and in relation to the extremely slender budget of the country in the pre-oil era, it was probably substantial.

It can thus be seen that fisheries were of importance to the Sultanate of Oman in the era before 1970 in several respects. In the context of the present fisheries situation in the 1970s and with respect to future development, it is useful to summarise this importance.

First, Omani fisheries satisfied a local nutritional need directly in providing animal protein for the coastal population in the form of fresh fish and for the people of the Interior in the form of cured fish. Fish contributed also indirectly to nutrition by providing fodder and fertiliser for livestock and agriculture. Secondly, fisheries gave employment to a large number of people predominantly in fishing itself, but also in the associated work of fish curing and trading and in the provision of boats and other equipment. Thirdly, the country as a whole benefitted from the large exports of cured fish and fish products. And fourthly, the government derived a not inconsiderable part of its revenue in the pre-oil period before 1967 from the taxation of fishing boats, fish sales and

fish exports. To what extent each of these will or should appear as aims for future development will be discussed in succeeding chapters.

3.4 Developments in the 1960s and early 1970s

It is clear from what has been said in the previous three sections that there had been little, if any, substantial change in Omani fishing methods and equipment and in fish marketing for many decades and probably centuries until very recently. Lack of innovation among artisanal fishermen has frequently been regarded as evidence of conservatism. To some extent unwillingness to innovate is understandable in that men whose livelihood is based on a single product which is unpredictable in its occurrence are better advised to retain the old, tried methods of production rather than experiment with uncertain innovations and thereby run the risk of losing all. In view of the large size of the catches in Omani waters, however, it may rightly be questioned why the Omani fishermen did not feel confident enough to experiment. It could be argued indeed that such lack of experimentation indicates a conservatism and unwillingness to accept or consider new ideas and methods which would be an obstacle to development.

Looked at in the broader context however it is evident that lack of innovation among the fishermen was only one aspect of a much more widespread conservatism of the Sultanate generally, a conservatism which was strictly imposed on the population by the autocratic political system. Since the division of the Sultanate with the death of Sa'id the Great in 1856, Metropolitan Oman had stagnated economically, socially and politically. Under Sa'id bin Taymur old methods were

retained because innovations were forbidden.

When some change was permitted in the 1960s the fishermen were among the first to grasp the new possibilities. About 1963 a Mutrah merchant was allowed to set up an agency to sell and service Johnson and Evinrude outboard marine engines of up to four horse power, and fishermen of the Capital Area were quick to adopt them and were enabled to fish areas further from the shore than previously. The dugout huri invaded the whole of the Batina from which it had once been absent, and by the early 1970s it had completely replaced the shasha eastwards of Musanʿa. At the same time nylon nets replaced the old cotton nets, and nylon ropes, iron anchors and plastic floats also made their appearance, while the old date palm frond trap was quickly ousted by a new design in galvanised iron wire until then found in the Arabian Gulf but not in the Sultanate. All these similarly spread rapidly.

When all import restrictions were lifted in 1970, fishermen were enabled to buy outboard motors of progressively higher horse power, and diesel engines could be introduced for the first time, especially on the Upper Batina. Fishing was extended to the edge of the continental shelf, and on the Upper and Middle Batina fishing schedules were changed as a result of the faster boats: catches came to be landed in the morning rather than the afternoon as before. Local boat-builders, many of whom had worked in the Gulf during Saʿid bin Taymur's reign, rapidly learnt to take advantage of their Gulf knowledge to adapt traditional Omani craft designs to suit the requirements of motor power and also introduced new designs common in the Gulf but not used in Oman until 1970.

Fish marketing patterns were also transformed when traders realised the potential of motorised land transport which now became available in the Sultanate for the first time. The results of these changes were still being worked out while the present survey was in progress and will be discussed in detail in later chapters.

Large as the traditional catch was, it might be considered probable that the innovations in fishing equipment from the early 1960s onwards would have increased it even further. This did not happen. Indeed, the indications are that the total catch has decreased since Bertram's report of 1948. Three reasons can be given, all in some measure correct. These will be discussed at greater length in Part II when the current situation of Omani fisheries is analysed, but it is necessary to mention them here since the changes involved began to occur before the present fieldwork started.

The first reason concerns the abundance of fish off the coasts of Oman. There would seem to have been in recent years, and especially since 1970, a reduction in the quantities of fish available for capture off the coasts of at least northern Oman. Sardines and anchovies in particular and other fish which feed on them, notably the Scombridae, are very unpredictable in their movements and abundance from year to year. Since these are among the main fish caught in Oman, as has been seen above, changes in abundance from time to time are to be expected.

Another reason why the total catch has not increased but rather declined lies most probably in the effect produced by the oil-based development in the Arab states of the Arabian

Gulf in that a substantial proportion of the Omani fishing manpower has been attracted away especially since the 1950s to Bahrain, Kuwait, Saudi Arabia and the then Trucial States. Although the Omani fishermen tend to remain fishermen even in the Gulf, and although for the most part they migrate only seasonally, returning to their home settlements for much of each year, nevertheless as far as Oman is concerned the result has been a substantial drop in the effective manpower engaged in fishing at any one time, and consequently a drop in the catch which not even the new methods and equipment introduced since the early 1960s could counteract. In any case, those fishermen who first used novel equipment would be precisely those who did migrate.

It would seem however that the most important reason for the decline in the catch has been the drop in demand from the former export markets. This has also contributed to the pendular migration of fishermen to the Gulf. Recent currency restrictions in India and East Africa have reduced foreign exchange available to the traditional importers there. Rising expectations for improved product quality may also have been contributory. Fishermen in Oman have responded by reducing their catch to levels which they know they can sell. The implications of this are to emphasise the importance of the demand factor: if production is to be increased,then demand must be stimulated. Increased production of fish cannot be brought about by technical innovation alone.

Meanwhile changes of relevance to fisheries were taking place at the level of government in the Sultanate. The creation of a modern ministerial system of government with a civil service

began only in 1970, and one of the main difficulties facing the civil service is the shortage of trained and experienced Omani personnel at all levels. In 1972 an Interim Planning Council was established to control and coordinate development, but it and its successor, the Supreme Council for Economic Planning, had little success, especially in the field of setting and enforcing financial limits to government expenditure. Late in 1972 a Ministry of Development was set up to take charge of development, within which fisheries concerns were handled by a separate department. This Ministry however was found to be cumbersome and it was dismantled in November 1974 when much of its work was taken over by a new Ministry of Agriculture, Fisheries, Petroleum and Minerals in which fisheries became the responsibility of a separate directorate-general. This continued to be the situation until early 1979 when agriculture and fisheries were separated from petroleum and minerals to form their own ministry.

As well as in construction projects, foreign consultant companies have been engaged since the early 1970s by ministries and other government bodies to carry out resource surveys of the Sultanate. The Whitehead Consulting Group was the first of these to report in 1972 and such of its findings as are of relevance to fishing will be commented on in later chapters (Whitehead 1972). From June 1972 the American company Mardela International Ltd. in association with F.M.C. International S.A. and Del Monte International, began a fisheries resources survey for the Sultanate government and reported in 1975 (Mardela 1975). Although much of its investigative work on the physical and zoological aspects of the resource is of potential use, its findings on the local artisanal sector of the fisheries are of little value and are often misleading, as will be shown in later

discussion. At the same time F.M.C. built a pilot fish catching and processing unit at Sohar on the Batina coast (F.M.C. 1975). The complete failure of this venture is considered in Chapter Twelve. The 1969-71 survey of the Trucial States fisheries undertaken by A.W. White and M.A. Barwani for the Trucial States Development Council has relevance for Oman and will also be mentioned in later chapters (White and Barwani 1970; White and Barwani 1971; White with Barwani 1971).

On the findings of these reports and others the government has begun to enter the field of industrial fisheries, both directly by buying three small trawlers and constructing ice plants and other shore facilities at Mutrah and Salala, and indirectly by granting fishing concessions to foreign companies. The wisdom of this approach will be examined in Chapter Twelve. At the same time, the intention of assisting the artisanal sector by specific action has been accepted as part of government policy and an annual budget for artisanal fisheries development has been allocated since 1976 in the first five-year development plan (1976-80). But at the time of writing such action has been limited, as will be seen in Part III of this thesis.

3.5 Conclusions on Omani fisheries before the present survey

Several major points are clear from this review of Omani fisheries before the mid 1970s. Supplies of fish off the Omani coasts were plentiful and catches large, not only in terms of the traditional methods but also in real terms. Until the early 1960s, fishing methods and equipment had remained basically unchanged certainly for many decades and probably for centuries,

and in the case of the craft in particular, rather than being primitive, they were in fact well adapted to local conditions. Fish handling, marketing and trading patterns were also long established. Principally because of deficiencies in curing methods, however, much of the full value of the catch was wasted. The patterns of fishing and fish marketing were by no means uniform along the coasts of Oman, but varied considerably, often over relatively short stretches, in terms of, for example, the fishing methods and equipment used, the proportions of the catch consumed locally or sent in cured form inland, and the permanency or otherwise of the fishing population.

Once external restrictions were removed the fishermen showed themselves willing and eager to experiment and adopt new and improved methods and equipment. No doubt there are intensely traditional fishing communities in the world who resist any innovation even when it is available and tested. In Oman however the fishing community, far from being incorrigably conservative, has welcomed and rapidly adopted new methods when these have been permitted and when they are demonstrably improvements on the former practices. Several recent instances of this in action were noted in the field survey and will be discussed in greater detail later.

Between Dr. Bertram's report of 1948 and the time of the present survey the Omani fishery underwent a transformation as a result of the enterprise of those Omanis directly involved in it. Increasingly however the Omani government will attempt to influence the development of the artisanal fishery and also seek to introduce a new element, that of a modern commercial fishery. How successful the changes and innovations in the

future are, whether introduced privately or by the government, will depend largely on the present state of the fishery and their suitability for development. This is examined in Part II of this thesis when the results of the present survey are analysed and interpreted. The next chapter, Chapter Four, presents the methodology of this survey.

CHAPTER FOUR

Background and methodology of the present survey.

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4.1 Field coverage

Fieldwork for the present study of fishing and fish marketing in northern Oman was conducted by the present writer over three field seasons covering a total of fourteen months between November 1974 and September 1976. Of the total period in the field about eight months were spent on the Batina coast based at Khabura and four and a half months in the Dhahira based at Ibri. The remainder was spent in travelling and in the Capital Area. As can be seen from Table 4.1 which details the periods spent in the field, two field seasons covered winter periods and the third field season a summer period.

Since the intensive fieldwork was concluded in September 1976, two subsequent short visits have been paid to Oman (in January and December 1978) and these have allowed more recent developments to be noted. It is with the situation in 1974-76 however that the survey is principally concerned.

A brief visit to Saudi Arabia (Jedda), Kuwait, Bahrain and the United Arab Emirates was made during December 1977 and January 1978 which permitted the present writer to collect first-hand information on the fisheries of those countries (forming the basis of Chapter Twelve below) and to place the Omani situation in a broader regional context. Planned visits at this time to the Yemen Arab Republic and the People's Democratic Republic of Yemen had however to be abandoned for practical and political reasons.

Most of the 1974-76 survey data was derived from the vicinity of the two field bases, Khabura and Ibri, though most

Table 4.1 : The field survey : periods spent in the field

Field Season	Dates	Approximate length of stay	Base
I	November 1974 - January 1975	3 months	Khabura
	February-April 1975	2½ months	Ibri
	April 1975	10 days	Khabura
II	October 1975 - January 1976	2½ months	Khabura
	January-March 1976	2 months	Ibri
	March 1976	8 days	Khabura
III	July-September 1976	2 months	Khabura
I,II, III		ca.1½ months	Capital Area & travelling
Total		14 months	
Return visits : January 1978		10 days	Khabura, Capital Area & Salala
December 1978		3 weeks	Khabura, Capital Area & Salala
Regional visit : December 1977 - January 1978		4 weeks	Jedda (Saudi Arabia) Kuwait Bahrain Dubai

of the settlements on the Batina coast and in the Northern Interior were visited at least once and many of them much more frequently. In addition, Dhofar was visited in both January and December 1978, and Masira Island, Sur and Ra's al-Hadd in December 1978. A low reconnaissance overflight of the coast between the Capital Area and Ra's al-Hadd by light aircraft of the Sultan's Air Force was also made in December 1978. Figure 4.1 summarises the extent of the field coverage.

4.2 Methodology of the fishing survey

Most of the field data on fishing were obtained, naturally enough, during the periods of the survey spent on the coast. Supplementary data were also collected in the Interior from itinerant fish traders during the periods spent at Ibri. This source was of particular value concerning the fishing of the southeast coasts of Oman, an area not visited personally.

The field data on fishing on the Batina were derived from four main sources:

1. Informal conversations with fishermen and observations of their methods, equipment and work;
2. Interviews with fishermen by questionnaire;
3. Boat counts;
4. Interviews with traders and other parties with interests in fish and fishing equipment.

4.2.1 Informal conversations with fishermen and field observations of their methods, equipment and work

As has been shown in Figure 4.1, almost the whole length of the Batina coast (some 220 kilometres out of a total of 285 kilometres) was visited by the present writer, and in addition

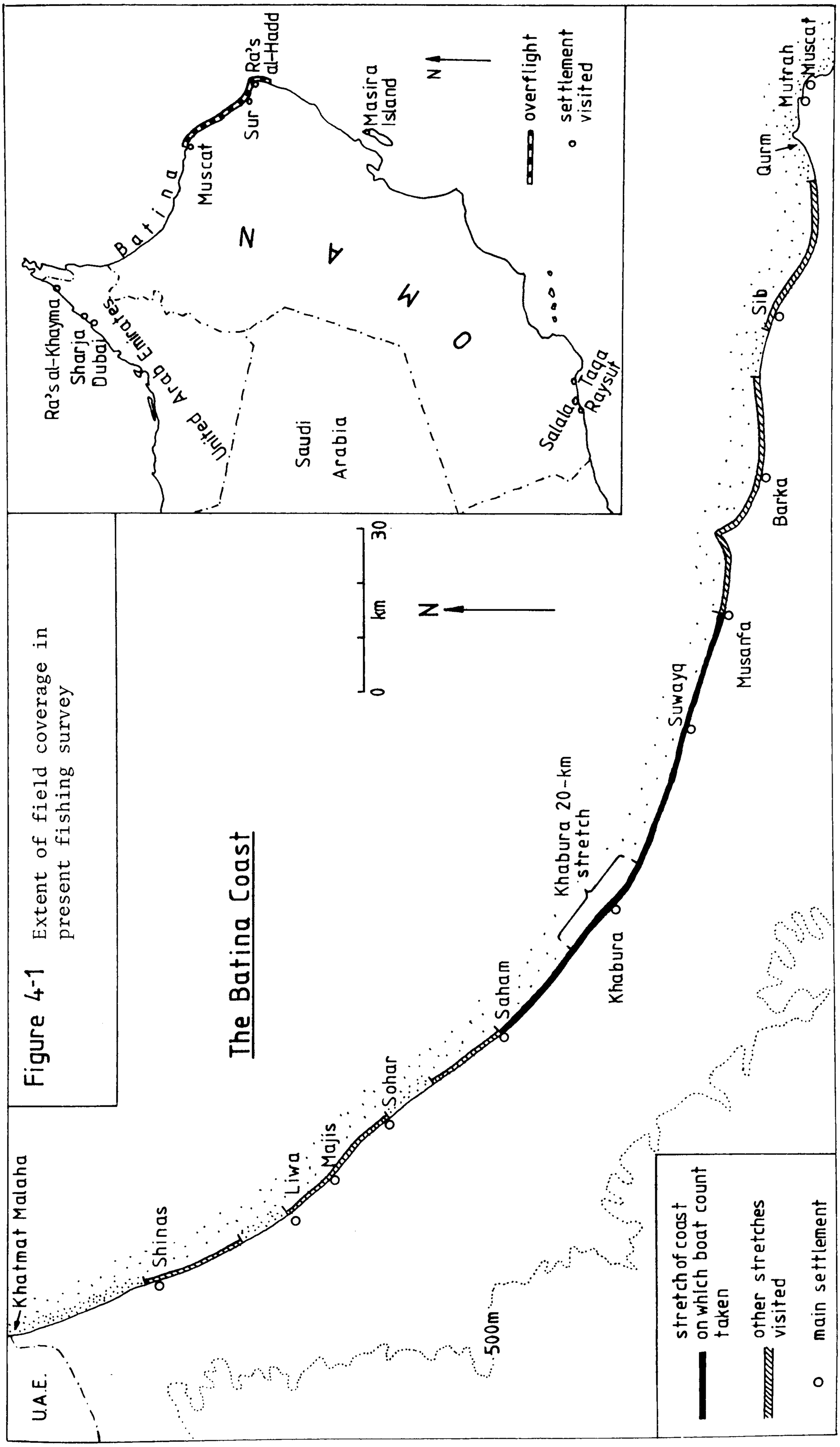


Figure 4-1 Extent of field coverage in present fishing survey

The Batina Coast

the Capital Area, Sur, Ra's al-Hadd, Masira and several fishing settlements around Salala. Whenever the opportunity occurred, fishermen were observed at work and were engaged in conversation about their techniques and equipment and about their life, attitudes and home settlements. On several occasions the present writer accompanied fishermen of the Khabura area on fishing trips and so was able to see most of the different types of equipment in operation.

The main topics on which information was collected were as follows:

(1) Present fishing methods: The names of the different types of boats and nets and other tackle and how each is used were gained from fishermen's descriptions and from personal observations.

(2) Past patterns of fishing and recent innovations and developments: Fishermen's descriptions were relied on to establish the patterns of the recent past. Information so gained has already been discussed in Chapter Three above.

(3) Basic general data about each settlement visited: From a combination of questioning and observation, a variety of data on each of the fishing settlements was obtained, including for example the price of fuel and motor oil, the nature of the sea bed, and an estimate of the proportion of the settlement engaged in fishing.

4.2.2 Interviews with fishermen by questionnaire

On the basis of a close acquaintance with the fishermen in the Khabura area and constant observation of their work in the first field season, much circumstantial detail (for example on costs of equipment and migration to work in the Gulf) had

been collected. It was felt however that an attempt could be made to collect certain types of information in a more systematic and organised way to eradicate subjectivity as far as possible in the circumstances. On the basis of the fieldwork of the first field season a list of questions was drawn up and tested on twenty fishermen in four settlements near Khabura. This initial trial indicated that the broad strategy and most of the detailed content were appropriate, and a slightly revised version of the questionnaire was employed throughout the rest of the survey without further change.

The present writer agrees with P. Hill (1966 pp. 16-17) when she points out the inadequacies, and even dangers, of a conventional questionnaire approach in an indigenous society in the less developed world, especially when it attempts to collect economic statistics. A researcher who relies on formal questionnaires might well obscure or even miss the crucial aspects of the people he is studying by imposing on his impression of them his Western based assumptions. As will be shown in this thesis, notions such as maximising return on capital investment, or even more basically, calculation of profits and losses, have arguably much less to do with the motivation of Omani fishermen and fish traders than they would in Western societies. If a researcher designs a questionnaire which assumes that return on investment, for example, is a major aspect of motivation, he will no doubt find evidence for it in the responses; but whether his findings reflect the true situation is another matter.

In the present study however the questionnaire was constructed only after several months' close contact with the fishermen and was used in conjunction with the information

derived from the more extensive questioning and observations described in the previous subsection. Moreover, all interviews were carried out by the present writer personally rather than by assistants. This had the advantage that the accuracy and significance of a response could better be judged by observing the manner in which it was given and the context in which it occurred.

The questionnaire was made up in the following way. (The full questions are given in Appendix A).

a. Details of work other than fishing, and its relative importance (Questions 3 and 4 of the questionnaire);

b. Details of boat (or boats) - type, age, cost, ownership, crew, sharing system (Questions 1, 2, and 7);

c. Details of engine - make, type, horsepower, age, initial cost, running costs (Questions 5 and 6);

d. Details of tackle - nets: number, types, costs; traps: number, costs; and lines (Questions 8, 9 and 10).

Although the people of Oman are not accustomed to being subjected to interview surveys, whether for academic or administrative purposes, the reaction of the fishermen on being approached with the questionnaire was exceptionally good. A total of 268 interviews was attempted and of these 267 were successful, only one man refusing to be interviewed, a negligible proportion. As might be expected however some respondents were

more articulate and able and eager to volunteer information than others.

The selection of fishermen for interview was carried out with the following considerations in mind.

(1) Seasonal migration of fishermen:

It was realised during the first field season that certain fishermen migrated seasonally to the Arabian Gulf and the Capital Area, mainly between the months of October and December, or in the spring and early summer. For this reason interviewing was divided between two field seasons: one-third of the interviews were conducted in December 1975 and January 1976, and the remainder during July, August and September 1976. The combined results are therefore considered to be relatively free from the effects of seasonal migration since during the periods of interviewing the large majority of the fishermen who do migrate would have been present in their home settlements and thus available as potential respondents.

(2) Selection of respondents by settlement:

It was considered that the settlement would make the most convenient and appropriate unit of selection and study, since, first, this would make easier estimating the total number of fishermen on the Batina (see Chapter Six, Section 2), and second, differences between individual respondents might be related to characteristics of the settlement in which they lived (see, for example, Chapter Five, Sections 2 and 4).

Difficulties were met in some cases in defining what is a single settlement and what is subdivisible. Although most Batina settlements are locationally distinct units, many are

not physically separated from their neighbours and owe their separate identity to tribal or other reasons. In the present survey any group of more than about twenty houses which is either physically separate or otherwise generally acknowledged to be distinct from its neighbours has been taken as a separate settlement and is called such. The term fishing settlement has been used throughout to denote a settlement in which at least some fishermen live, and is not meant to imply that all the inhabitants are fishermen, which as will be seen (Chapter Six, Section 3) is a rare occurrence.

On this definition there are 123 fishing settlements on the 285 kilometres of the Batina coast between Khatmat Malaha and Qurm, and of these the present author visited and spoke to fishermen in 105. Appendix B lists the fishing settlements of the Batina coast.

Initially the survey was envisaged to cover only the length of coast to about ten kilometres either side of Khabura. All the fifteen fishing settlements on this stretch were studied. Each was visited frequently throughout all three field seasons and friendly relations with a large number of fishermen were easily established. It was then decided to extend the study northwards and southwards along the coast in order to put the Khabura situation in the broader context of the Batina as a whole and to determine whether the marked differences found among the Khabura settlements were part of larger scale trends. Ten sample settlements were therefore chosen outside the Khabura twenty kilometre stretch (by marking random points along the coast), five between Shinas and Khabura and five between Khabura and Sib (Figure 4.2). Each of these ten sample

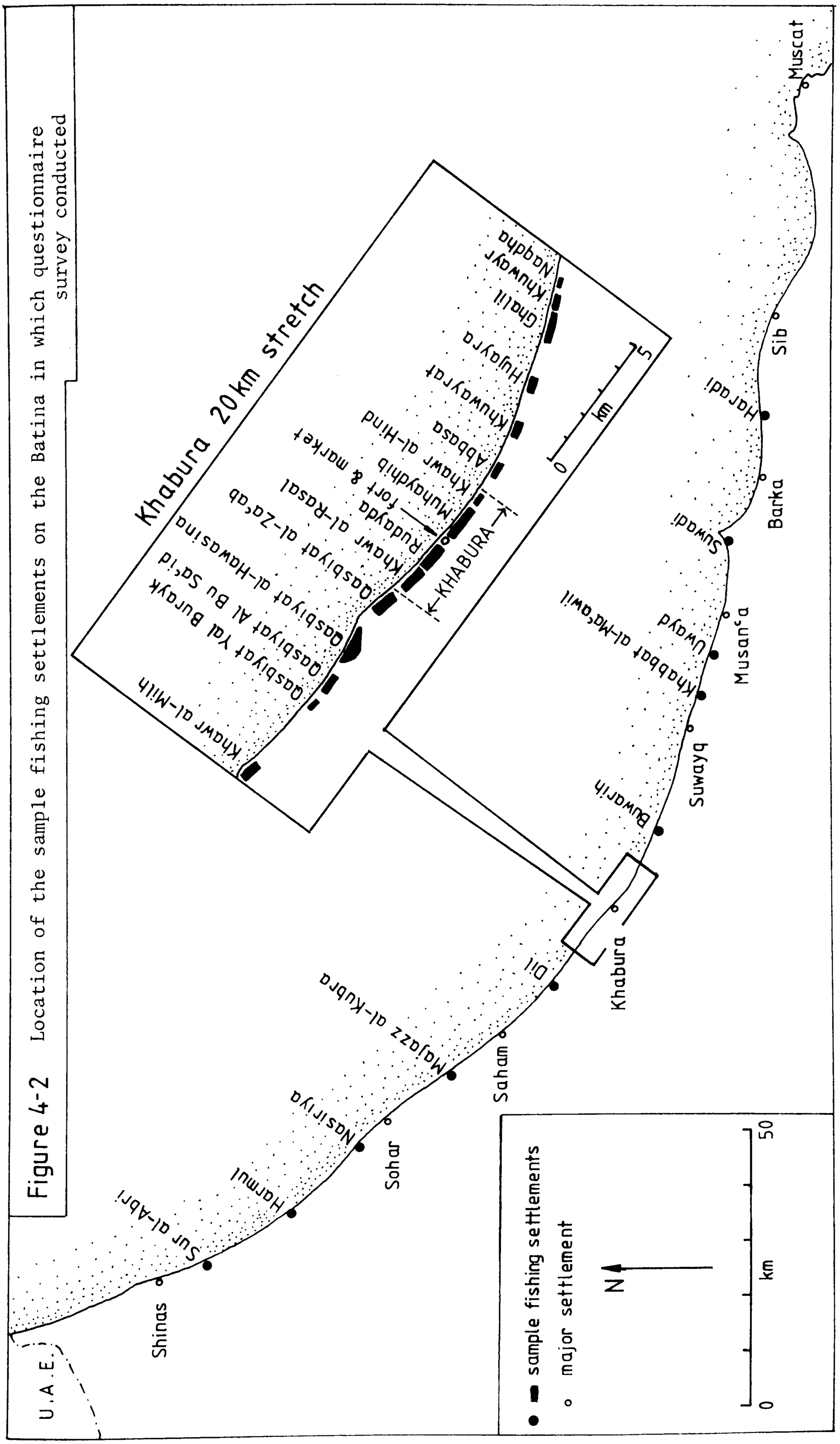


Figure 4-2 Location of the sample fishing settlements on the Batina in which questionnaire survey conducted

settlements was visited on several separate days and at different times of day (to eliminate the effects of possible differences in fishing schedules on the availability of fishermen). On entering a new settlement, the present writer visited any local dignitary, such as the local shaykh if such existed, as a matter of courtesy, and gained a general acquaintance with the settlement and its fishermen before any interviewing by questionnaire was attempted. A count of the boats by type was also made in order to achieve a measure of the size of the fishing population in each of these ten sample settlements and also in the fifteen sample settlements of the Khabura stretch.

(3) Selection of respondents within each settlement

It was assumed that anyone living in a sample settlement could be a prospective respondent in that fishing might well be carried out to some degree by people other than those calling themselves fishermen. For this reason, prospective interviewees were approached with the question: "Do you fish?", rather than: "Are you a fisherman?" This made it possible in the analysis of the results to define the degree of involvement in fishing of that part of the population who are not primarily fishermen.

In each of the twenty-five sample settlements interviews were continued until, generally speaking, a target of at least half the number of wooden boats and one-third of the number of shash had been accounted for by being assigned to owners. Table 4.2 summarises the coverage actually attained. (A more detailed breakdown by settlement is given in Appendix C). On the basis of boat counts and interview responses about ownership and crews, it is estimated that the 139 interviews conducted on the twenty kilometre Khabura stretch represent approximately

Table 4.2 : Boat counts and interviews carried out in the twenty-five sample settlements of the survey

	Boat counts		Number of interviews conducted	Boats accounted for in interviews			
	shash	wooden craft		shash number	shash % of total count	wooden craft number	wooden craft % of total count
Northern Batina: (5 settlements)	162	83	60	52	32%	45	54%
Khabura 20km stretch:							
North (5 settlements	206	34	41	84	41%	26	76%
Khabura proper (4 neighbourhoods)	155	15	25	61	39%	7	47%
South (6 settlements)	304	63	73	139	46%	38	60%
			139				
Southern Batina: (5 settlements)	66	182	68	28	42%	64	35%
Totals:	893	377	267	364	41%	180	48%

The 25 sample settlements:

Northern Batina : Sur al-Abri, Harmul, Nasiriya, Majazz al-Kubra, Dil.

Khabura, north : Khawr al-Milh, Qasbiyat Yal Burayk, Qasbiyat Al Bu Saʿid, Qasbiyat al-Hawasina, Qasbiyat al-Zaʿab.

Khabura proper : Khawr al-Rasal, Rudayda, Muhaydhib, Khawr Al-Hind.

Khabura, south : Abbasa, Khuwayrat, Hujayra, Ghalil, Khuwayr, Naqdha.

Southern Batina : Buwarih, Khabbat al-Maʿawil, Uwayd, Suwadi, Haradi.

forty-five per cent of the total number of fishermen there. The remaining 128 interviews account for some four per cent of the Batina total which is estimated to be around 3,500 adult males as will be shown in Chapter Six (Section 2) below.

Respondents were selected in each settlement on an ad hoc basis. In view of the fact that no register of Batina fishermen has ever been compiled (nor even a list of all the fishing settlements), and that to draw up such a register was beyond the means of the present writer, the selection could not be truly statistically random. The procedure adopted was however the only practicable method of selection in the circumstances, and when the responses are viewed together with the data derived from other sources the survey still forms, at the time of writing, the most detailed record of the fishermen of the Batina that has been carried out.

The data deriving from the questionnaire survey were analysed after the author's return to Durham University by means of computer using the standard statistical data processing package SPSS.

4.2.3 Boat counts

Beach counts of shash and wooden boats by type were made in all the twenty-five settlements in which the questionnaire survey was carried out. In addition, all wooden boats (but not shash) were counted along a continuous stretch of the central Batina from Saham fort to Musanʿa fort, a distance of just over ninety kilometres, about one-third of the length of the Batina from Khatmat Malaha to Qurm (285 km). The number of fishing settlements lying on this stretch is fifty-five, almost half the Batina total of 123. A major reason for making these counts

was that, in conjunction with the data derived from the questionnaire survey, they would enable estimates to be made of the size of the fishing population and the fishing fleet and of the capital invested in fishing equipment on the Batina.

In the boat counts only those craft which appeared seaworthy were included. In the case of wooden craft there was generally little doubt as to whether a boat was in usable condition or not. With shash however it was occasionally difficult to be certain whether a particular shashahad been discarded or was still in use. Local advice in such doubtful cases was not always at hand, and consequently it is possible that the number of shash was to a small degree overcounted, though probably not by more than five per cent. On the other hand, many migrating fishermen were known to carry their shash inside their houses for safe keeping when they are absent from their home settlement. Since however the times of the survey coincided with periods when few fishermen were away, probably few shash were missed for this reason. It is likely indeed that any such undercounting probably counterbalanced over-counting, and the shash counts have therefore been left uncorrected in subsequent discussion.

4.2.4 Interviews with traders and other parties with interests in fish and fishing equipment

Over the three field seasons traders and merchants in the Capital Area and elsewhere with interests in fishing and fishing equipment were interviewed. The principal of these were as follows:

In Mutrah:

(a) Oman Commercial Enterprises - sole agents in Oman for

outboard marine engines of the Yamaha Motor Company Ltd. of Japan. Since 1973 Yamaha have become the most ubiquitous and largest selling outboard petrol motors in northern Oman. In 1975 Oman Commercial Enterprises began selling nylon fish netting in addition.

(b) Nasir Abdullatif and Company - sole agents in Oman for Evinrude outboard marine engines supplied by Outboard Marine (Belgium) S.A. Evinrude together with Johnson (also supplied by Outboard Marine) are the longest established makes of outboard engines in northern Oman.

In Saham, Batina coast:

(a) Abdulla and Husayn Hamza al-Asfour

(b) Dawd Hamza al-Asfour

The interests of these two companies are predominantly in the dried lime trade (see Durham Oman Project Reports 1978 Vol VI). They were also able to provide some information on the drying and trading of sardines and anchovies, since both companies were engaged in exporting these until about 1970.

In addition, acquaintance was made with several smaller merchants and traders in the Capital Area and many more in the Batina coastal markets who provide fishing equipment, and also several professional boat builders and the sole major repairer of inboard diesel engines on the Batina.

A major concern of these interviews was to check from independent sources data derived from the fishermen. These data had to do especially with fishermen's capital and running costs, and any credit or sharing agreements that the traders concluded with them. The interviews provided in addition a

wider context for the data than could be gained from individual fishermen, in particular concerning the supply of fishing equipment.

Officials of the Directorate-General of Fisheries and of the Department of Customs were also visited on several occasions and their help in providing data is gratefully acknowledged. Permission of the Directorate-General enabled the present writer to visit the F.M.C. fisheries project at Sohar in March and August 1976 and December 1978, and the government fisheries installations at Mutrah and at Raysut (Dhofar) in December 1978.

4.3 Methodology of the marketing survey

Field data on fish handling and marketing were collected mainly in the settlements of Khabura and Ibri, representing respectively a Batina market and an Interior market. As has been noted already, the periods of residence at Khabura took place during two consecutive winters (1974-75 and 1975-76) and one summer (1976), while Ibri was visited only during the two winter periods. This was unfortunate but unavoidable since practical difficulties made a summer stay at Ibri impossible.

The marketing data were analysed by computer using the standard statistical package SPSS, as was done with the fishermen questionnaire data.

4.3.1 Khabura fish market

On each of a total of eighty-five days a survey was made in Khabura fish market of the quantities and types of fish for sale. During the first field season two hours (10.30 am to 12.30 pm, the period of greatest activity) were spent on each of

fifty days in the fish market, and the quantities of each species seen during these two hours were estimated. During the second and third field seasons fifteen and twenty whole mornings respectively were so spent (from 7.30 am until 1 pm), and every individual fish of medium to large size was counted and recorded by type as it entered the market. The small fish (of less than approximately 300 gm) were not counted individually but their quantities only estimated.

In addition, on each of the eighty-five survey days, a sample of the bargains struck was taken and the weight, type and final selling price were recorded in each case. In most cases the method of sale and the seller were also noted (see Chapter Nine, Section 4). Because in Khabura fresh fish other than those of sardine size are sold only by the piece or by the whole fish and not by weight, the weight of each sampled fish was taken by means of a Salter spring balance to the nearest 50 gm in order to provide a means of comparing the prices between species and from day to day. A total of 1,435 individual price-weight recordings were made over the eighty-five days, 425 in the first field season, 476 in the second, and 534 in the third (that is, averages of nine, thirty-two and twenty-seven per day respectively, though the number of recordings on any day varied with the availability of fish).

Other data were also collected at Khabura fish market. In particular the recording of complete boat-loads of fish together with the prices achieved for loads was possible in some cases, and these will be discussed in Chapter Seven (Section 3) when fishermen's takings are dealt with. Also, interviews were conducted with the resident Khabura fish traders and their mode of operation was observed.

4.3.2 Ibri fish market

Both cured fish and, since about 1972, fresh (iced) fish are sold in Ibri market. On entering the market almost all fish (in common with many other commodities) is sold initially by auction. Daily records were kept of the loads of both fresh fish and cured fish brought into Ibri market by trader-transporters for most of the two field seasons spent at Ibri. With the assistance of the auctioneers and auction recorders it was found to be possible to note for most loads the type of fish, the origin of the fish and of the seller, the selling price and the settlement of residence of each buyer. In most cases also the seller was asked to give his buying price and his transport costs and other expenses. The total number of regular sellers was few, particularly in the case of fresh fish, and a friendly confidence was quickly struck up with them. It is believed that in most cases the stated buying price and the expenses were on the whole accurate within reasonable limits.

An attempt was made to check the buying price figures of the trader-transporters who buy fish from Dubai and elsewhere in the U.A.E. from original unpublished Department of Customs records. These purport to detail by kind and by value all the merchandise which enters the Sultanate. The records for the relevant months for the customs post at Qabil (south of Buraymi), through which nearly all the fish originating in the U.A.E. and destined for Ibri enters, were examined for this purpose. They proved however to be of little use, since they were found on examination to be both incomplete and insufficiently accurate, and in any case they covered only the fish which entered the Sultanate from the U.A.E.

In addition at Ibri a daily record of retail fresh fish prices was kept over nearly all the periods of residence there. This task was much simpler than at Khabura: first, the number of species of fish available on any day was rarely more than four or five; and second, since 1974 fresh fish has been retailed by weight by order of Ibri baladiya (municipality). The recording of retail prices at Ibri therefore entailed merely observing how much the fish retailers' prices were each day. Unlike Khabura, virtually no bargaining was noted and in practice very little difference in quoted prices occurred between one fish retailer and another for a given type of fish on any particular day.

4.4 Identification and classification of fish found in the survey

A total of approximately 130 local names (excluding variants) for different types of fish was collected and these were used for recording throughout the fieldwork. Identification posed a problem in that facilities were not available to make a collection of preserved samples of fish for later expert study. Recourse was therefore confined to field descriptions and measurements and in the case of about seventy species, colour photographs were taken in the field. Such identification as was possible was carried out in Britain on the basis of this field data and is explained further in Appendix D which gives the authorities on which the classification was made. To an extent therefore it has been possible to tie the vulgar names of the Batina to scientific taxonomic classification.

For present purposes, however, it is considered that precise taxonomic identification in every case is not necessary.

Firstly, this survey does not claim to be the basis of a zoological treatise on the fish of the Gulf of Oman. Secondly, in terms of marketing, a fisherman or a customer will be influenced in deciding the price he is prepared to accept or pay by what he believes, rightly or wrongly, an individual fish to be, rather than how it is classified by a taxonomist. A distinction made in the local terminology, for example, between the young and the adult of what are zoologically the same species may well be of more significance in terms of marketable value than two zoologically distinct species which may bear the same local name. It can be argued therefore that the local vulgar names, which were used for recording throughout the field survey, are more relevant to an analysis of marketing than the scientifically specific names. Thirdly, such scientific classification as was considered to be useful was in grouping the fish by Family, a task which even with limited identifying data can be accomplished with relative ease and little risk of error. The grouping is detailed in Chapter Eight below.

PART II

The fisheries of northern Oman in the mid 1970s : the field survey data.

CHAPTER FIVE

Present fishing methods and equipment in use on the Batina.

CHAPTER FIVE

Present fishing methods and equipment in use on the Batina

5.1 Introduction

R. Legendre remarked at the beginning of this century that methods of fishing among primitive peoples bear close resemblance to those in use in more advanced countries (Legendre 1912 p.14). This would appear to be substantially as true today as seventy years ago: material details may vary from area to area and the more advanced countries have evolved more efficient and powerful equipment, but the same basic forms are found everywhere. Von Brandt (1972 p.3) sees the ubiquity of the basic forms as the result of men finding the same or similar solutions to the same ubiquitous problems, and gives numerous illustrations of almost identical techniques and equipment in use in parts of the world widely separated in terms of both location and technological level.

It is therefore not surprising that the techniques and equipment used in Oman are by no means unique in their general design and principle, and they need be described only briefly here, except insofar as they have local specific aspects and implications. Batina fishing tackle and fishing craft are first discussed separately (Sections 2 and 3) and then in the spatial context of the Batina coast (Section 4).

5.2 Fishing tackle

5.2.1 Types and classification

Fishing tackle may for convenience be considered in three groups: nets, traps and lines.

The local terminology for different nets and net systems

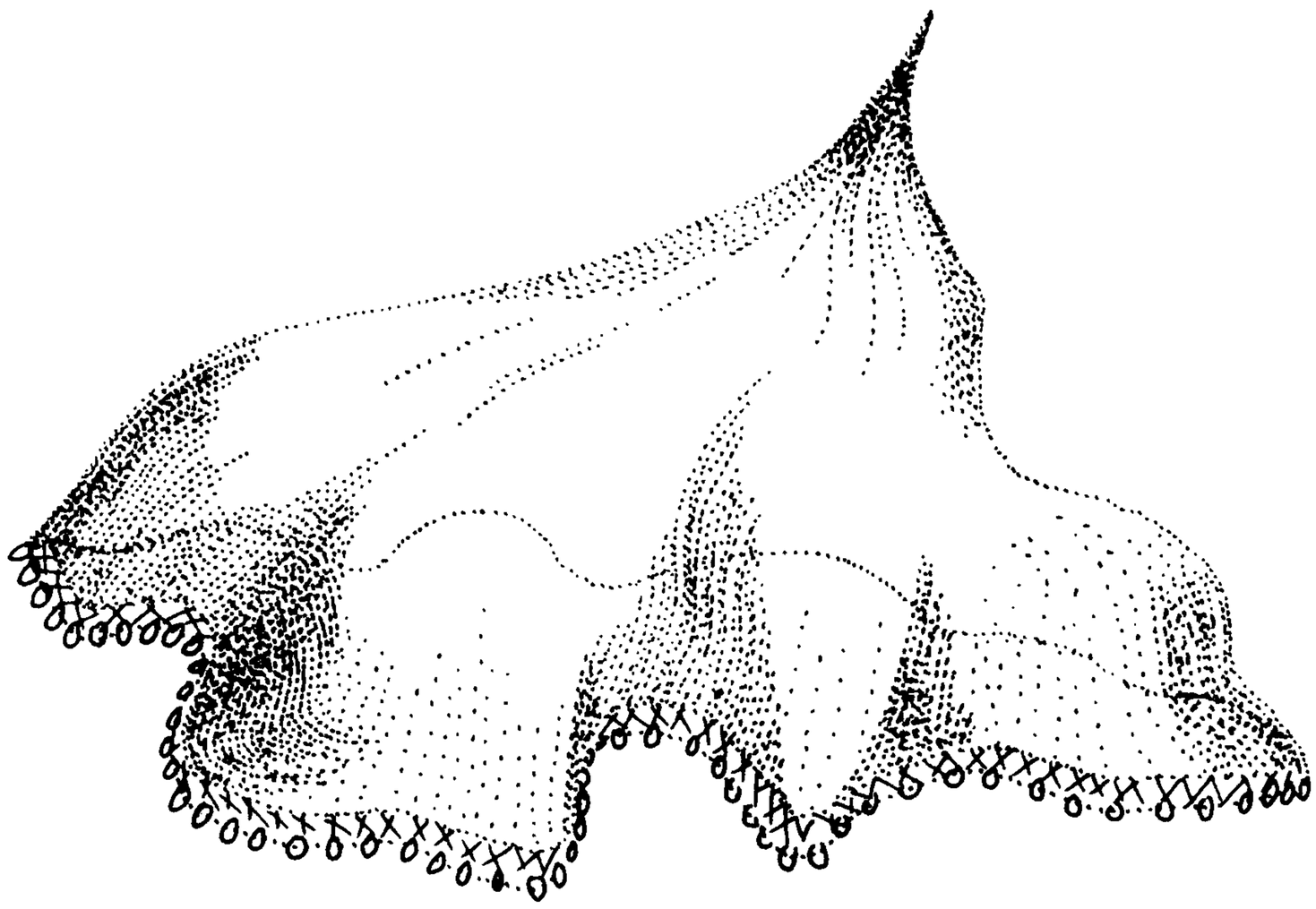
varies along the coast of the Batina. With the exception of jaruf for beach seine and faruwa for a type of small encircling net worked by waders, very few of the local terms are unambiguous along the whole coast. Batina nets are therefore best classified not by local terminology but rather by how they are thrown, laid or fixed in the sea. On this basis four categories are apparent: (i) castnets, (ii) encircling nets, (iii) fixed (or set) nets, and (iv) drift nets. The major characteristics of these are summarised in Table 5.1 and in Figures 5.1 to 5.7, and further details are given in Appendix E. It will be noted from the table that the beach seine requires by far the largest number of men to work it. Although fifteen is considered the minimum, the largest beach seines need thirty or more. Further, all net systems require at least one boat or shasha for their operation, except the faruwa which is worked by waders, and castnets which are also generally worked by waders. The discussion of costs of nets, which vary considerably, is left until Chapter Seven (Section 2).

As has already been noted in Chapter Three (Section 4) nylon netting has replaced cotton, and nylon ropes, polystyrene floats and iron anchors are everywhere found. As was also pointed out in Chapter Three (Section 4), galvanised steel wire has now completely ousted date fronds in the making of traps. The date frond trap was heavy and cumbersome, especially after having been left in the sea for some days, since the date fronds absorbed water. The wire type is illustrated in Figure 5.8, and usually measures between 1.25 and 1.5 metres in height. Traps of this kind are often

Table 5.1 Summary of characteristics of nets found on the Batina coast

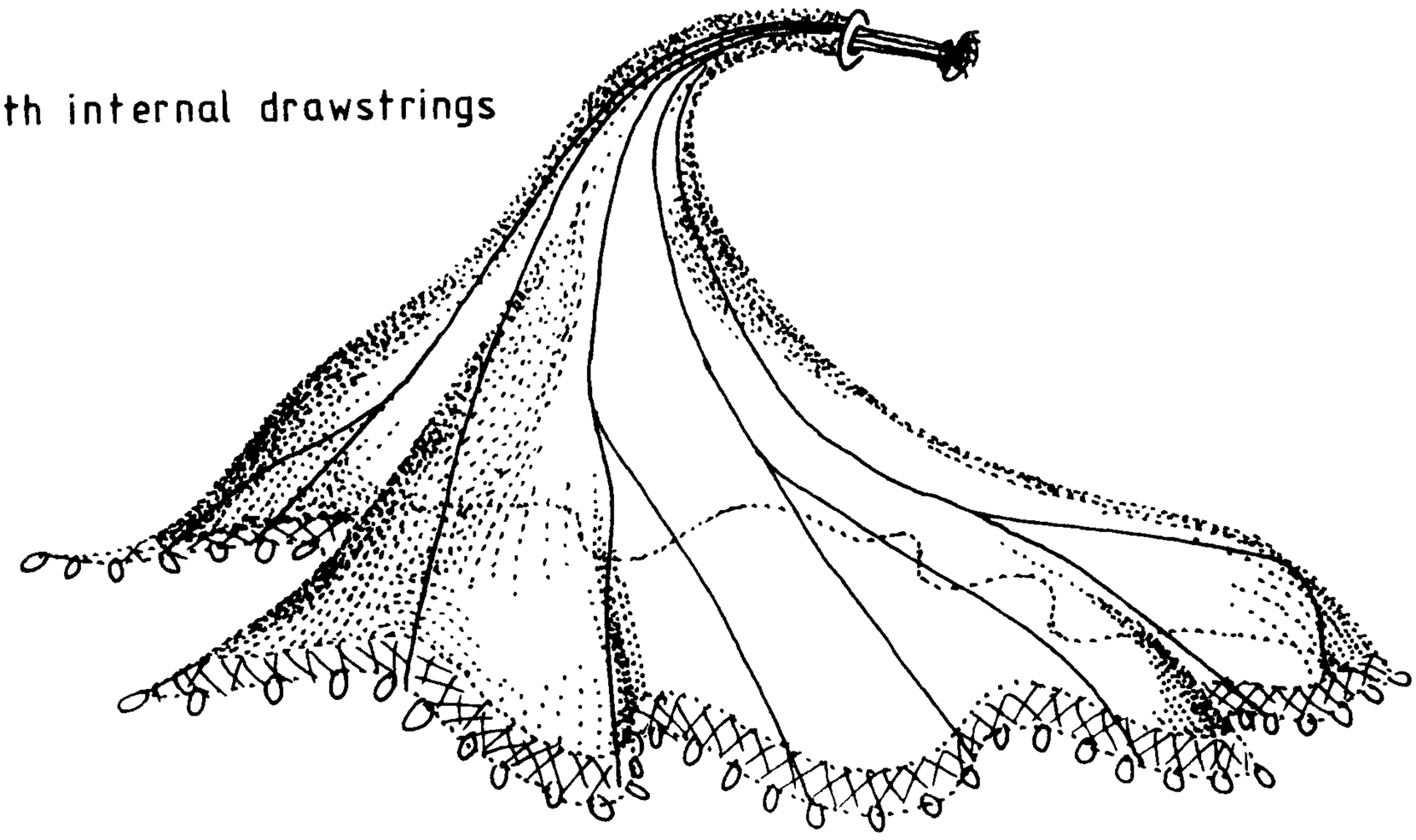
		Figure	Usual mesh size (knot to knot)	Estimated average cost	Usual dimensions	Method of use	Min.no. of men required	Local names	Main catch
a. castnets	1. with internal drawstrings	5.1	0.3 to 0.5 cm	RO 18	up to 20 m circumference	thrown by wader or from boat	1	ghall, shabka, saliya	sardines, anchovies
	2. without internal drawstrings								
b. encircling nets	1. beach seine (with or without bunt)	5.2	0.3 to 0.5 cm at centre	RO 250	up to several hundred metres in length	worked with one boat from beach	15	jaruf, dhaghw	sardines, anchovies
	2. offshore seines	5.3	various	RO 65	usually ca. 100 m long; longest seen = 320m long	worked by one or more boats	2	various, incl. hayyali, dhaghiya	various pelagic
	3. faruwa	5.4	0.3 to 1.5 cm	RO 8 to RO 10	up to 15 m long by 2 to 3 m depth	worked by waders without boat	5	faruwa	sardines, anchovies, mullet, and other small pelagic
c. fixed nets (gill and tangle set nets)	1. pen-type (i.e.keddle)	5.5	2 cm to 10 cm	RO 15 to RO 65	up to 100m long by 20m broad by 20m deep	fixed in sea with four to seven anchors at between 10 and 20m depth	3	mansab, sini	various medium to large pelagic and sharks
	2. Linear type	5.6	2 cm to 25 cm	RO 15 to RO 65	Up to 200 m long	fixed in sea with one anchor around which net revolves with current	3	hayyali, dawwari, tawali, mansab, &c.	various medium to large pelagic, and bottom fish
d. drift nets		5.7	2 cm to 6 cm	RO 65	100 to 200 m long	drifts with boat at night	2	hayyali, tawali, sini, &c.	various medium to large pelagic

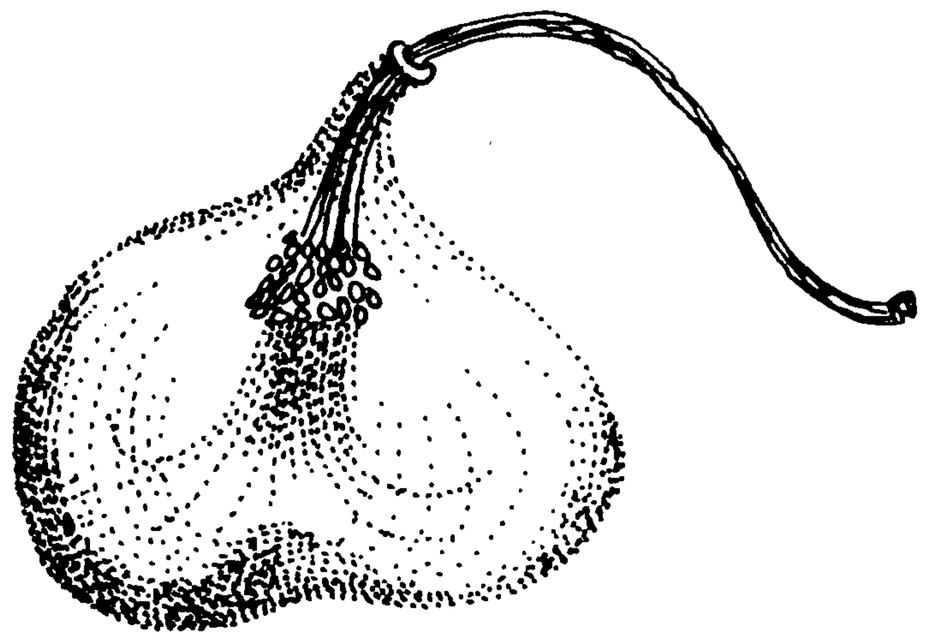
Figure 5-1 Batina castnets



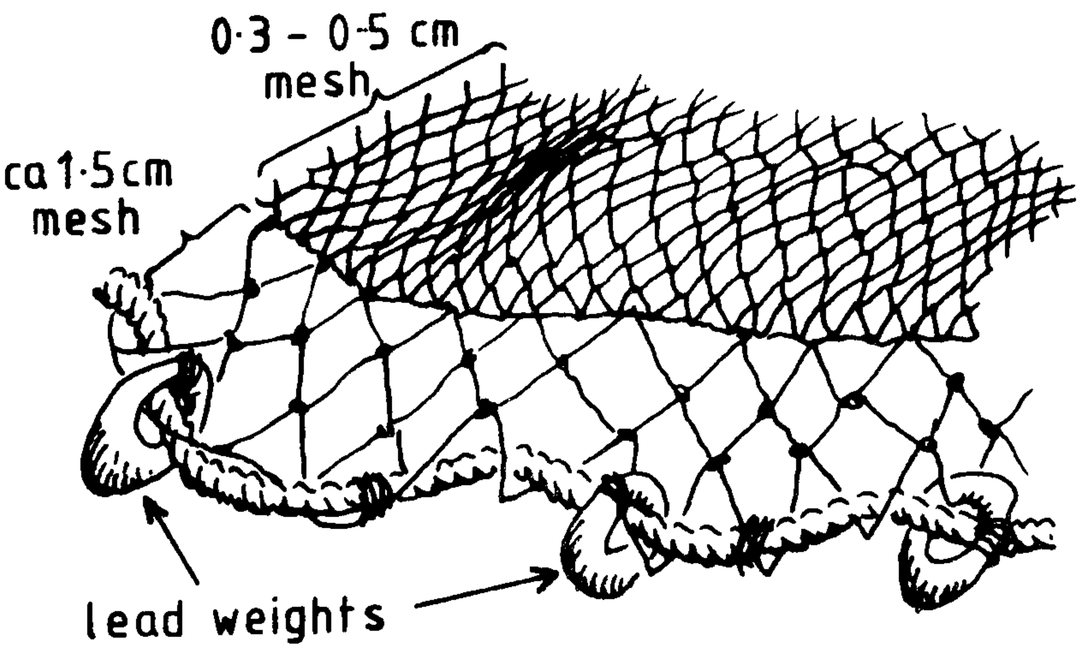
(a) without internal drawstrings

(b) with internal drawstrings



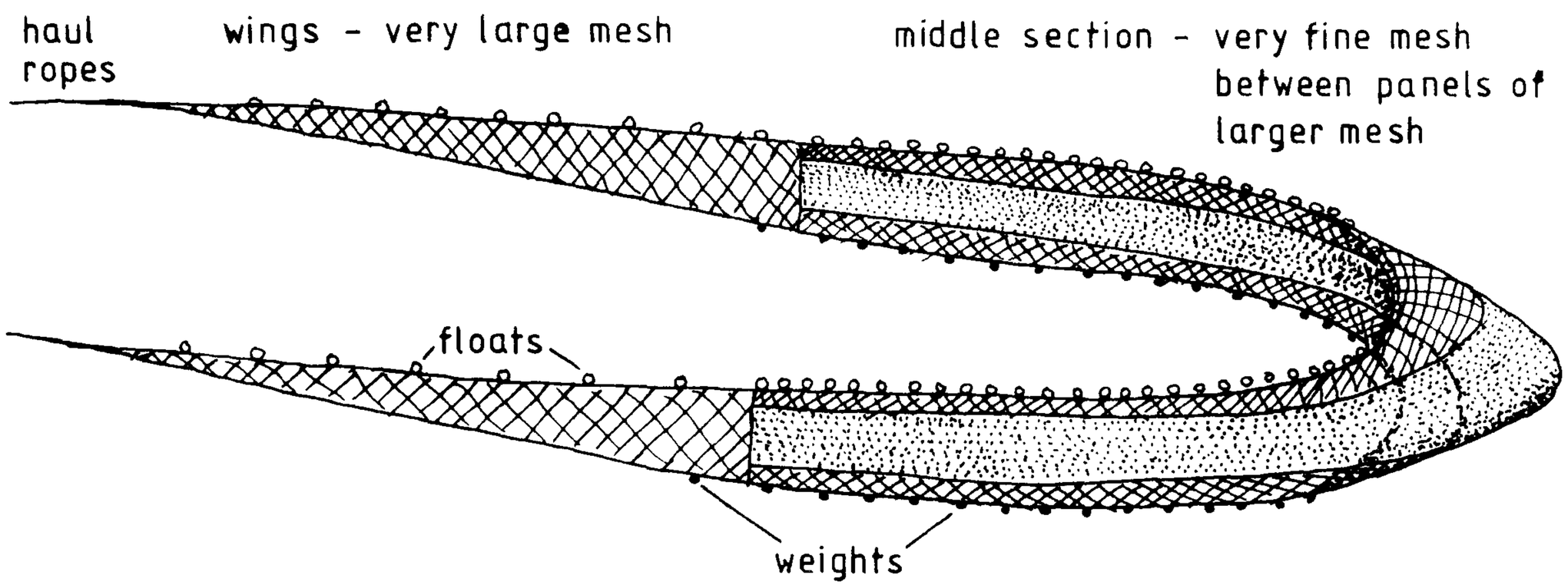


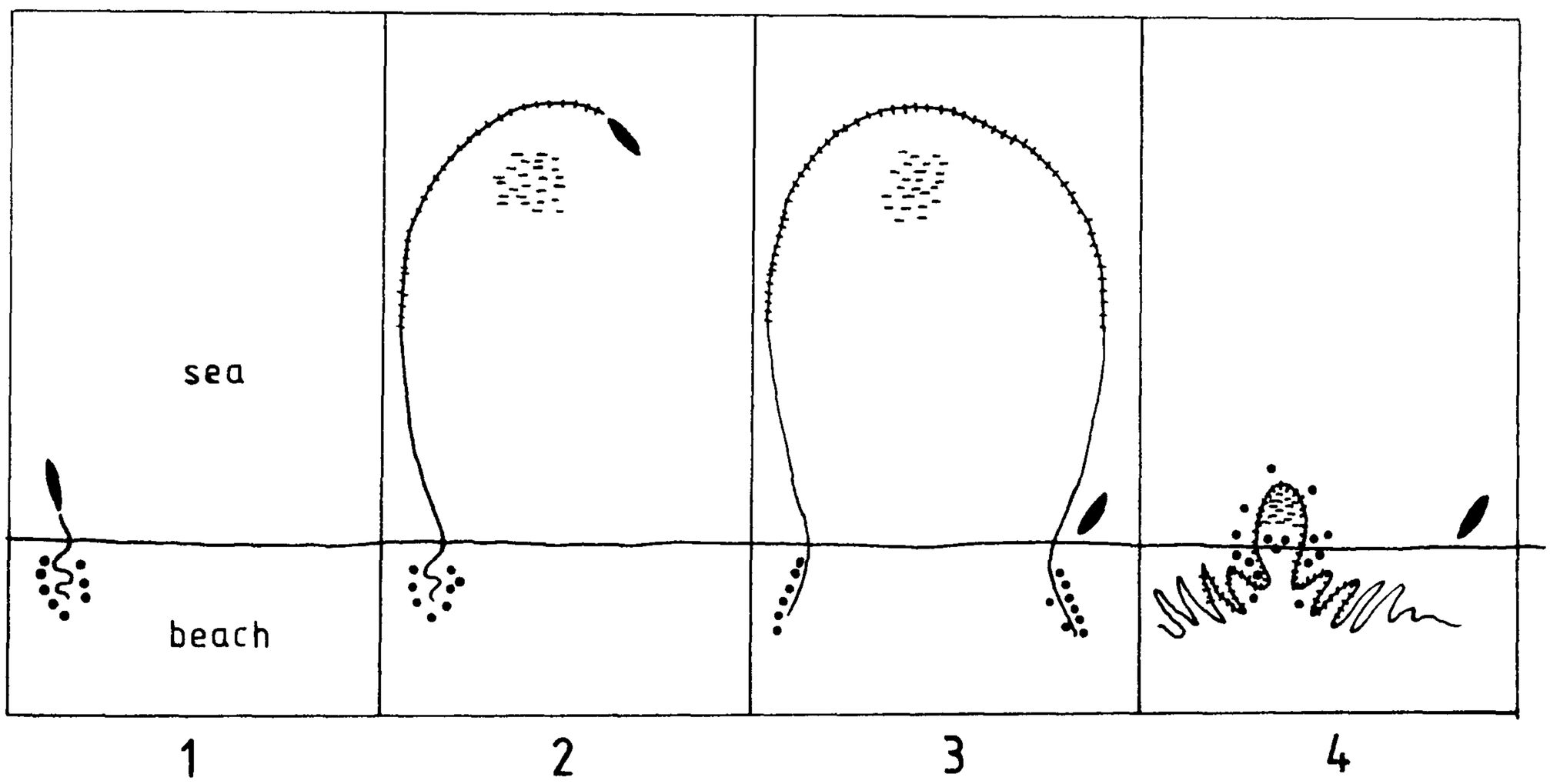
net closed



edge of net

Figure 5-2 The Batina beach seine





boat

rope

net

men

fish

Figure 5-3 Batina offshore seines

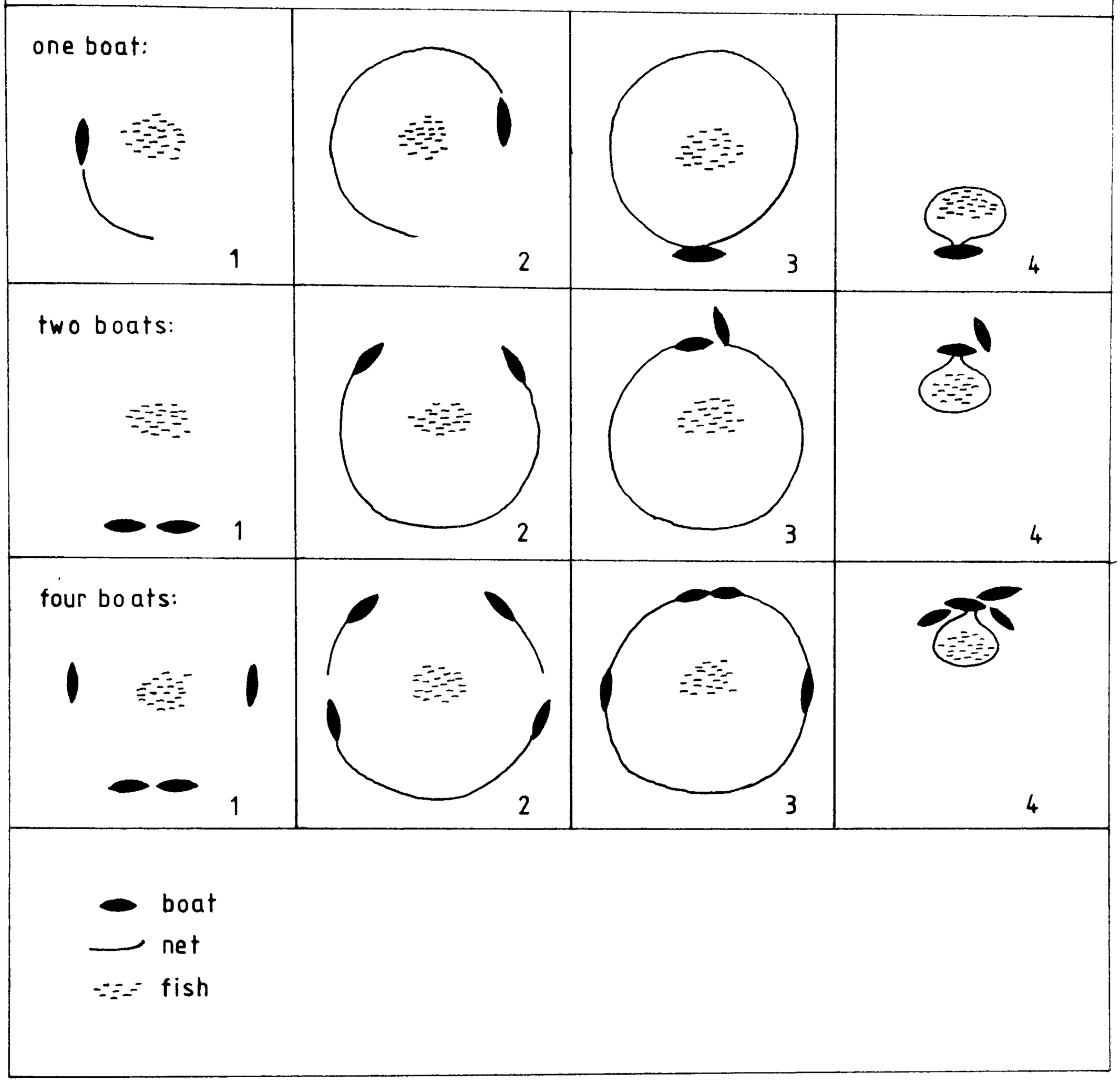


Figure 5-4 The Batina faruwa method

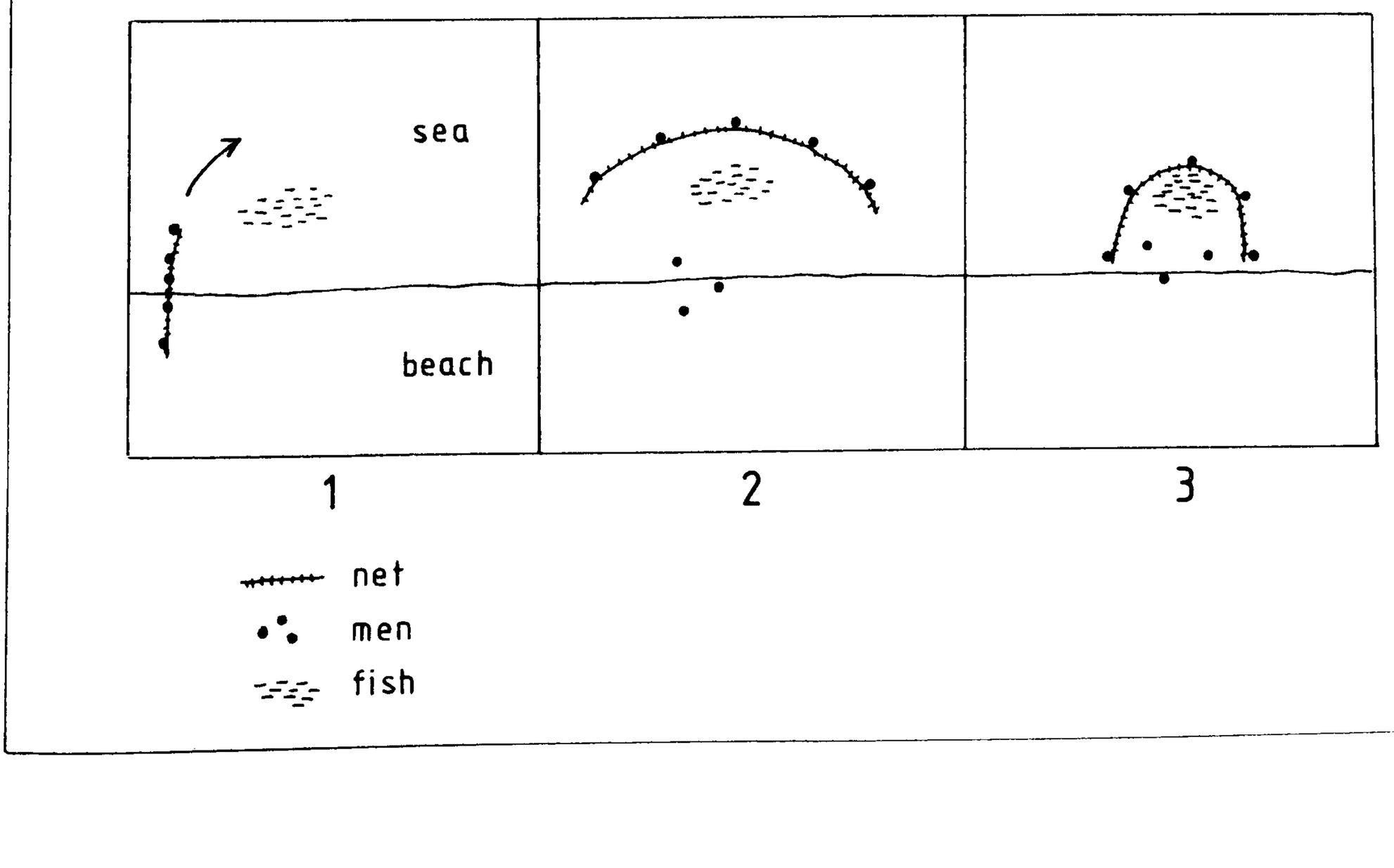


Figure 5-5 Batina pen-type fixed nets (Central Batina terms)

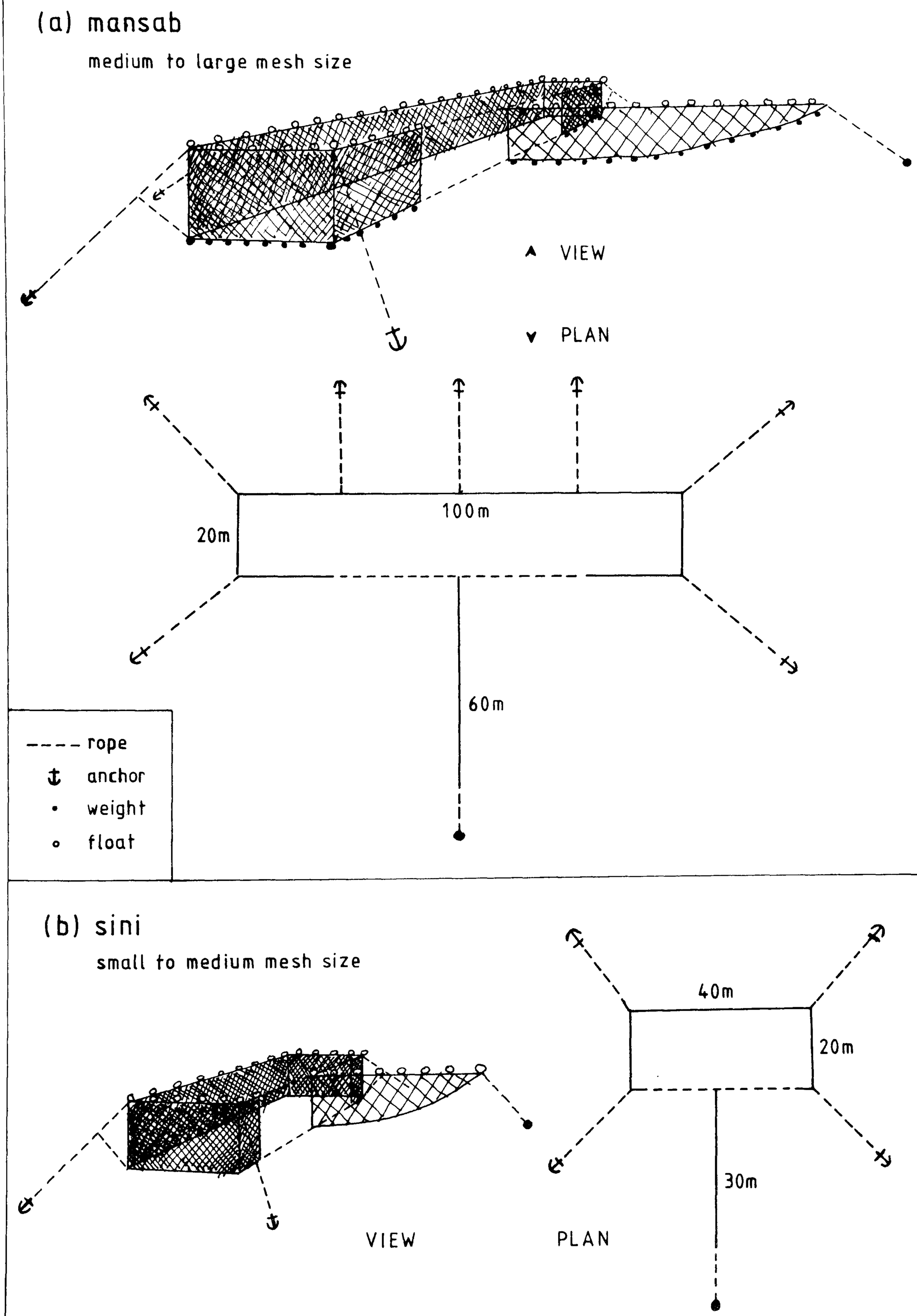


Figure 5-6 Batina linear fixed nets (Central Batina terms)

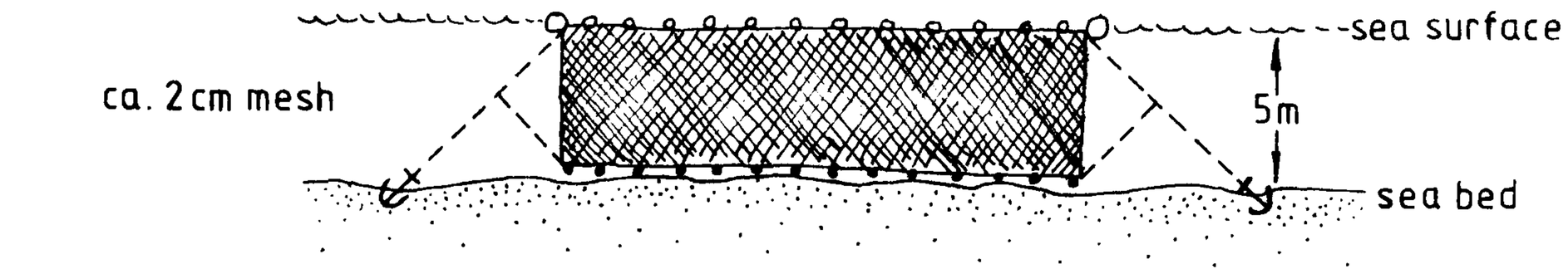


Figure 5-7 Batina drift net

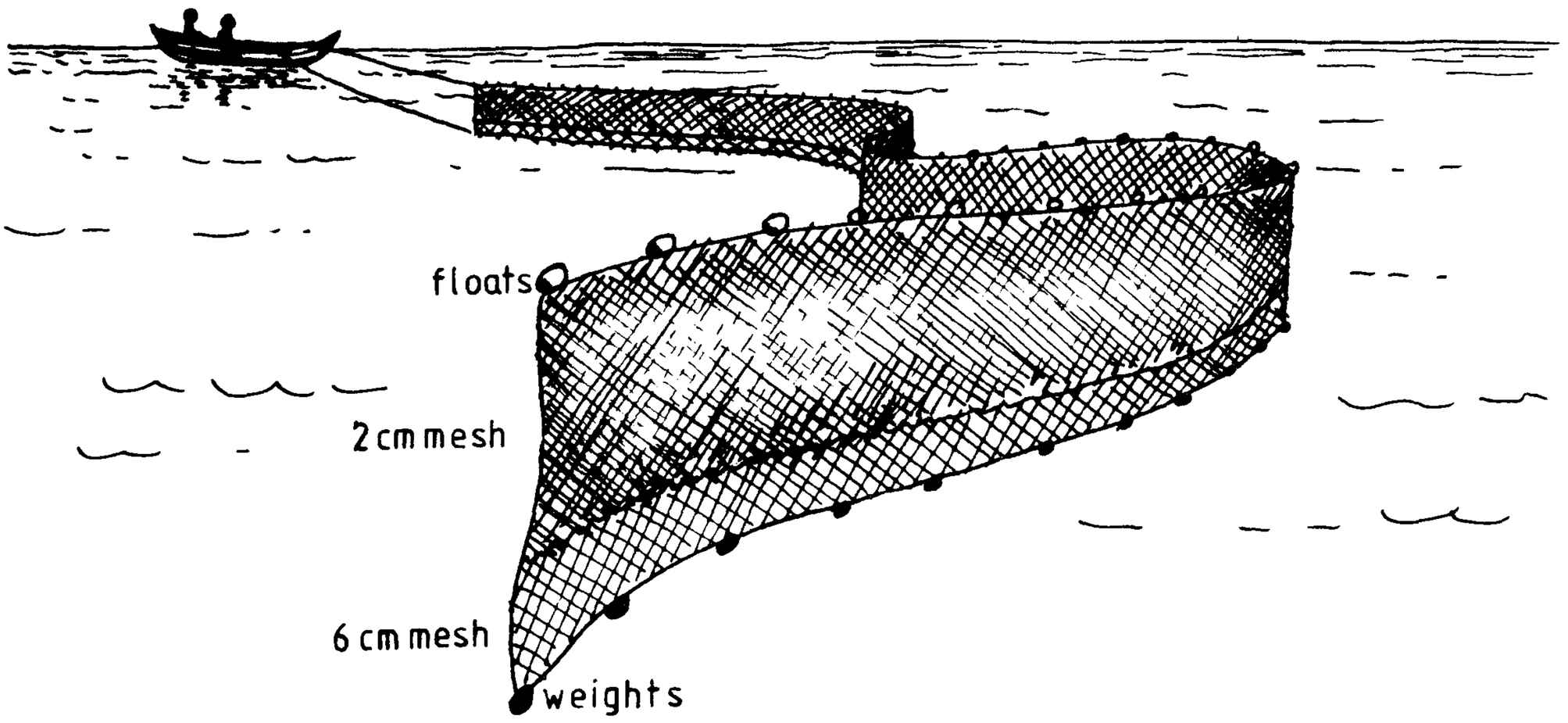


Figure 5-8 The Batina wire trap

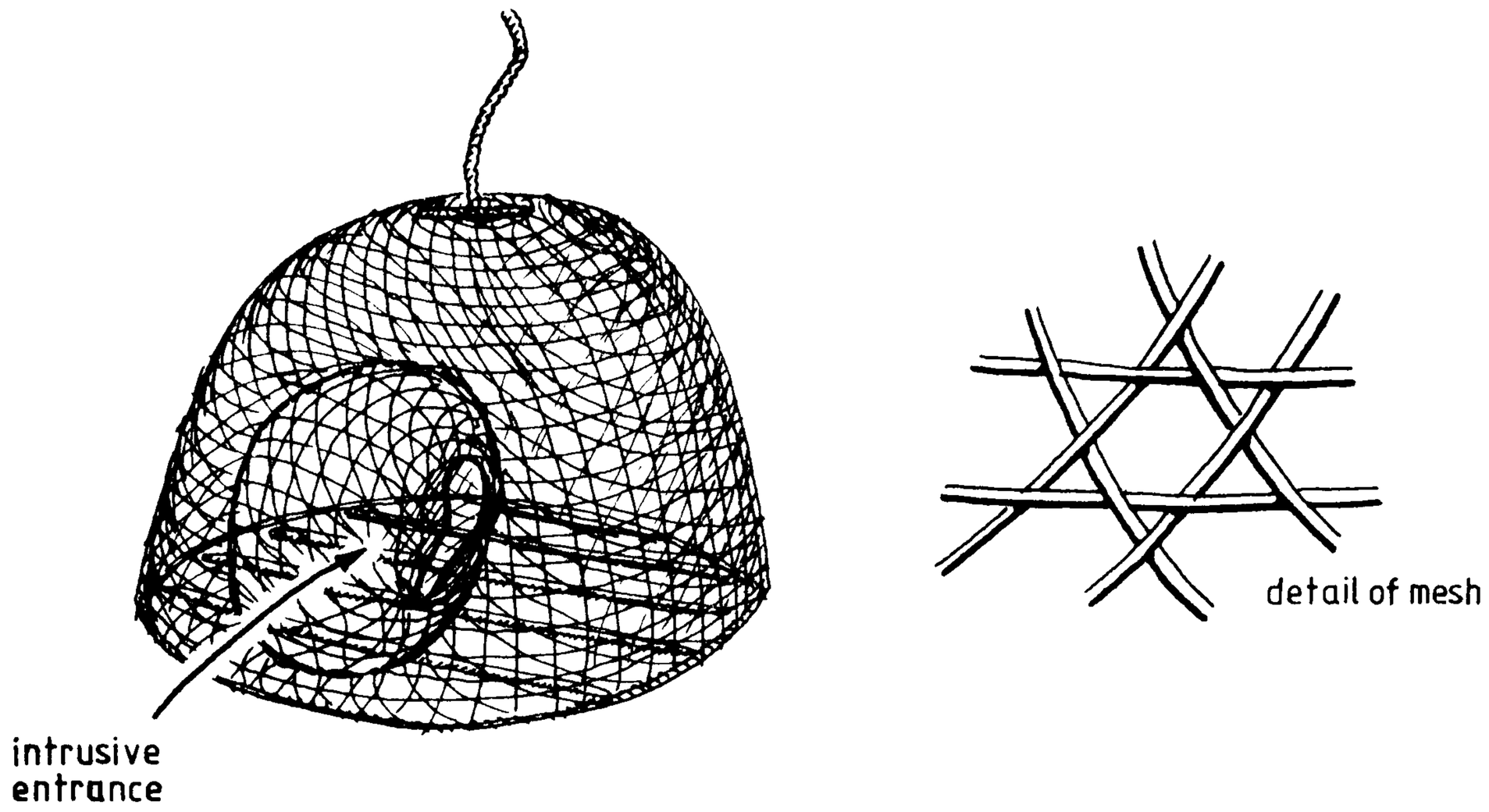
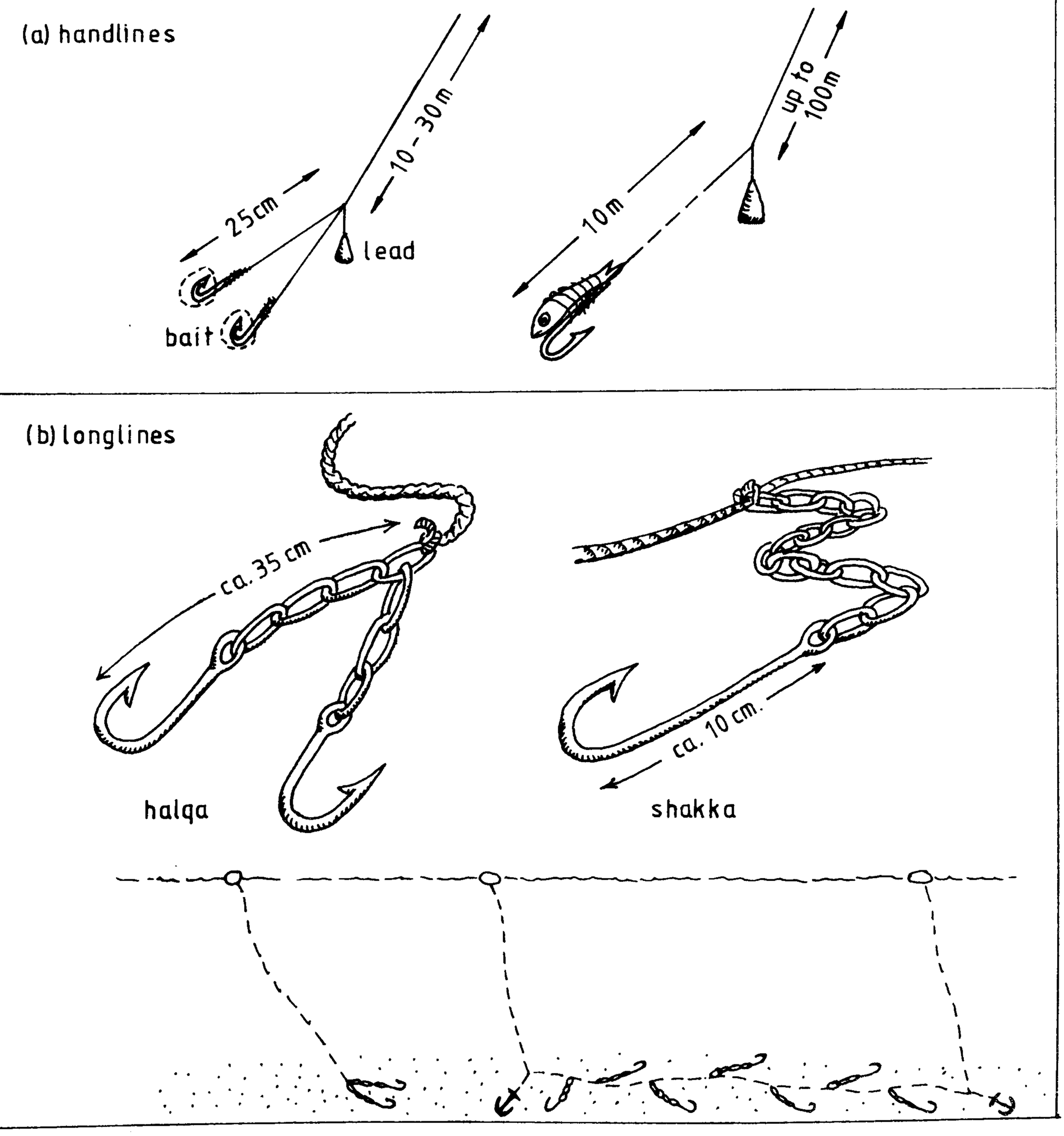


Figure 5-9 Batina handlines and longlines



baited with cuttlefish or other unwanted fish. Costs of traps are discussed in Chapter Seven.

Both handlines and longlines are used by Batina fishermen though they are less important than nets and traps. Longlines are always baited. Handlines are sometimes used with an artificial lure made of palm fibre and wood (Figure 5.9).

5.2.2 Tackle preferences

Preference for either nets or traps (in either case with or without lines) was found in some cases during the survey to be markedly defined by settlement. In the Khabura area, for example, the thirty fishermen of Qasbiyat al-Za'ab all fish with traps, but only three (all brothers) have nets. In Khawr al-Rasal, the next settlement along the coast, no traps at all are found but all the fishermen have nets. The same circumstance applies to contiguous settlements in other areas, for example in the wilaya of Barka: Haradi with nets only, and Basit nearly all traps. Several other instances could be quoted, and in no case could any physical or economic reason for such division of preference be found. Physical differences of the sea bed, for example, are minimal between contiguous settlements. Economic differences do exist even between neighbouring settlements, but these are insufficient to explain why some settlements favour traps and other nets. Capital outlay for an average set of traps is indeed less than for an average set of nets, as will be seen in Chapter Seven, but many of the poorer fishermen choose nets since smaller nets cost less than traps and last longer. The fishermen's own explanations for such differences between

settlements generally contain the idea that it is merely by tradition. This is indeed the most satisfactory explanation that can be suggested.

Such 'specialist' settlements form only a small proportion of the total however. In most settlements both traps and nets are found, though individuals within them often tend to prefer one or the other. Table 5.2 summarises the preferences among the 267 respondents in the questionnaire survey. As can be seen, nets are by far the most popular means of fishing, while the number of fishermen dependent on lines alone is very small. Traps have an intermediate popularity. It is considered that this accurately illustrates the position on the Batina as a whole.

In general terms traps have an advantage over fixed gill and tangle nets in that they need be inspected and emptied less frequently than is necessary with fixed nets. Inspection of fixed nets is necessary at least once daily since fish caught in them tend to die quickly (cf Davis 1958 p.4), and their quality is therefore subject to deterioration, especially rapid in summer when sea surface temperatures are 30°C or more. Further, the longer a fish is held in a fixed net, the greater is the risk of its being eaten or damaged by predators and scavengers. It was observed during the survey that on being raised fixed nets produced very few live fish. When a trap was raised on the other hand, all or at least most of the fish caught were alive, even when two or three days had elapsed since the last inspection.

Against this advantage of traps however is the fact that in Oman the pelagic fish, such as are caught mainly by

Table 5.2 : Numbers of respondents to questionnaire with nets, traps and lines

Respondents with :	Number of fishermen	Percentages of total respondents
nets but no traps (with or without lines)	133	49.81 %
nets and traps (with or without lines)	108	40.45 %
traps but no nets (with or without lines)	19	7.12 %
lines only (no nets or traps)	7	2.62 %
Total	267	100.00 %

nets, are preferred with a few exceptions to the bottom fish caught by trap.

The Batina pattern of preference for nets over traps and for pelagic fish over bottom dwellers contrasts with the situation over much of the rest of the Arabian Peninsula coasts. In the Arabian Gulf (especially from Bahrain northwards) and all along the Red Sea coasts, traps and lines are more important with the artisanal fishermen than nets, and bottom dwelling fish (in Bahrain especially that called hamur, a form of grouper) are considered the best eating. The main reason for this is undoubtedly the different nature of the sea beds. Traps are particularly productive where the bed is irregular and rocky. Off the Batina linear rocky outcrops (locally called jabals, literally 'mountains') which trend parallel to the shore occur at certain depths. These are known and used by the trap fishermen. Where no jabal crops out, the fishermen sink tree branches, oil drums, motor tyres or other large pieces of debris to attract bottom dwelling fish to their traps. Generally speaking however the floor of the continental shelf off the Batina is sand and mud and is therefore not entirely suited to trap fishing. In both the Arabian Gulf and the Red Sea on the other hand, coral reefs and rock outcrops form extensive areas of the sea bed, and more trap fishing is thereby encouraged.

5.3 Fishing craft

5.3.1 Types and classification

The types of fishing craft found on the Batina before the 1960s have already been described in Chapter Three (Section 3). These are the date frond shasha (strictly a

raft rather than a boat), and the plank-built badan and its relative the shahuf or baqqara. Both these types of plank-built craft were used principally with the beach seine.

The shasha is still vigorously used, as will be seen below (Chapter Six, Section 6), though its numbers, especially on the Lower Batina, have declined over the last decade.

The badan and shahuf/baqqara are still found, though by the mid-1970s they were being much less used, for reasons which have already been mentioned in Chapter Three (Section 4). First, from 1970 onwards shoals of sardines and anchovies, which formed the main catch of these craft, became much less abundant. Second, the large numbers of fishermen needed to crew them and to haul the beach seines have become more difficult to recruit in the last two decades. Third, probably the most decisive cause has been competition from motor power and the associated intrusion on to the Batina of craft not found there before the early 1960s.

Modification of the stern pieces of the Batina beach seine boats to accommodate engines, as has been carried out successfully on not dissimilar craft in India (Ziener 1956 pp. 47-50), would no doubt have been possible. In no case has this been done however. When the opportunity to motorise came, the Batina fishermen preferred to adopt forms of craft from elsewhere.

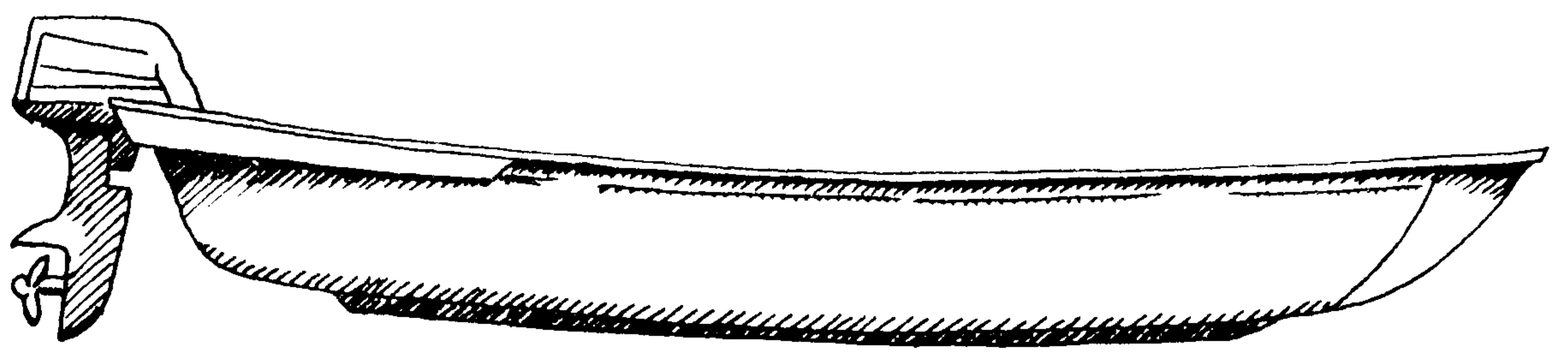
At first, in the early 1960s, only small outboard petrol motors were permitted in Oman, such as were suitable only for small craft. It is understandable therefore that the dugout huri, which was already found in the Capital Area and elsewhere in Oman and which could be motorised by a simple addition to the stern, was the first motor powered craft

to be adopted by the Batina fishermen (Figure 5.10). Since the early 1960s the huri, once absent from the Batina (Bertram 1948 pp. 5 and 28), has spread along the whole coast, and is especially numerous on the Lower Batina. Indeed, east of Musan'a it had completely ousted the shasha by the mid 1970s.

With the appearance of diesel inboard motors in 1970 came plank-built craft of designs new to the Batina but based on types current in the Arabian Gulf. These recently introduced designs are of two types, depending on the shape of the stern. The term shu'i is generally used if the craft has a transom (square-cut) stern, though these are in the minority. Most are of a double-ended type with a single stern post matching the stem. Both the double-ended type and the shu'i are loosely termed 'huri' by most fishermen, though other names are also in use, especially on the northern Batina. It is probable that their very recent appearance on the Batina has so far discouraged the adoption of any single unambiguous name for them.

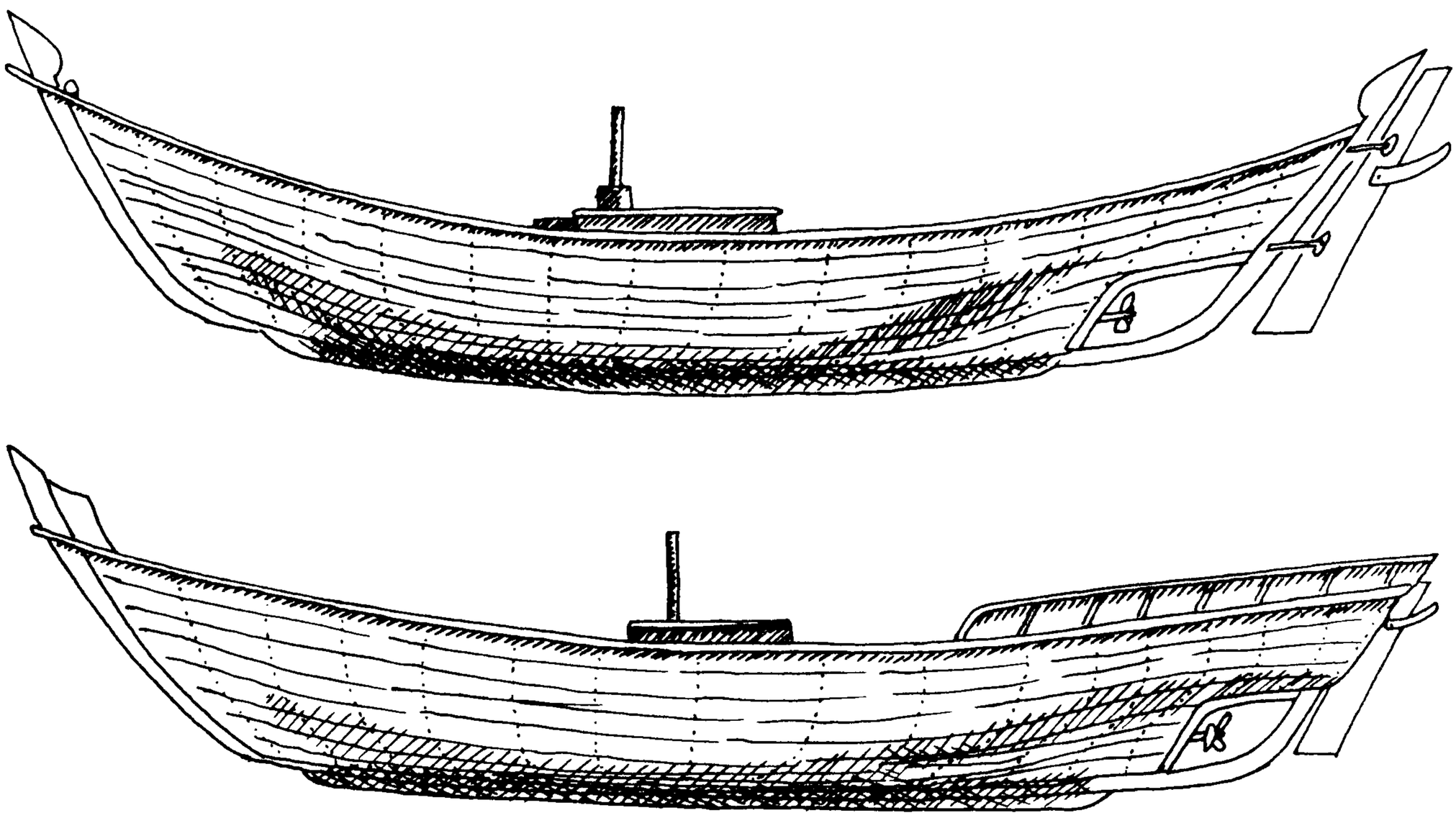
The shu'i and the large plank-built 'huri' are illustrated in Figure 5.11. A dozen were measured in the field and overall lengths ranged from 8.8 m to 12.1 m, and beam widths from 1.7 m to 2.4 m. They are therefore highly suited to receive inboard diesel engines of up to about twenty horsepower, and in fact eighty-five per cent of those encountered in the questionnaire survey were so powered. They are decked both fore and aft and are fitted with removable hatches. The central part of the vessel accommodates the engine, though the forward hold where the fish are carried amounts to about one-third of the total capacity of the boat, and additional

Figure 5-10 The dugout huri with outboard engine



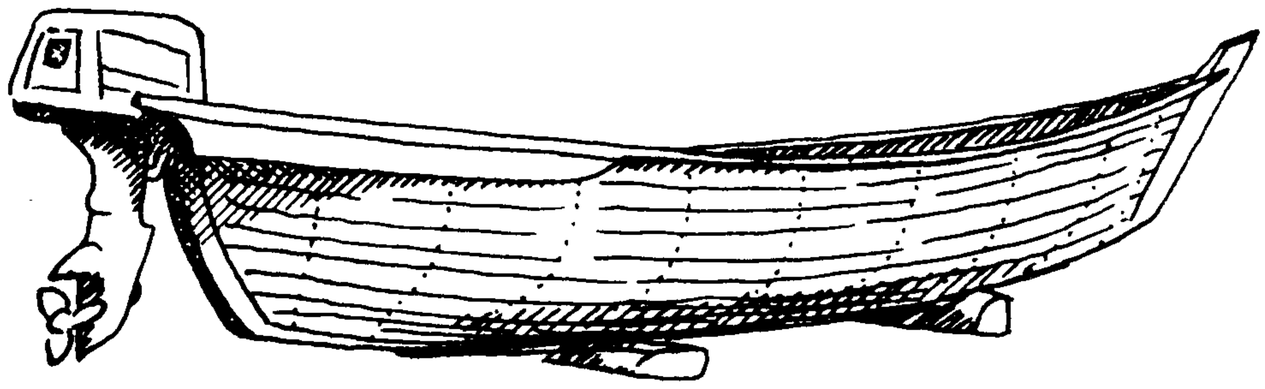
overall length 8m

Figure 5-11 The large plank-built 'huri' and shuʿi of the Batina



overall lengths 10·5m

Figure 5-12 The small plank-built 'huri' of the Batina



overall length 8m

storage space is available aft over the drive shaft. The total usable storage space is thus probably about 2.5 cubic metres for an average sized vessel.

A smaller, undecked version of the plank-built double-ended type is also seen, though in smaller numbers (Figure 5.12). It is much more akin to the dugout huri than to the other plank-built boats in terms of both size and cost, and like the dugout it takes an outboard petrol engine when motorised.

The characteristics of these six identifiable types of wooden craft found on the Batina in the mid 1970s are summarised in Table 5.3 and further details are given in Appendix F. As in the case of nets, it will be noted that the local terminology for craft, even within the Batina, is not always type-specific. Although badan is everywhere unambiguous, shahuf refers to a beach seine boat on the central Batina and to the motorised double-ended craft in the north. The dugout canoe is always called huri, though the same term is applied in places also to some plank-built vessels. Clearly therefore the local terminology is unsatisfactory for present classificatory purposes. Further, the small plank-built deckless craft are much better grouped with the dugout huri than with the other plank-built vessels. The following classification has therefore been adopted in subsequent discussion:

Class I : Small craft - Dugout huri canoes, with small plank-built craft of a similar size as a subsidiary and less numerous subtype.

Table 5.3 : Classification and characteristics of Batina wooden fishing craft

Structural characteristics		Typical dimensions length x beam (metres)	Type of fishing	Type of motor	Local nomenclature				Terms adopted in this thesis	
					Lower Batina	Central Batina	Upper Batina	Arabian Gulf and elsewhere in region		
dugout	double-ended canoe	7.25 x 1.0	all purpose	outboard petrol	huri	huri	huri	huri	dugout huri	Class I
plank-built	double-ended-both stem and stern pointed	7.75x1.25	all purpose	outboard petrol	huri	huri	huri, shahuf	(various)	small plank-built huri	Class I
plank-built	double-ended-both stem and stern pointed	10.75x2.0	all purpose	inboard diesel	(huri lansh)*	huri	shahuf	lansh	large plank-built huri	Class II
plank-built	transom stern	10.0x2.0	all purpose	inboard diesel	(shuʿi)*	shuʿi	shuʿi, lansh	sambuk, mashwa, lansh	shuʿi	Class II
plank-built	concave prow, tall vertical stern-piece	13.25x2.25	beach seine fishing	never motorised	(badan)*	badan	badan	*	badan	Class III
plank-built	straight pointed prow, vertical stern-piece	12.75x2.0	beach seine fishing	never motorised	*	shahuf	baqqara	amla	shahuf	Class III

* type rare or non-existent

Class II : Large all-purpose craft - The shu'i and the large double-ended 'huri'.

Class III : Beach seine craft - The badan and the shahuf/baqqara.

In none of the Batina settlements is there any natural harbour. Many of the wadi mouths contain water all the year round, and in some cases the water would be of sufficient depth to accommodate at least the smaller wooden craft. However, none is permanently open to the sea, as longshore drift and storms very rapidly close off the mouths of the wadis after rain water run-off has breached the beach. Boats of all types are therefore drawn up onto the upper beach on simple movable runners when not in use. In the case of the larger plank-built boats, each of which weighs several tonnes, hauling the craft up the beach in this manner is laborious and requires in many cases the efforts of ten men or more to accomplish it. When unloading at a market, the larger boats are not usually beached, but left to roll in the surf. In even a small surf damage to the keel can often result from a boat being bounced on the sand.

The distance of the fishing settlements from the sea varies. In the case of Dil and other settlements on the middle Batina the fishermen's houses are often no more than a few metres from the high tide mark, and when they are beached boats must be brought right up to the houses. In other areas, notably at Shinas, wide expanses of mud flats covered by shallow water lagoons at high tide separate the dune beach from the settlements, and boats must be beached half a kilometre or more from the houses. In the latter areas the ease with which boats can be manned and unloaded is reduced.

5.3.2 Boat building

As was noted in Chapter Three (Section 3) huris were traditionally imported as ready dugout shells from the Malabar coast of India. This continues to be the case. Both the importing merchants in Mutrah and the fishermen themselves speak of Mangalore as being the chief exporting port. It is usual for a fishermen to buy the basic dugout shell from a Mutrah merchant. Less usually he can buy from an intermediate trader in one of the Lower Batina markets, and save himself the trouble and at least part of the cost of transporting it from Mutrah.

In his fishing settlement he then engages the services of one of the professional boat builders to make certain modifications. The modifications are particularly necessary if the craft is to be powered by an engine since they include the construction of the engine mount on the stern. Other additions are the fitting of one or more planks to the gunwale to increase the freeboard, and two lengths of wood to the keel to give strength and to act as runners. The attachment of the keel runners seems frequently to require the strengthening of the inside of the huri by the insertion of transverse reinforcing spars. A stronger prow is often added at the same time, and in the larger dugouts removable cross-planking is often fitted inside, forming a part-deck and seats. The cost of these modifications is in addition to the cost of the huri shell and these will be dealt with later (Chapter Seven, Section 2).

It is unusual for a fishermen to search much further than his own settlement or its immediate neighbour for a boat builder capable of carrying out these modifications. Most of

the Lower Batina settlements which were visited were found to contain one or sometimes more small boat builders.

According to the fishermen, nearly all the plank-built boats on the Batina are also built locally by Batina boat builders. This is certainly the case as regards those detailed in the questionnaire survey. Of the ninety-five plank-built craft encountered in the interviews (i.e., sixty-one of Class II, ten of Class III and twenty-four small plank-built craft included in the 110 of Class I), the builders of fifty-one were known by the respondents. (The remaining forty-four were not known, usually because of changes in ownership). Table 5.4 shows that only three of these fifty-one were found to have been constructed by boat builders from places other than on the Batina; (one boat had been brought from Bahrain and two from the U.A.E.). In fact almost three-quarters of the fifty-one craft had been built by men from three Lower Batina settlements: Khadhra and Buwarih near Suwayq, and Abu Abali just east of Musan'a. Visits to these three settlements showed that each was the home of a group of particularly active specialist boat builders. Throughout the survey other less active builders were encountered from time to time, though it is the Khadhra, Buwarih and Abu Abali men who are the best known along the whole length of the Batina coast as builders of the large plank-built craft now fitted with diesel engines.

Several of the Batina boat builders, or their fathers before them, had, it was found, come originally from Sur, a famous Omani boat building centre. It was there that they had learnt their trade. Many had also spent some time in Bahrain and elsewhere in the Arabian Gulf where, they said, they had

Table 5.4 : Origins of boat builders of plank-built fishing craft encountered in the Batina interview survey

Origin of boat builder	number of plank-built craft	percentage of total known
Khadhra	20	
Buwarih	9	72.55%
Abu Abali	8	
other places on Lower Batina	7	
places on Upper Batina	4	21.57%
U.A.E.*	2	
Bahrain *	1	5.88%
Total where origin known	51	100.00%
Orgin not known by respondent	44	-
Total plank-built craft in survey	95	-

* U.A.E., Bahrain : origins of boats as well as boat builders

learnt the techniques of incorporating diesel engines into the design.

During the survey, four new plank-built boats in the process of being built were encountered. All but one of these was being constructed in the settlement in which it had been ordered, that is, the settlement of the fisherman. It is considered that this is the usual pattern: the boat builder visits the settlement of the client to build a boat rather than construct it in his own settlement and deliver it by sea when ready. In the fourth case it was this latter method that was being followed, though there the boat in question was much smaller than the other three and in any case the boat builder lived only a few kilometres along the coast from the settlement of the client fisherman.

It is likely then that nearly all the plank-built boats at present on the Batina were built on the Batina by boat builders who also live there. However it was also found that in most cases the capital needed to invest in a new boat (or even to buy one second-hand), which is sometimes considerable, is not of local origin, but rather is the product of several years' accumulated earnings on the part of the fisherman in the Arabian Gulf states. This important point will be taken up again later, as will also the question of costs of construction and maintenance (Chapter Seven).

5.3.3 Boat engines

Of the 181 wooden boats encountered in the questionnaire survey 146 (just over eighty per cent) were motorised. Ten of the 181 were Class III (*badans* and *shahufs*) which, as has been seen above, are never motorised. If these ten are omitted, the

proportion motorised increases to just over eighty-five per cent (Table 5.5). It is considered that this represents the overall pattern on the Batina.

Outboard petrol engines, which are fitted to Class I craft, were found to be of several different makes. Evinrude, Johnson and Seagull, the earliest models on the Batina, are still found but since 1973 the Japanese firm of Yamaha has encroached on their market so much that eighty-five per cent of the outboard engines encountered in the questionnaire survey were from this manufacturer. Yamaha's very rapid success has been mainly because of its very competitive pricing.

Since their appearance in 1970, inboard diesel engines from Western companies (notably Lister) have similarly suffered a reverse in the face of Japanese competition. Yanmar motors are now by far the most common inboard diesel engines, accounting for around ninety per cent of that type on the Batina.

Without doubt the largest single problem for the fishermen with motorised vessels, and the one most frequently referred to by them, is that of servicing and repairs. This is a common difficulty when an artisanal fishery is first motorised (compare for example George (1973 p.6) in India). Given the capital availability, it is relatively easy to import motors; but supporting services take time to develop indigenously, while expert and sympathetic planning on the part of the government or of commercial interests is required if the process is to be hastened and this has not happened so far in Oman. In the case of the Batina, the problem is felt most acutely by the owners of the inboard diesel engines. This is so, first, because inboard spare parts are available only from Dubai (since no agent

Table 5.5 : Wooden craft encountered in the questionnaire survey with engines, by class of craft

Class of craft *	Total in survey	Number motorised	Percentage motorised of total	
I	110	92	83.64%	85.38%
II	61	54	88.52%	
III	10	nil	-	
All craft	181	146	80.66%	

*Class I : dugout huris and small plank-built huris - outboard petrol engines

Class II : large plank-built craft - inboard diesel engines

Class III : beach seine craft - never motorised

for inboards exists in Oman), and second, because there is only one mechanic on the Batina who is genuinely competent and familiar with inboard diesel engines - that is, one man to service and repair a total of probably more than 300 inboard engines spread out along 150 km of the Batina from east of Suwayq to north of Shinas. In many settlements a man who is able to carry out small-scale repairs can be found, but his expertise does not generally extend beyond minor problems, and in any case he will not always be available since he carries out repairs as a favour rather than as a full-time occupation. The mechanics at garages on the main Batina road are skilled in land vehicle engines but not the types used by the fishermen, and in any case the garage proprietors are not at all willing to involve themselves with the problems of the fishermen.

The breakdown of his inboard diesel engine can therefore have serious results for a fisherman. Local general traders are unlikely to stock the replacement part he needs, and the fisherman will usually have to make a trip to the agents in Dubai, between 140 and 300 km away. The return fare will cost him around RO 10, and the trip will most likely involve other incidental expenses including probably an overnight stay. Having brought back the required spare part to his home settlement, he must then secure the services of someone who is capable of fixing it, which is not always an easy task. If a local man cannot be found who is equal to the problem, a message must somehow be got through to the only 'professional' repairer on the coast. Even if he is able to come immediately (which will be seldom) the period from breakdown to re-launching will at the very least be several days, and delays of two or three

weeks were in fact commonly met with on the survey. The financial loss to the fisherman will therefore be not only the amount spent directly on spare parts, transport and payment to the engine repairer (considerable though this may be), but also the loss of potential return from fishing during the whole period his boat is laid up.

Some of the more far sighted fishermen do, it is true, make use of any trip to Dubai to buy up a stock of replacement parts for their engines and also other fishing requisites cheaper in Dubai than in Muscat, such as netting and wire for traps. By this means the transport costs per item can be greatly reduced, and in addition the fisherman's time is saved. However, buying several items at a time requires a certain amount of capital outlay which may not be available to the fisherman at the time, and in any case no fisherman can be sure which part of his engine will next need replacing.

Concerning the other group of fishermen, those who own outboard petrol engines, their position is slightly easier. They can buy their motors initially from agents in Mutrah who in addition to supplying them also have workshop facilities to repair them. According to the agents, the standard of service is high and the availability of replacement parts good, and this is in general agreed by the fishermen.

However, here again the boat can be laid up and out of action for several days at least while the outboard motor is taken to Mutrah, repaired and brought back. The difficulty and inconvenience of getting the motor to Mutrah and back can be considerable, especially in more isolated settlements such as Suwadi, while a wait of two or three days was found during the

survey to be frequently necessary in Mutrah because of the pressure of demand on the repair service. The cost of the repair itself, which in any case varies with the seriousness of the fault, will thus again be only a part of the total actual cost to the fisherman.

The demand for replacement parts for both inboard and outboard engines on the Batina is high, having increased rapidly since 1970. The traders in the local Batina markets, however, have shown very little inclination to capitalise on this rising demand and very few indeed stock any marine motor spare parts. Many traders in Khabura market and several in other Batina markets were asked why they did not sell at least some of the more common parts needed, especially of the inboard type, assured as they would be of a ready local market. Part of the reason would appear to be their lack of knowledge of the types and models of motor parts which are required, and a lack of contacts with the Dubai and Mutrah suppliers. But the more basic reason is that the traders, like the garage proprietors, fight shy of any dealings with fishermen, since it may be presumed that if the will were there the knowledge could readily be acquired and the contacts established. The traders say that the fishermen would have to be offered credit like other customers, but that they would be very bad risks, escaping on their boats to their fishing settlements whenever payment were demanded.

It was found impossible to measure in any exact degree of detail the effect of motor breakdowns on the costs and efficiency of the fishermen, because of the wide range of unknown variables involved in each case. No fisherman was

found to keep any written record of how much he had spent on engine repairs, while incidental expenses and still more potential loss of earnings are extremely difficult to estimate with any precision. Insofar as the effect can be assessed, it is discussed in Chapter Seven (Section 2) under fishermen's costs. Indications are that it can be considerable. Several spot checks were carried out at different times at different fishing settlements to see how many boats were out of action at the time of the check. It was found to be quite usual for one-third of the boats in a settlement (excluding those whose owners were working elsewhere) to be laid up for repairs. In some cases the cause of the lay-up was damage to the fabric of the boat itself, but in most a motor fault was the reason.

5.4 The Upper Batina and Lower Batina fishing provinces

A spatial distinction which emerged early during the field survey and one which has already been referred to briefly (Chapter Three, Section 3) is that between the settlements of the Upper Batina and those of the Lower Batina. Early in the fieldwork in the Khabura area a remarkable difference was noted between the settlements lying from Hujayra northwards on the one hand (which can be called the Upper Batina), and those from Ghalil southwards on the other hand (the Lower Batina). The difference was evident in terms of both craft and tackle, and will now be investigated using the data derived from the questionnaire survey, the boat counts and other field observations.

5.4.1 Craft

Table 5.6 summarises the boat counts on the ninety kilometre stretch of coast from Saham to Musan'a. This shows

Table 5.6 : Frequencies of fishing craft counted on the Saham-Hujayra (Upper Batina) and Ghalil-Musan'a (Lower Batina) stretches, by class of craft

	Upper Batina (24 settlements counted)			Lower Batina (31 settlements counted)		
	number of craft counted	percentage of total in class	average number per settlement	number of craft counted	percentage of total in class	average number per settlement
Class I	36	14.75%	1.50	208	85.25%	6.71
Class II	108	85.71%	4.50	18	14.29%	0.58
Class III	27	100.00%	1.13	0	0%	0
All classes	171	-	7.13	226	-	7.29

conclusively that, although the average number of craft per settlement is virtually the same between Saham and Hujayra and between Ghalil and Musan'a when all types are taken together (7.13 per settlement against 7.29), there is a considerable difference between the two stretches of coast when the craft are differentiated by class. Over eighty-five per cent of the small craft counted (i.e. Class I) occur in the thirty-one Lower Batina settlements, while over eighty-five per cent of the large huris and shu'is (Class II) and all badans and shahufs (Class III) are found in the twenty-three Upper Batina settlements. According to the boat counts therefore, the Lower Batina is characterised by small boats and the Upper Batina by large boats.

To the north of Saham no continuous stretch was counted, but most of that stretch of coast was visited, and a prepond-erance of large boats over small was noted. Indeed, the impression was gained that the number of Class III (badans and shahufs) increases with distance northwards. Further, four of the five northern Batina settlements selected for the interview survey lie north of Saham. The breakdown of the boat counts in these four settlements is given in Table 5.7. It is true that in one of these four (Majazz al-Kubra), Class I boats outnumber both Class II and Class III. But taken as a whole, the large are by far in the majority.

Table 5.7 also gives the two interviewed settlements which lie east of the counted stretch beyond Musan'a. In these two settlements only one of Class II and none at all of Class III were found, against 111 of Class I. In fact from Musan'a eastwards as far as Sib no badan or shahuf was ever seen

Table 5.7 : Frequencies of craft counted in questionnaire survey settlements outside the Saham - Musan'a stretch, by class of craft

Settlement	Numbers of craft counted			
	Class I	Class II	Class III	All Classes
Northern Batina:				
Sur al-Abri	2	7	0	9
Harmul	7	10	4	21
Nasiriya	2	18	8	28
Majazz al-Kubra	3	1	2	6
Totals for northern four settlements	14	36	14	64
Southern Batina:				
Suwadi	66	1	0	67
Haradi	45	0	0	45
Totals for southern two settlements	111	1	0	112

and Class II were extremely rare. On the other hand, Class I were everywhere very numerous.

From Sib eastward this Lower Batina pattern changes. Class II remain rare and Class I numerous, but Class III, the badans and shahufs, occur again. No sample settlements fell within this stretch and no continuous boat counts were made. However, it is estimated from visits to all the settlements between Sib and Qurm that about twelve badans are found on this stretch.

The evidence of the boat counts and the visits to the other settlements not counted indicates conclusively that the Upper and Lower Batina differ considerably in terms of types of boats at present in use. Table 5.8 summarises the situation. The dividing line is sharp and falls between the settlements of Hujayra and Ghalil, just south of Khabura. The Upper Batina is characterised by large plank-built huris and shu'is. The original plank-built Omani beach seine craft, the badans and shahufs, are also still found in considerable numbers on the Upper Batina, though as has been discussed in an earlier section their use is now limited. The small plank-built craft and dugout huris on the other hand are very much less common on the Upper Batina, though on the Lower Batina it is this latter type which by far predominates, and the large plank-built huris and shu'is are extremely rare in comparison. Between Ghalil and Sib badans and shahufs are entirely absent, though from Sib eastwards the badan reappears.

The pattern is thus easily stated. Explanation will be attempted after a discussion of the fishing tackle evidence for the distinction between Upper and Lower Batina.

Table 5.8 : Summary of frequencies of different classes of craft on the Batina

Section of Batina	Class of craft		
	I	II	III
Upper Batina : Khatmat Malaha to Hujayra	few	large number	present
Lower Batina: (a) Ghalil to Sib	large number	very few	absent
(b) Sib to Qurm	large number	very few	present

5.4.2 Tackle

Tables 5.9 and 5.10 summarise the frequencies with which different items of tackle occurred among the respondents in the questionnaire survey on the Upper and Lower Batina. Considering first Table 5.9, which gives the numbers of respondents with and without the various items of tackle indicated, it can be seen that in terms of traps and lines there is very little difference between the two parts of the Batina. The difference is larger for nets when the different types are taken together: fifteen per cent of the respondents on the Upper Batina had no nets compared with only one per cent without nets on the Lower Batina. However, when the nets are differentiated by type, impressive differences in distribution can be seen in the case of castnets, faruwa nets and beach seines. On the Lower Batina no respondent had a beach seine and only one had a faruwa, but eighty-eight per cent possessed at least one castnet. On the Upper Batina on the other hand only eleven per cent had a castnet, but almost a quarter had either a faruwa or a beach seine or both.

A similar pattern is found if the number of items of different types of tackle occurring among the questionnaire respondents are totalled for the Upper and Lower Batina (Table 5.10). The number of castnets per hundred respondents was almost ten times greater in the Lower Batina sample than in the Upper Batina sample, while all the fifty-three beach seines and all but one of the forty-five faruwas were found on the Upper Batina.

When the numbers of all nets counted from the responses are taken together, irrespective of type, a larger difference

Table 5.9 : Frequencies of occurrence of different types of tackle among questionnaire respondents on Upper and Lower Batina

Type of tackle	Upper Batina number of respondents	%	Lower Batina number of respondents	%	Whole Batina number of respondents	%
TRAPS						
respondents with at least one	73	44%	47	47%	120	45%
respondents without any	94	56%	53	53%	147	55%
all respondents	167	100%	100	100%	267	100%
LINES						
respondents with at least one	155	96%	95	95%	250	95%
respondents without any	7	4%	5	5%	12	5%
all respondents	162	100%	100	100%	262	100%
not asked	5	-	-	-	5	-
NETS, undifferentiated						
respondents with at least one	142	85%	99	99%	241	90%
respondents without any	25	15%	1	1%	26	10%
all respondents	167	100%	100	100%	267	100%
NETS, differentiated						
Castnets						
respondents with at least one	18	11%	88	88%	106	40%
respondents without any	149	89%	12	12%	161	60%
all respondents	167	100%	100	100%	267	100%
Faruwa nets						
respondents with at least one	36	22%	1	1%	37	14%
respondents without any	131	78%	99	99%	230	86%
all respondents	167	100%	100	100%	267	100%
Beach seines						
respondents with at least one	40	24%	0	0%	40	15%
respondents without any	127	76%	100	100%	227	85%
all respondents	167	100%	100	100%	267	100%

Table 5.10 : Numbers of items of different types of tackle owned by questionnaire respondents on Upper and Lower Batina

Type of tackle	Upper Batina (167 respondents)		Lower Batina (100 respondents)		Whole Batina (267 respondents)	
	number of items	per 100 respondents	number of items	per 100 respondents	number of items	per 100 respondents
Castnets	40	24	226	226	266	100
Faruwa nets	44	26	1	1	45	17
Beach seines	53	32	0	0	53	20
Large pen-type fixed nets	76	46	57	57	133	50
Linear fixed nets, small pen-type fixed nets, and drift nets	600	359	505	505	1105	414
All nets, undifferentiated	813	487	789	789	1602	601
Traps	540	323	218	218	758	284

between the Upper and Lower Batina parts of the sample would seem to be apparent than was the case in Table 5.9 when simply possession or absence of nets was recorded. According to the sample, 487 nets (of all types) per hundred fishermen were found on the Upper Batina, while on the Lower Batina, 789 nets per hundred fishermen were counted, almost two-thirds more. This can probably be explained by the smaller average size of individual nets (in particular the large numbers of castnets) occurring on the Lower Batina.

With traps, 323 per 100 fishermen were found in the Upper Batina sample but only 218 per 100 on the Lower Batina. As far as the number of traps is concerned therefore, traps were more common in the part of the sample on the Upper Batina than that on the Lower Batina, even though a very slightly larger proportion of fishermen interviewed on the Lower Batina owned traps than on the Upper Batina (Table 5.9 : 47% as against 44%). This indicates that the average number of traps per trap-owning fisherman in the sample is considerably higher on the Upper Batina than on the Lower Batina (actually 7.40 traps per trap-owning fisherman as against 4.64 for the Upper and Lower Batina respectively).

This then is the pattern of distribution of tackle produced by the data from the sample of 267 respondents, that is, 167 on the Upper Batina and 100 on the Lower Batina. Since the two parts of the sample are not truly statistically random because of the difficulties of collection of the field data, as explained in Chapter Four (Section 2), tests for significance of differences between samples, such as analysis of variance or the χ^2 test, cannot reasonably be applied here. However it is submitted that the differences between the Upper and Lower

Batina samples in the cases of many of the items of tackle shown in Tables 5.9 and 5.10 are of such a magnitude that, coupled with the observed differences in the distributions of boats already discussed, they do indicate beyond any reasonable doubt that two stretches of coast form two distinct provinces as regards fishing methods and equipment.

5.4.3 Reasons for the distinction between Upper and Lower Batina

Several explanations might be attempted for this distinction between Upper and Lower Batina. Taking first of all the types of craft which are new to the Batina (i.e., Class I and II), the differences in distribution can perhaps be seen as the result of 'invasion' of each class from the end of the Batina at which it was originally most common and most available. That is to say, dugout huris were formerly found among the 'rock' fishermen of the coast from Qurm eastwards (Bertram 1948 p. 8) and their import was (and still is) via Mutrah, so that the fishermen of the Lower Batina would be more likely to adopt them than would the fishermen of the Upper Batina who are more distant from Mutrah. The large plank-built craft of Class II on the other hand originated in design from the Gulf, that is to say, nearer the Upper Batina than the Lower Batina, and could be expected therefore to be adopted more readily by Upper Batina fishermen. The pattern would be strengthened by the fact that the nearest source of inboard diesel engines was (and is) in Dubai, whereas only outboard petrol engines are available in Mutrah. The influence of Dubai on the Upper Batina and of Mutrah on the Lower Batina might thus be seen as the underlying cause of the markedly peaked distributions of the types of craft new

to the Batina (See also Appendix G).

This explanation, although probably true as far as it goes, does not account for the equally marked differences in distribution of the traditional Batina craft, Class III, the badans and shahufs, nor for the different frequencies of the different types of tackle. These are interrelated to a large extent. It will be recalled that both Class III craft and the beach seine nets associated with them are absent over most of the Lower Batina (specifically the wilayas of Suwayq, Musan'a and Barka), while castnets which are designed to catch predominantly the same species of fish, are considerably more common on this stretch then elsewhere. The fishermen on both parts of the coast are conscious of this distributional difference and accounted for it in a variety of ways.

Some suggested that unfavourable currents and winds on the Lower Batina, which faces predominantly northward, made beach seining an unsuitable method there. However this would not explain why the system appears again in the Sib area, nor why the break between the beach seine stretch and the castnet stretch in the central Batina should be so abrupt.

Alternatively, it was occasionally suggested by other fishermen that the slope of the submerged littoral was the deciding factor. It might readily be imagined that castnets would be most effective when the beach slopes gently, so allowing the thrower to wade out further, while for the beach seine the slope would, within limits, be less critical. Two fishermen at Uwayd on the Lower Batina, for example, claimed this: that the slope of the beach at Uwayd was particularly suitable for castnet fishing, while at Sib, they said, the slope

is steeper and therefore the beach seine is used. This explanation is somewhat improbable as a general principle since beach slopes can change greatly overnight in stormy conditions, while some castnets, especially those with internal drawcords, are used successfully from boats in water which, although shallow, is too deep for wading. Moreover, it leaves unexplained the distribution of the faruwa method which also involved wading and which is confined precisely to those parts of the coast where the beach seine is found and where castnets are very much less popular.

Unconvincing though these reasons are as complete explanations for the distributions of Class III craft and the different types of tackle, they may in certain local cases have some validity. However, most fishermen who were asked were able to provide a much more satisfactory reason. At some indeterminate date in the past, certainly decades ago, and possibly even a century ago or more, the ruling sultan, they maintained, prohibited the use of the beach seine in the wilayas of Suwayq, Musan'a and Barka so that the poorer fishermen of these wilayas who could afford only castnets and shash would be protected from the few who were rich enough to own beach seines and badans which by their nature are capable of clearing a large area of sea of most of its fish. Although the ban seemingly has no official recognition now, the pattern of employing castnets instead of beach seines from Suwayq wilaya to Barka wilaya, and the reverse pattern elsewhere, have become entrenched so as to be locally traditional.

This explanation implies a further point: that the fishermen over most of the Lower Batina were on the whole less well-off than those on the rest of the Batina in having to be

protected from the few who could afford beach seines and badans. Whether this was true, or still is true today, is difficult to determine in the complete absence of any comparative household income or expenditure data for the two sets of settlements. It is perhaps noteworthy however that today fishermen on the Upper Batina (who prefer large boats with inboard diesel engines to dugouts with outboard petrol engines) are able to invest on average three times as much capital in their boats and engines than the Lower Batina fishermen do, as will be shown in Chapter Seven. The average amount a fisherman invests in tackle is also larger on the Upper Batina than on the Lower Batina, whether by choice, habit or necessity.

5.5 The size of the Batina fishing fleet

In Table 5.11 an attempt has been made to estimate the total numbers of the different classes of fishing craft on the Batina, bearing in mind the differences that have been shown to exist between the Upper and Lower Batina. The estimates for the wooden craft are based on the average numbers per settlement as derived from the boat counts between Saham and Musan'a and in the six other sample settlements lying outwith this stretch. The totals for the Batina have been found by assuming that the distributions on the uncounted stretches of coast are the same as on the counted stretches. Most of the uncounted settlements were visited by the present writer and in his judgment this is a sustainable assumption, within acceptable limits.

The number of shash is more difficult to determine. The estimate of 3,000 has been chosen with the following considerations in mind. It will be shown in Chapter Six (Section 2)

Table 5.11 : Estimation of numbers of fishing craft on the Batina, by class of vessel, based on the Saham-Musan'a boat count and other counted settlements

	Numbers of wooden craft			Numbers of shash
	Class I	Class II	Class III	
Upper Batina				
28 counted settlements (1)	50	144	41	
average per settlement	1.79	5.14	1.46	
estimated total (63 settlements)	113	324	92	?2,250
Lower Batina				
33 counted settlements (2)	319	19	0	
average per settlement	9.67	0.58	0	
estimated total (60 settlements)	580	35	12 (3)	? 750
Estimated totals for Batina	693	359	104	?3,000

Notes :

(1) i.e. 24 settlements from Saham to Hujayra plus Majazz al-Kubra, Nasiriya, Harmul and Sur al-Abri

(2) i.e. 31 settlements from Ghalil to Musan'a plus Suwadi and Haradi

(3) i.e. the number of Class III craft on the Lower Batina eastwards of Sib (see Section 4 above)

that there are some 3,500 adult fishermen on the Batina. Of these about 1,500 are thought to live on the Upper Batina and about 2,000 on the Lower Batina. According to the questionnaire responses the average number of shash owned by a fisherman on the Upper Batina is about 1.5 which would give a total of some 2,250 shash on that stretch of coast. On the Lower Batina and especially east of Musanʿa, the shash has been largely replaced by the dugout huri, as has already been observed (Section 3 above). A total of 750 shash for the Lower Batina would therefore seem to be a reasonable estimate. The total for the whole Batina would therefore be 3,000 shash.

At this point it is convenient to consider the value of capital invested in the craft and motors on the Batina, though a fuller discussion of costs is left until Chapter Seven. Using mean unit replacement costs, the calculation of which is explained in that chapter, Table 5.12 puts forward the estimated capital invested in each class of craft, together with their motors, at 1976 values. As can be seen, when totalled the value exceeds RO 1 million, even when the Class III craft are omitted. In the opinion of the present writer, this is a substantial amount.

5.6 Conclusions on Batina fishing methods and equipment

The year 1970 was significant for Batina fisheries in more than one way. It was marked by the removal of import restrictions on the larger motors, but also by the decline in abundance of the sardine and anchovy shoals on which the larger pelagic fish to a great extent rely on for food. Although the disappearance of the sardines and anchovies is probably only a temporary phenomenon, it has combined at a

Table 5.12 : Estimation of the total values of capital invested in craft and motors on the Batina, at 1976 replacement costs

	Class I	Class II	Totals Classes I & II	Shash	Totals Class I & II and Shash	Class III	Totals all craft
CRAFT							
mean unit cost (see Chapter Seven)	RO 425	RO 1,300		RO 12		RO 1,300	
estimated number on Batina	693	359		3,000		104	
total estimated values of craft on Batina	RO 295,000	RO 467,000	RO 762,000	RO 36,000	RO 798,000	RO 135,000	RO 933,000
MOTORS							
percentage of craft motorised (from Table 5.5)	83.64%	88.52%		not accounted		nil	
estimated number on Batina	580	318					
mean unit cost (see Chapter Seven)	RO 200	RO 800					
total estimated value of motors on Batina	RO 116,000	RO 254,000	RO 370,000	-	RO 370,000	-	RO 370,000
total estimated values of craft and motors on Batina	RO 411,000	RO 721,000	RO 1,132,000	RO 36,000	RO 1,168,000	RO 135,000	RO 1,303,000

critical period with the introduction of the larger diesel powered boats to produce a virtual abandonment, probably permanent, of the traditional Batina beach seine craft.

Certain specific problems which currently confront the fishermen of the Batina have been identified in this chapter. The supply of tackle poses a problem since it is generally available only in Mutrah or Dubai and little can be had locally. Beaching of the larger craft especially is difficult, while for those with motors, fuel supply can also be a problem, particularly in fishing settlements remote from the Batina markets and from fuel stations on the main Batina road. The greatest single problem for the fishermen with motorised craft is without doubt however the servicing and repairing of motors. Strategies for improving the situation in these respects and specifically what the role of government would best be, will be discussed in subsequent chapters.

It has also been shown that major differences in both types of equipment and names for them vary considerably along the coast even within the Batina which at first sight might appear uniform and undifferentiated. This is important in that it illustrates the need for close acquaintance with a rural activity, in this case fishing, before an overall understanding and appraisal is possible and before measures which can aid and foster development can be suggested. Development measures which are appropriate for one stretch of coast may well be unnecessary or even inappropriate for another stretch.

The government of the Sultanate relaxed import regulations in the early 1960s and removed them completely in 1970. Apart from this permissive measure, no direct government

assistance had been given by the end of the field survey in 1976 to the fishermen of northern Oman to assist their development. Nevertheless in a very few years traditional fishing tackle which was laborious to make and which needed frequent renewal had been replaced by more durable nylon, polystyrene and wire imports. At the same time several hundred new motorised boats had been introduced onto the Batina, the 1976 replacement value of which can be placed at over one million Riyals Omani. Further, although the designs of the new plank built boats have been imported, their construction is done locally by local boat builders.

In the mind of the present writer the Batina fishermen and boat builders are a clear example of the willingness of an artisanal industry to adopt and adapt innovations from elsewhere when the opportunity becomes available to them. In accordance with the view put forward in Chapters One (Section 4) and Two (Section 2), the fishermen and boat builders are by no means resistant to changes, provided those changes meet perceived needs and expectations and are in accord with the physical and social environment. This too has implications for development and will be taken up again in later chapters. The next chapters, Chapter Six and Seven, concentrate on the main agents of the changes, the fishermen themselves, and on the means by which the innovations have been imported to the Batina.

CHAPTER SIX

The Batina fishermen : I. Numbers, community and migration.

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6.1 Introduction

The Batina fishermen are naturally a key element in the northern Omani fishery. To understand the nature of the fishery and to attempt to prescribe measures for its development demands a knowledge of the fishermen and their life and attitudes, and it is the object of the present chapter and Chapter Seven to focus on these aspects. The size of the fishing population is first discussed (Section 2), bearing in mind the doubts cast in Chapter Three on the accuracy of earlier estimates. The fishing community and the fishermen's attitudes to it and to their non-fishing neighbours are then examined (Sections 3 and 4), and this is followed by a discussion of migration among the fishermen and its effects on the fishery (Section 5). Finally, the mechanism by which innovations in fishing technology have been introduced to the Batina fishermen is studied (Section 6). Chapter Seven deals with economic aspects and attitudes. Productivity is however left until the Batina catch has been estimated in Chapter Eight.

6.2 The size of the Batina fishing population

Before the present fieldwork, the size of the fishing community in northern Oman had been estimated by I. MacIvor (1880-81) at 30,000 and by G.C.L. Bertram (1948) at 25,000 or less. As was shown in Chapter Three (Section 3) however, both these estimates were probably too high by at least half. The Whitehead Report (1972 Part III Section 2.3.3) estimated a total of 15,000 for the Batina, but it is clear that this figure

was influenced by, or even directly derived from, Bertram's estimate and was not based on any independent detailed field survey. Mardela (1975 Book I Chapter 2 p.3) suggested an even lower number than Whitehead's, but does not hazard any figure of its own.

This present survey indicates that the fishing population on the Batina is certainly only a small fraction of any of the previous estimates. Combining the data from the questionnaire responses, the boat counts and the settlement counts, it has been possible to arrive at an estimate of the fishing population of the Batina in the mid 1970s which is considered reasonably accurate. Two bases of calculation have here been used which are largely independent of each other: the first method relies on shash counts; and the second method is based on the numbers of interviews conducted and the proportion they comprise of the fishermen of the sample settlements. The two methods yield closely similar results, and are further confirmed by a calculation of the manpower crewing wooden boats.

(i) Calculations based on shash counts:

It has already been pointed out (Chapter Four, Section 2) that the twenty kilometre stretch of coast around Khabura was surveyed in greater detail than any other part of the Batina. All fifteen fishing settlements on this stretch were studied. Although differences occur between one settlement and another (for example, in terms of types of tackle), the stretch is relatively short and can for present purposes be assumed broadly to have a degree of uniformity.

The total number of shash counted in these fifteen Khabura settlements was 665, and of these 284 (42.71 per cent)

were 'accounted for' by being assigned to owners in the 139 interviews conducted in these settlements. All but ten of the 139 fishermen owned at least one shasha. The average number of shash per fisherman (including those with none) is therefore 2.04 shash per man. On this basis, the 665 shash would represent about 330 fishermen between the fifteen settlements, or an average of twenty-two fishermen per settlement. If the size of the Khabura fishing settlements is typical of those of the Batina as a whole with its 123 fishing settlements, the total number of fishermen on the Batina would be approximately 2,700 men.

From the evidence of the sample settlements outwith the Khabura stretch, however, there are indications that the average number of fishermen per fishing settlement may be somewhat higher than in the Khabura area. On the Lower Batina, shash counts are an insufficient guide for estimating the number of fishermen, since the frequency of shash declines eastwards and there are none beyond Musan'a, as has already been noted. Taking the five settlements on the Upper Batina beyond the Khabura stretch however, the total number of shash counted was 162. The sixty interviews conducted in these five settlements accounted for fifty-two of these shash, that is, less than one shasha per fisherman. This ratio would give 187 fishermen between five settlements, an average of about thirty-seven fishermen per settlement.

These five settlements northwards of the Khabura stretch were chosen at random, but it is difficult to say how representative they are of the Batina as a whole in terms of numbers of fishermen. However, if one assumes that the average of

twenty-two fishermen per settlement found in the Khabura area is typical of two-thirds of the 123 Batina fishing settlements (i.e., eighty-two settlements), and thirty-seven per settlement is typical of the remaining one-third (i.e., forty-one settlements), the total number of fishermen on the Batina would be some 3,300. If half the Batina settlements are like those of the Khabura stretch and half are the size of the northern five settlements, the total Batina fishermen would rise to about 3,600.

On the evidence of the shash counts therefore the total number of fishermen on the Batina probably lies around 3,500. This is considered by the present writer to be a maximum estimate.

(ii) Calculations based on the proportion of craft covered by the interviews:

The 139 questionnaire interviews on the twenty kilometre Khabura stretch assigned forty-three per cent of the shash and sixty-three per cent of the wooden craft to owners. Allowing for a degree of multiple ownership (that is, individual boats being owned by more than one fisherman)and also the fact that most wooden boat owners in the Khabura area also own shash, these 139 interviews might be considered to cover some forty-five per cent of the total number of fishermen in the fifteen Khabura settlements. On this basis the total number fishermen can be estimated at 310, or about twenty-one per settlement.

Assuming a coverage of forty-five per cent in the five Upper Batina sample settlements, and a forty per cent coverage in the five Lower Batina sample settlements on the same basis of numbers of craft accounted for in the interviews (Table 6.1),

Table 6.1 : Calculation of number of Batina fishermen on the basis of the proportions of wooden craft covered by the interviews

	Northern Batina	Khabura stretch	Southern Batina
a. no. of settlements surveyed	5	15	5
b. no. of interviews conducted	60	139	68
c. proportion of shash accounted for in interview	32.10%	42.71%	42.42%
d. proportion of wooden craft accounted for in interviews	54.22%	63.39%	35.16%
e. estimated proportion of fishermen covered	45%	45%	40%
f. estimated total of fishermen in sample settlements (b/e)	133	310	170
g. estimated total of fishermen per settlement (f/a)	26.6	20.7	34.0
h. total nos. of settlements	51	15	57
i. estimated total nos.of fishermen (gxh)	1357	310	1938
estimated total fishermen on Batina	3,605 ≃ 3,600		

the average number of fishermen per settlement would be about twenty-seven on the Upper Batina and thirty-four on the Lower Batina. When these averages are multiplied by the numbers of settlements on the respective stretches of the Batina and the totals so derived added to the estimated total for the Khabura stretch, the total for the Batina is calculated at about 3,600. This lies within the top of the range estimated by the shash counts.

Comparing the two estimates derived above, the present writer submits that the likely total adult male fishing population on the Batina coast is about 3,500, and this figure will be assumed in subsequent references. The estimate is not only very much lower than any previous estimate, but is in the present writer's view probably more accurate since it is based on very much more detailed field observations than have ever been made before.

A figure of this magnitude is supported by the results of the boat counts taken in combination with the data on average sizes of crews from the questionnaire survey. It will be recalled from Table 5.11 that the estimated total number of Class I craft on the Batina is 693 and of Class II 359. The questionnaire responses give average crew sizes for these craft as 2.13 and 3.54 men per boat respectively. Even if all boats can be manned at the same time, then the total crewmen on the Batina would be only 2,750 (Table 6.2). The present writer's observations suggest however that the number of boats that are crewed at the same time is probably never more than three-quarters of the total, in which case the total number of crewmen would drop to about 2,000. There would be also a number of fishermen who are never members of crews of wooden

Table 6.2 : Calculation of numbers of Batina fishermen who crew wooden craft

	Class I craft	Class II craft
estimated totals for Batina	693 boats	359 boats
average crews per boat	2.13 men	3.54 men
total Batina crewmen if all all craft manned	1,476 men	1,271 men
	2,747 men	
total Batina crewmen if $\frac{3}{4}$ craft manned	2,060 men	

craft, but rather fish with shash only. These may total a further 1,500 men, though it is considered that this would be a maximum estimate. The total for those who crew wooden craft and those who fish only with shash might therefore approach 3,500 on the Batina as a whole, but is unlikely to exceed this figure.

This maximum estimate of 3,500 includes only adult male fishermen. The women of fishing families take no part in fishing apart from occasional help given in hauling beach seines. Adolescents (the sons of fishermen or their younger brothers) assist more extensively however. They are frequently employed on fishing trips to tend to the steering or to the engine, and also on land in the hauling of beach seines and the mending of nets. Older men who have passed on the major part of the work and the ownership of their craft and nets to their sons or younger brothers are often similarly employed, and many of them will not have been included in the above estimate either. The total active and semi-active fishing population is therefore likely to be rather higher than the 3,500 estimated above. The absolute maximum can perhaps be placed at 4,500 men and adolescents.

It will be shown below (Section 5) that just over half the adult Batina fishermen (if the questionnaire sample is representative) work regularly at some place other than on the Batina for part of the year. As a result, the equivalent of the work of an estimated 500 men is lost to the Batina fishery per year. When this is taken into account it will be seen that the average effective adult manpower over the year is 3,000 at the most.

6.3 Fishermen and their non-fishing neighbours

6.3.1 Fishermen - a distinct community?

In 1948 Bertram saw the fishermen and the cultivators of the Batina as being two separate communities "largely dependent for their well-being each on the product of the other's industry" but "mainly separate in work and interests" from each other (Bertram 1948 p.7). The separateness of artisanal fishermen from neighbouring cultivators would seem to be usual in other regions: for example, R. Firth (1966) noted this on the Malay coasts, and H. Pozdena (1975 p.55) similarly among the coastal Baluch of the Iranian Makran. Exchange of produce is relied on by both communities, but they remain distinct and separate. The applicability of such statements to the Batina in the 1970s was considered during the present field survey, and the nature of the links between fishermen and non-fishermen were investigated in some detail.

There are two points of evidence which at first sight would appear to suggest that the fishermen and the farmers of the Batina are not as distinct as is the case elsewhere and as Bertram supposed was true of the Batina thirty years ago. The first point concerns the spatial distribution of fishing families relative to that of non-fishing families; and the second point is that about half of the fishermen were found to possess gardens.

It is true that there exist on the Batina settlements composed almost wholly of fishing families. In the survey settlements, Sur al-Abri (south of Shinas) and Suwadi (east of Musan'a) are in this category. Similarly, several shore settlements were found during the survey in which no fishermen

atall live, for example Adgham (between Saham and Khabura) and Qarhat al-Khadhra (near Suwayq). However, the large majority of shore settlements were found to be a mixture of fishermen, cultivators and those with other occupations, all living as neighbours. Indeed the fishermen are not even always those with houses nearest the sea.

In spatial terms at least fishing families on the whole live in close association with non-fishermen. Nevertheless this does not rule out the possibility that in socio-economic terms the fishermen form a distinct community. The second point, that many fishermen farm as well as fish, is more crucial. Of the 256 respondents in the questionnaire survey to the question about possession of gardens, exactly one half (128) were found to own a garden, in most cases a date palm garden. This high proportion of garden owners among the fishermen would in itself tend to suggest a class of fishermen-farmers, and thus obscure the supposed distinction between the two communities. Further analysis shows however that in fact the distinction does still hold and that the possession of gardens by fishermen is less significant than the proportion owning them would suggest. As Table 6.3 indicates, with over ninety per cent of the garden owning fishermen the garden was said to be small and insufficient to meet the household's needs for local agricultural produce. Only four of the fishermen reckoned that their garden was large enough to produce a saleable excess.

As for local work other than fishing and gardening, Table 6.4 summarises the situation revealed by the questionnaire survey. As can be seen, very few of the respondents have other work.

It may be objected that since the present writer was

Table 6.3 : Size of gardens of garden-owning fishermen

Size of garden	Respondents	
	no.	proportion of totals
more than enough for household	4	3.12% 1.56%
enough for household	7	5.47% 2.73%
small, not enough for household	117	91.41% 45.70%
Total respondents with garden	128	100.00% -
Respondents without garden	128	- 50.00%
Total responses	256	- 100.00%

Table 6.4: Fishermen with other work than fishing

	Respondents	
	no.	proportion of total
Fishing only (with or without garden)	233	91.74%
Fishing and fish trading	6	2.36%
Fishing and labouring	9	3.54%
Fishing and any other work	6	2.36%
Total respondents	254	100.00%

conducting a fishing survey, the respondents with gardens or other work might have felt that it would be in their best interest to play down their other interests and stress a rather greater dependence on fishing than was truly the case. By so doing, they might reason, some good could come their way in the form perhaps of government assistance, and certainly from their point of view nothing would be lost. Although indeed some respondents may well have allowed such a consideration to colour their reply, the present writer believes that their number, if present, was small and would not alter significantly the overall picture. Throughout the survey, and in the Khabura area in particular, opportunities were taken to visit the gardens of several of the respondents and their size in every case matched the description provided by the respondent concerned. In addition, in the Khabura area close acquaintance with many of the fishermen over the three field seasons revealed that the amount of time they spent in the gardens was extremely small, even during the season of the date harvest.

It can safely be concluded therefore that although a large number of Batina fishermen own gardens, they are for the most part small and provide only limited produce. Only a very small percentage of garden owners on the Batina who fish are other than fishermen first and foremost. The fishermen live in close proximity with the farmers and other non-fishermen, and have important economic links with them which are now to be examined, but as will further be shown, the fishermen form a distinct socio-economic community. This finding confirms Bertram's observation in 1948, and the Batina is similar in this respect to other parts of the developing world.

6.3.2 Economic links

The Batina fishermen have strong economic links with their non-fishing neighbours both as suppliers and as consumers. As suppliers the fishermen provide for the population as a whole the major available source of animal protein. The whole Batina non-fishing population are prospective customers of the fishermen. On any given day moreover the majority of coastal households will be actual customers, since most families eat at least some fish every day. In addition, according to historical accounts, they have traditionally provided an important source of fertiliser to the Batina farmers in the form of dried sardines, and to a lesser extent, fish viscera and other waste, though it would appear that in the past this supply link was much stronger than in recent years. Owing to the reduction in the quantities of sardines landed on the Batina, no sardines were found during the survey being used as fertiliser. Supplying the populations of the Interior and the mountains with dried fish both for human consumption (especially shark and anchovies) and for animal fodder (dried sardines) has been important in terms of the income of the Batina fishermen, though here again less so than formerly, and probably never to the extent found in Dhofar Province.

In the case of fresh fish, supply from the Batina fishermen to the consumer is either direct or by means of an intermediate trader (seldom more than one). Dried fish on the other hand generally reaches the consumer, whether for human consumption or as manure or animal fodder, via an intermediate trader. These links will be analysed in greater detail in Chapters Nine and Ten.

As consumers the Batina fishermen are linked to the local general traders and the farmers in the same way as any other group of the Batina consuming public, except that they sometimes find it more difficult to buy on credit, as has already been mentioned. The local general traders provide them with most of their day to day needs, in particular imported food and clothes, while the farmers sell them fresh locally grown produce, in particular dates and also green fodder for any domestic animals they may keep.

In addition, the raw materials from which the shash are made are obtained locally from the farmers, in particular date palm fronds, palm fibre cord and palm frond butts, though increasingly nylon cord and expanded polystyrene are being substituted for the last two items. The local general trader plays only a very small part however in providing the fishermen with their specifically fishing requisites, and when he does it is generally confined to some manufactured nylon nets and ropes, and occasionally motor oil. Local garages provide much of their fuel needs. For most of the fishing requisites, including, as has been seen, motors and motor spare parts, and also wire for traps and most of his other tackle, the fishermen must have recourse to the larger merchants in Dubai and Mutrah as will be shown in Chapter Seven (Section 2). Reliance on Dubai is general on the Upper Batina while Mutrah is visited more frequently by the fishermen of the Lower Batina. As has been mentioned in Chapter Five, the line of demarcation between the two spheres of influence falls between Suwayq and Khabura. Fishing nets are also obtained from merchants in Bahrain and elsewhere in the Gulf, though only when the fisherman is returning from seasonal work there.

6.3.3 Social relations

Although in these ways the two communities have strong economic links, the attitude towards the fishermen of their non-fishing neighbours is ambivalent. Many non-fishermen, even those who are no richer nor of any higher social standing, occasionally speak of them as being 'only fishermen' and that their work is dirty and on a par with that of fish traders. A frequent complaint of customers is that fishermen's prices are exorbitantly high. Traders in the Batina markets are in general unwilling to give fishermen credit for their purchases (which is a usual and free service to consumers as a rule) or to stock fishing tackle and spare parts for their engines, since they say they are bad debtors.

On the other hand, others speak of the fishermen with respect and sometimes admiration. They acknowledge that the fishermen's work is dangerous and difficult and requires skill and courage to a degree absent from work on land, and recognise that their produce, the fish, is essential to the well-being of the non-fishing population. More than one fisherman in the Khabura area is acknowledged to have the status of a local shaykh and is treated as such by both fishermen and non-fishermen alike.

The Batina fishermen themselves form a strongly linked community in terms of social relationships. Community linkages between fishermen, even at considerable distances along the coast, are often more apparent than between one fisherman and his nearest non-fishing neighbours. A large degree of professional and social solidarity and contact exists among the Batina fishing community, several instances of which were

discovered by chance during the period of the survey. Although no attempt was made to measure statistically the degree of social linkage and mutual knowledge among the Batina fishermen, several illustrative examples were noted and may be quoted here.

1. In September 1976 a fishermen and his crew, who were well-known to the present writer in their home settlement of Qasbiyat al-Hawasina (Khabura), were found fishing with their boat at Nasiriya between Sohar and Majis, some seventy kilometres away. In Qasbiya they had heard that fish were plentiful off the Sohar stretch of coast and so had taken their boat up the coast to stay with friends at Nasiriya for a few days.

2. Also in September 1976 one fisherman of Nasiriya who was interviewed there could name several fishermen in the Khabura area who were known also to the present writer. This fisherman said he occasionally visited other fishing settlements up and down the coast to visit fishing friends and to see how the state of fish and fishing there compared with that at Nasiriya.

3. In August 1976 while working at Dil (between Saham and Khabura) the present writer met by chance a fisherman and his father from Hujayra (between Suwayq and Khabura) who were visiting close friends (possibly relatives) at Dil for a few days.

4. Also at Dil in August 1976 another fisherman from the Khabura area (Khuwayrat) well known to the present author was found visiting his wife's relatives, also a fishing family, whose home settlement was Dil.

5. In September 1976 a man from Khuwayrat (Khabura)

was encountered at Harmul (between Majis and Shinas) some ninety kilometres to the north. He was paying a social call on some fishermen friends of his, and although not now a fisherman himself his family (at Khuwayrat) did fish.

6. A fisherman and his three brothers of Qasbiyat al-Za'ab (Khabura area) were discovered to have relatives by marriage at Sharisa (near Suwayq) some forty kilometres away. Between November 1975 and September 1976 they were known to have paid (at least) two visits to Sharisa to see them socially. The present writer accompanied the brothers and wives on one of these occasions. During the visit a large part of their conversation consisted, as might be expected, of matters concerning fishing - comparing catches, fishing techniques, distances from the shore, and so on.

As well as these specific instances, two more general indications that coastwise relationships are strong can be quoted. Firstly, several fishermen in the Khabura area knew by name most of the fishing settlements of the whole Batina coast and their relative locations, and frequently knew personally individual fishermen in many of them. Further, they were generally aware of different fishing techniques and terminology on stretches of coast remote from Khabura. In contrast, the same Khabura fishermen were mostly very vague about the locations and names of settlements very much closer to Khabura but lying inland.

Secondly, many of the wooden craft owned by respondents in the interview survey had been bought second-hand. Most frequently they had been purchased from previous owners who lived in the same settlement as the buyer, or in one close by.

In twenty-five known cases however the seller had been a fisherman in a settlement remote from that of the buyer, again indicating a degree of contact between individual fishermen in settlements on different parts of the coast.

All the above cited evidence, though circumstantial, points to mutual connections and knowledge among fishermen over long stretches of the Batina. Instances were also found of links between Batina fishermen and fishermen on other stretches of the Omani coast. At the northern end of the Batina in the Shinas area, a number of settlements were found during the summer of 1976 which contained fishermen of the Shuhuh tribe from Musandam. Their regular seasonal migration to the northern Batina has already been referred to in Chapter Three (Section 3), and although the total number of migrating Shuhuh fishermen probably does not exceed twenty-five or thirty, the evidence does establish a fishing contact between the two parts of the Sultanate.

Another example, though one which is probably more isolated, is that of a fisherman who was found in Dhayan (between Khabura and Suwayq) in the summer of 1976. He said he spent every summer fishing off Dhayan where he also owned some date palms, but that he returned to his home settlement of Sur, southeast of Muscat, where he fished for the remainder of the year.

Of quite another order are the seasonal migrations fishermen from the Batina to the Capital Area and to the Gulf states, and these will be considered in Section 5 below. Here the point to be made is that fishermen on the Batina itself maintain contact and often close relationships with each other, frequently over considerable distances, which are at least as

strong if not stronger than their relationships with landsmen over a much smaller area. It is here maintained that despite the strong economic links they have with their more immediate non-fishing neighbours, they themselves are conscious of a degree of kinship and communality of interest, and even solidarity, which is not confined within individual settlements.

6.4 Fishermen solidarity: the incident of the wali's pricing order

A striking example of solidarity in action happened to occur during the period of survey in Khabura. In January 1976 the wali of Khabura, prompted by a few of the more influential members of the Khabura community, decided that fish prices in Khabura were too high, and that the cause was unfair pricing by the fishermen and the resident fish traders in the market. The fishermen, the argument went, asked inflated prices, and the fish traders, in order to keep in favour with the fishermen, accepted too readily these high prices. Consequently the wali issued an order to the fish market that stated that: (1) all fish in Khabura market was henceforth to be sold by weight instead of by the piece; and (2) no price was to be asked higher than the maximum prices fixed (arbitrarily) by the wali. A scale of three prices was set, according to the type of fish. The prices were stated in terms of price per kilogram and were about half the prices, weight for weight, that had been charged before the order.

On the first day of the order the catch was moderately large, and a usual number of fishermen arrived at the market, none of them having been forewarned. Arguments between fishermen, fish traders and customers broke out. Many fishermen sold their catches at the low fixed prices, but retired disgruntled.

Others withdrew their whole catch and returned to their home settlements with it unsold. By the second day of the order, the news had spread among the fishermen of the Khabura area, and the number selling at the market was considerably fewer than usual. Nevertheless, some fish was available and the customers were still very naturally pleased with the new arrangement. On the third day however an important action took place. One of the most respected fishermen of the Khabura area sent word along the coast that a meeting of the fishermen who regularly sold at Khabura market would be held that afternoon at his house in Qasbiyat al-Za'ab. Support for a concerted plan of retaliatory action was achieved. Unanimously the forty or so fishermen present, most of whom were owners of motor craft, agreed to boycott Khabura market until the price restrictions were lifted and instead dispose of their catches at other Batina markets - Saham, Suwayq and Khadhra - none of which came under the jurisdiction of the wali of Khabura. As the fishermen pointed out, the order was issued by the wali on his own authority only and not on that of the sultan, and was therefore unfair in applying to them and not to the fishermen in other wilayas on the Batina.

The concerted action of the fishermen held, and for ten days Khabura market was entirely without fish. A few Khaburans ventured out to the fishing settlements to try and buy fish directly from the fishermen, though at prices more in accord with those before the price restrictions. Most consumers who normally bought at Khabura market had however to go without fish at any price. Possibly the most adversely affected section was the fish traders of Khabura market whose stocks of previously

acquired salt fish soon ran out and who were thus left without any commodity from which to derive their livelihood. As a result the fish traders soon sided with the fishermen in pressing for the withdrawal of the order.

On the third day of the boycott the wali was visited by a deputation of fishermen, but he refused to give way. He was undoubtedly unwilling to lose face publicly by being forced to withdraw the order, and most probably had his eye on local pressure from influential non-fishermen who had encouraged him to action in the first place. On the other hand, he was almost certainly unaware of the strength of the fishermen's resolve and was powerless to force them to deliver fish to the market against their will.

Finally, however, on the tenth day of the boycott, the wali agreed to a compromise. The order would be withdrawn if the fishermen resumed delivering to the market and agreed to the sale of fish only by public auction. One of the leading fish traders was appointed official auctioneer. (As will be remembered from Chapter Three (Section 3), public auction was compulsory under Sultan Sa'id bin Taymur for market sales of fish. From 1970 however it had become uncommon at Khabura).

The following day the fishermen returned to the market and the auctioning system was observed. Before more than a few lots had been sold however, prices had returned to the levels before the issuing of the price order. Gradually over the succeeding weeks direct bargain sales reappeared, and selling by weight was abandoned, except for sardine-sized fish which in any case had often been sold by weight before the order. A month after the boycott the situation had returned to the state before the order, a slight increase in the proportion of fish auctioned

being the only lasting innovation. The wali had in fact been forced to climb down completely both on selling by weight and on fixed pricing as a result of the concerted action by the fishermen.

This episode illustrates several points. The wali had acted unwisely in tampering with market price mechanisms by trying to impose unrealistically low prices in Khabura while the fishermen had recourse to outlets in other wilayas over which the wali of Khabura had no control. This aspect will be taken up again later in Chapter Nine when marketing is studied in greater detail. In addition, the incident highlighted the supreme importance of fish in the diet of Batina Omanis in the absence of any readily available alternative source of animal protein. Had the availability of animal meat been on a par with that of fish, the fishermen's boycott might well have been less successful.

In the present context, however, the most significant point lies in the attitude and action of the fishermen. When under pressure the fishing community showed itself capable of rallying under a leader and of acting concertedly for the benefit of that community. No such effective solidarity of action was possible among the wali and his supporters. No serious attempt was even considered on the part of the consumers to boycott the fishermen by refusing to buy their fish either in their home settlements during the strike or in the market after the strike had ended, nor was any plan conceived, public or private, to ferry fish to Khabura market from more distant sources. The consumers of fish in the Khabura area acted without coordination.

It is difficult to imagine any other group of producers

or providers of services on the Batina acting with such solidarity if faced with analogous circumstances. In the case of the cultivators for example, their much larger numbers and the greater dispersal of their dwellings would probably preclude a concerted action. Unity of purpose and action would most likely be absent similarly from the trading community in Khabura, which, though of much smaller numbers than the farmers, has within it several divisions of interest. Certain professional antagonisms exist within Khabura market, between for example the smaller traders and the larger, and between the tenant shopkeepers and the traders who let shop premises to them (see Durham Oman Project Reports 1978 Vol. VI). The Shi'a traders, it is true, would probably be capable of presenting a united front by virtue of their common religious and marital ties, but they make up only a small proportion of the total Khabura traders, even though a very powerful one.

It is significant to note that a similar event took place on a larger scale in Abu Dhabi about 1975: the municipality attempted to control fish prices artificially, the fishermen boycotted the market, and the control had to be abandoned. This will be mentioned again in Chapter Twelve (Section 2). The boycott in January 1976 at Khabura is the only instance there that is known to have occurred, and it was by chance that the present writer was on the scene at the time. The account is therefore by nature anecdotal. It is considered nevertheless to be illustrative of a more general but less tangible strength of community feeling among the fishermen of the Batina, and of what they are capable of achieving when the situation demands it. How such strength can be utilised in the development of the artisanal fishery of the Batina will be considered in Chapter

Thirteen.

6.5 The effects of migration on the Batina fishery

The fact that many Batina fishermen seasonally migrate was realised early in the present field survey Questions which attempted to investigate the nature and dimensions of the migration were therefore included in the questionnaire. Table 6.5 summarises the responses on the numbers involved and the types of work which the migrants take up in either another part of Oman (for by far the most, the Capital Area) or in the Arabian Gulf states. Very few respondents indeed replied that they habitually migrate to both the Gulf and to elsewhere in Oman, and the two groups can be considered to be mutually exclusive. The results of the questionnaire sample are believed by the present writer to represent the situation on the Batina as a whole.

As can be seen from the table, a substantial proportion of the respondents (over fifty per cent in total) were regularly migrating to work elsewhere at the time of the survey. An additional nineteen of the respondents are known to have worked recently in the Gulf but are unsure whether they will return. It is considered that well over half the Batina fishermen have at some time in the past three decades worked in the Gulf. What is also noteworthy from the results is that by far the majority of the migrants remain fishermen rather than take up other employment.

In the case of those going to other places in Oman, the large majority take their own boats to fish off the Capital Area for parts of the year where fish prices are higher. The migrants to the Gulf states on the other hand generally work as captains and crews of craft rather larger than are seen on

Table 6.5 : Work chosen by Batina migrant fishermen elsewhere in Oman and Gulf states

Type of work	Respondents			
	Elsewhere in Oman		Gulf states	
	no.	proportion	no.	proportion
Fishing only	23	9.35%	78	32.10%
Fishing and fish trading	7	2.85%	0	
Fishing by preference	0		7	2.88%
Work other than fishing (labouring, police & armed services)	2	0.81%	7	2.88%
Total migrants	32	13.01%	92*	37.86%
Do not currently migrate	214	86.99%	151	62.14%
Total responses	246	100.00%	243	100.00%

* a further 19 (making a total of 111 migrants) are known to have worked recently in the Gulf, but are unsure whether they would return and are classed here as not currently migrating

the Batina and which belong to nationals of the Gulf countries. According to the questionnaire responses, Bahrain attracts by far the largest proportion of the ninety-two Batina fishermen who migrate to the Gulf, fifty-six (61%) of whom put Bahrain as their first choice. The U.A.E. (mainly Dubai and Abu Dhabi) and Qatar follow with 17% and 15% respectively, and Saudi Arabia and Kuwait attract the remaining seven per cent. The manpower of the fisheries of the Gulf will be considered in Chapter Twelve. Here it is necessary to state only that the pattern revealed by the present survey as far as Omani migrant fishermen in the Gulf are concerned is broadly in accord with such evidence from Gulf sources as is available.

This migration has had three main effects on the Batina fishery. First, acquaintance with developments in fishing (and in other aspects of life) in the Gulf has made it possible for large numbers of fishermen in a short space of time to accept and adopt innovations for use on the Batina. This has already been mentioned in Chapter Three (Section 4) and elsewhere, and will be elaborated further in the next section (Section 6 below).

Second, earnings from the Gulf have been invested in the Batina. It is clear from conversations with fishermen, especially those with the larger, more expensive diesel powered vessels, that the capital invested in craft, motors and other equipment has derived largely, and probably even mostly, from savings earned in the Gulf countries, and not from the proceeds of fishing on the Batina itself. Further, it is also the case that an undefinable but large number of fishing families, especially those of the elderly and poorer fishermen, receive financial support from sons or other relatives fishing or otherwise working in the Gulf. To a large extent therefore the Batina

fishery has been and still is subsidised from outside sources.

The third effect of the migration is the loss it causes to the effective fishing manpower to the Batina fishery. Sufficient data were gathered in the questionnaire survey to produce a working estimate of this loss in quantitative terms, and a discussion of this now follows.

Of the thirty-two questionnaire respondents who periodically migrate within the Sultanate, twenty-five were able to give an estimate of the frequency with which they currently did so. Table 6.6a shows this, while Table 6.6b attempts to estimate the annual loss to the Batina in fishing manpower which this migration causes. Here, "more than six months" is assumed on average to be nine months per year, "two to six months" to be four months per year, and "less than two months" to be one month per year. "Every year or nearly every year" is assumed to be four years in five, and "some years" to be one year in two. On this basis, out of a total potential of 300 man-months per year every year (i.e., twenty-five men working twelve months every year), sixty-six man-months will be lost per year on average, or twenty-two per cent of the total potential of the respondents who were able to estimate.

It was calculated earlier (Section 2 above) that the total potential adult fishing manpower of the Batina is of the order of 3,500 men. If the present sample is representative, and thirteen per cent of these migrate periodically from the Batina to other places in Oman, then the net loss to the Batina will be equivalent to the work of 100 men per year on average (i.e., 3,500 x 13% x 22% $\simeq$ 100).

Seventy-five of the ninety-two respondents who currently

Table 6.6a : Frequency with which Batina fishermen in the survey work elsewhere in Oman

Period spent elsewhere in Oman at a time	No. of respondents	
	every year, or nearly every year	some years
> 6 months	1	0
2 to 6 months	10	13
< 2 months	1	0
Total responses	25	
unable to estimate	7	
Total respondents who migrate to places elsewhere in Oman	32	

Table 6.6b : Estimation of fishing manpower lost to Batina through migrants working elsewhere in Oman

Assumed median period spent elsewhere in Oman (months per year)	Man-months lost per year	
	if migration is 4 years in 5 (loss factor 0.8)	if migration is 1 year in 2 (loss factor 0.5)
9	(9x0.8x1) = 7.2	0
4	(4x0.8x10)= 32.0	(4x0.5x13) = 26.0
1	(1x0.8x1) = 0.8	0
Total	40.0	26.0

= 66 man-months lost per year

Total responses in sample = 25 ≡ 300 man-months per year

$$\text{Percentage loss} = \frac{66}{300} \times 100\% = 22\%$$

migrate to the Gulf were able to give an estimate of the frequency with which they do so. As can be seen from Table 6.7a, the large majority go for periods of between two and six months, as was the case with those who work elsewhere in Oman. Table 6.7b attempts to estimate the annual loss to the Batina in fishing manpower which their absence causes, on the same basis as was used in Table 6.6b for those migrating to places in the Sultanate. In this case it would appear that twenty-nine per cent of the potential adult fishing manpower of the Gulf migrants in the sample is lost to the Batina on average in a year. Again, if the sample is representative, then the net loss to the Batina as a whole will be equivalent to the work of 390 men per year on average (i.e., 3,500 x 38% x 29% $\simeq$ 390).

Adding this loss to that from fishermen working elsewhere in Oman gives a total composite loss of manpower due to all migration which is equivalent to 490 (approximately 500) men per year. If 3,500 is the total number of adult Batina fishermen, the actual effective adult manpower over the year will therefore average 3,000. This estimate will be used subsequently in discussing productivity in Chapter Eight and elsewhere, and will be referred to as the effective adult fishing manpower.

6.6 The demonstration effect in the spread of innovations

As has already been noted, innovations in methods and equipment have been introduced to the Batina fishery by the fishermen themselves and not by government aid programmes. The mechanics of the spread of innovations in the view of the present writer can be interpreted as a two-tier process of what for convenience may be called the demonstration effect. (See

Table 6.7a : Frequency with which Batina fishermen in the survey work in the Gulf states

Period spent in Gulf at a time	No. of respondents	
	every year, or nearly every year	some years
more than one year	1	0
> 6 months	15	3
2 to 6 months	21	29
< 2 months	6	0
Total responses	75	
unable to estimate	17	
Total respondents who migrate to Gulf states	92	

Table 6.7b : Estimation of fishing manpower lost to Batina through migrants working in Gulf states

Assumed median period spent in Gulf states (months per year)	Man-months lost per year	
	if migration is 4 years in 5 (loss factor 0.8)	if migration is 1 year in 2 (loss factor 0.5)
12	(12x0.8x1) = 9.6	0
9	(9 x0.8x5) = 108.0	(9x0.5x3) = 13.5
4	(4 x0.8x21)= 67.2	(4x0.8x29)= 58.0
1	(1 x0.8x6) = 4.8	0
Totals	189.6	71.5

= 261.1 man-months lost per year

Total responses in sample = 75 ≡ 900 man-months per year

Percentage loss = $\frac{261.1}{900}$ x 100% = 29.01%

also Appendix G).

(1) The influence of demonstration abroad

The seasonal migration of a major part of the Batina fishing population is of long standing. Even before the development of the oil industry in the Gulf states Omanis went to Bahrain and elsewhere for the pearl fishery. Over the decades a large proportion of the fishermen have had contact with methods and equipment in advance of those current in Oman, and have had the opportunity of witnessing the effectiveness of motor powered craft, nylon nets and ropes, polystyrene floats and wire traps, and their superiority over Omani traditional equipment. When restrictions on such equipment were relaxed in the 1960s, and especially since they were removed altogether in 1970, the Batina fishermen used their foreign-earned capital to import the innovations into their home settlements. In other words, demonstration by more advanced artisanal fishermen in the Gulf combined with relaxation of import restrictions at home to produce an imitative response in those Batina fishermen who migrated.

(2) The influence of demonstration coastwise along the Batina

As has been shown, coastwise contact between fishermen takes place over large distances as well as within individual settlements. It can readily be imagined therefore that once an innovation has been introduced into one settlement news of it would spread along the coast to fishermen who had not migrated. An illustration of the actual spread of an idea, albeit on a small scale, can be quoted from the field survey. It concerns the fitting of outboard motors to shash, a recent innovation which is unlikely to have originated in the Gulf

(since shash are not now found there), but which nevertheless llustrates the demonstration effect in action.

In the first field season (winter 1974-75) only a very few fishermen were noted who had attempted to mount outboard petrol engines onto their shash. On the twenty kilometre Khabura stretch only one shasha (in Khawr al-Hind) was observed by the present writer to be fitted with an outboard motor at that time. A rectangular well had been cut through the body of the shasha towards the stern and a board serving as engine mount had been secured to the forward edge of this well. This particular shasha had been so modified only a few months before January 1975 when it was first seen.

The authors of the Mardela Report (1975 Book II p.2.1) noted similar early attempts at shash motorisation but dismissed them as misguided and were of the opinion that shash were entirely unsuited to motorisation. Had Mardela been correct, the experiment would no doubt have perished. However, by August 1976, eleven more motorised shash had appeared on the same twenty kilometre stretch, and still more fishermen were talking of converting their shash in the same way. On the subsequent field visit by the present author in January 1978, motorised shash had become almost as common as shash without motors in some settlements. Moreover, many of those who had fitted motors to their shash were already owners of motorised wooden craft, which is perhaps at first sight even more surprising. Further, there is more recent evidence for supposing that the shash now made specifically to take motors are on average, in the Khabura area at least, larger than shash were before motorisation was introduced, an observation pointed out

to the present writer by Dr. R.W. Dutton, at that time Field Director of the Durham University Khabura Development Project.

Clearly what has happened is that fishermen had observed that the Khawr al-Hind man (and probably others up and down the coast) had achieved a degree of success with his experiment. What to outsiders like the Mardela team seemed an unworkable idea has in fact proved itself a successful innovation, at least as far as the fishermen are concerned. Although perhaps to conventional eyes an unsuitable candidate for motorisation, the shasha can, when fitted with a motor, combine its own inherent flexibility and manoeuvrability in high seas and its ease of beaching with something approaching the speed and labour saving advantage of a motor-powered wooden craft, and at only a small fraction of the cost.

This illustration shows how in only a few months an idea can spread among Batina fishermen when it is demonstrated to have advantages. It also sheds a sidelight on the inadvisability of an outside observer's making too hasty assumptions about the suitability or otherwise of traditional fishing equipment for development.

6.7 Conclusions on the Batina fishermen as a community

It has been shown in this chapter that although the fishermen live among the non-fishing Batina population, and naturally have strong economic links with them, they nevertheless have a strong sense of identity of their own and form a linked community which has the potential to act with communal resolution if under pressure from without.

On the bases discussed in the chapter, the total adult male fishing population can be put at 3,500 individuals as a

maximum estimate. If adolescents are included, the absolute total is not likely to exceed 4,500, and even this may be too high. Both these figures are considerably lower than any previous estimate. While it is thought probable that there has been a real drop in numbers of fishermen since Dr. G.C.L. Bertram's report of 1948, the present writer believes that the numbers were never as large as any of the previous estimates suggested.

If each of the adult fishermen has five dependents, the total population on the Batina who rely on fishing for their livelihood would be of the order of 17,500 at the most, that is, fewer than one-tenth of the estimated total population of the Batina and its seaward wadis. The Batina fishing community is thus relatively small in numbers - much smaller than for example those who farm. Nevertheless, the product of the fishermen is of an importance considerably greater than their numbers would suggest, since, in the absence of any other source of relatively plentiful animal protein, fish is a major constituent in the diet of the Omani population as a whole.

A large proportion of the fishermen currently work elsewhere for part of every year (or at any rate most years). The fact that the large majority of these choose to remain fishermen in doing so further strengthens the conclusion that they consciously feel an identity in being fishermen. It would appear from the survey that about one third of the fishermen regularly fish for periods in the Gulf states, and probably the majority of Batina fishermen have fished there at some time in the past twenty or thirty years. As a result

of this seasonal migration to the Gulf and elsewhere, the actual effective manpower in any year is less than 3,500 adult fishermen, and has been calculated here at 3,000.

On the other hand, migration to the Gulf countries has also produced benefits for the Batina fishery in that the Gulf has been the main source of innovative stimulus for improved fishing equipment since the 1960s. In addition, work in the Gulf has provided most of the capital necessary to introduce that equipment to the Batina. There exists therefore a paradox. A large proportion of the fishermen choose to invest their Gulf savings in fishing equipment for use on the Batina, and yet continue to return regularly to the Gulf for a large part of most years. The pull of the Gulf countries is simple to explain: the earnings from working there are greater than those which can be expected from the Batina. The motivation of the Batina fishermen in continuing to invest in fishing equipment at their home settlements and using if for only part of the year is however more difficult to understand, and this will be defined more precisely in the next chapter which studies their costs, taking and profitability.

CHAPTER SEVEN

The Batina fishermen : II. Costs, takings and investment attitudes.

CHAPTER SEVEN

The Batina fishermen: II. Costs, takings and investment attitudes

7.1 Introduction

This chapter attempts to analyse in some detail the economic aspects of the Batina fishermen. Gross costs and takings are studied in Sections 2 and 3 and how these are divided among crews is considered in Section 4, while Section 5 investigates the attitudes of the fishermen to investing their savings in fishing equipment and their motivation in doing so.

Wide variations in their costs were found among the respondents to the questionnaire survey. These were mostly the result of the large differences in the types and quantities of equipment used by individual fishermen. Assessment of the survey results suggests that three groups of fishermen can be distinguished according to the type of craft they own, and most Batina fisherman can be assigned to one or other of these groups. They are:

Group 1 : fishermen owning or jointly owning small outboard petrol-powered wooden craft (Class I) who are found in greatest numbers on the Lower Batina and who may be said to be typical of that stretch;

Group 2 : fishermen owning or jointly owning large inboard diesel-powered wooden craft (Class II) found almost wholly on the Upper Batina;

Group 3 : fishermen owning no motorised craft who fish only with shash. These are found throughout the Upper Batina and on the western half of the Lower Batina.

This classification is not wholly comprehensive since it embraces neither those fishermen who have recently motorised their shash nor the owners of the beach seine boats (Class III). At the time of the field survey however motorised shash were still relatively few in number, while Class III craft are little used now, as has been seen in Chapters Three and Five, and Table 7.1 shows that almost ninety-five per cent of the respondents to the questionnaire survey can be assigned to one or other of the three groups. Nevertheless, the grouping is to some extent a simplification. Most of Group 2 and many of Group 1 own shash as well as wooden craft, while many men who own only shash frequently act as crews on wooden craft. On the other hand, very few of Groups 1 and 2 own more than one boat of Classes I or II: out of the 154 fishermen in the questionnaire survey assigned to these groups only fifteen owned two Class I or II craft, and only one fisherman owned three. Moreover, out of these sixteen owners of more than one craft, only three cases were found who owned more than one motor, and in two of these three cases the fisherman in question was a joint owner. At the time of the survey therefore there was no substantial suggestion of more ambitious fishermen building up larger fleets of boats. If the above points are borne in mind it is believed that this grouping forms a suitable and realistic basis on which to consider the costs and takings of the Batina fishermen.

7.2 Fishing costs

In no case could the costs and takings of an individual fisherman over a period be measured precisely, since no fisherman ever met kept written accounts or even detailed mental records of how much he had spent on his equipment and fuel.

Table 7.1 : Fishermen of questionnaire survey grouped by type of craft owned

	No. of respondents		Percentage of total	
Group 1 (small craft, Class I)	97	253	36.33	94.76%
Group 2 (large craft, Class II)	57		21.35	
Group 3 (non-motorised shash)	99		37.08	
Fishermen with motorised shash, no wooden boat	9	14	3.37	5.24%
Fishermen with Class III beach seines, no Class I or II	5		1.87	
Total fishermen in questionnaire survey	267		100.00%	

This is not surprising in a society which is largely preliterate and predominantly non-wage earning, and in which there are no governmental requirements to keep such records for tax or other official reasons. Insofar as it was possible to estimate costs, it was done from the questionnaire survey by asking the respondents to estimate the cost of each item individually (each shasha, each net, etc), rather than by asking for blanket estimates.

The identifiable costs involved in fishing can be divided into three categories:

a. initial capital costs and capital replacement costs, the major capital equipment being boat, engine (where present), and tackle;

b. medium-term recurrent running costs, the major being repairs to boat and engine;

c. day-to-day running costs, being mainly costs of fuel and lubricants.

Capital costs apply to all three groups of fishermen described above. Medium-term and day-to-day costs apply only to Groups 1 and 2 (i.e. those with motorised wooden craft), and not to Group 3 (i.e. owners of non-motorised shash).

Because of the rapid inflation rate in Oman, capital replacement and running costs have risen considerably since the questionnaire survey was carried out in late 1975 to mid 1976. The cost of replacing a shasha for example in 1976 was typically RO 12, as will be calculated below. On the present writer's last return to Oman in December 1978 the typical cost of a shasha was between RO 20 and RO 30. A wire fish trap has

similarly increased in price from about R010 to about double this. It is believed however that the costs quoted here are internally consistent and accurately reflect the situation in 1976 with which period this survey is principally concerned.

7.2.1 Capital costs

(a) Craft:

The questionnaire responses produced the prices which the owners said they had paid in the case of all but twenty-four of the Class I and Class II craft. Figures 7.1 and 7.2 show the distribution of these prices. In each case, prices for vessels bought new and those bought second-hand are distinquished. Generally speaking, the more recently a boat was said to have been purchased, the more expensive it was, and since a general rise in price with time is to be expected, this pattern confirms to a degree the probable overall accuracy of the results. There is nevertheless quite a wide range of prices within any one year. This can be explained partly by the variation in the size of vessels within any class, and partly by inaccurate recall on the part of the fishermen of either the sum paid, or the number of years elapsed since the purchase, or both. It is considered likely for example that some at least of the five Class I craft said to have been bought fifteen years before the survey were in fact purchased more recently.

It will also be noted from the figures that almost all of the Class II craft were said to have been bought since 1970. This is consistent with the known introduction of diesel engines on the Batina in that year. In the case of Class I craft, the fishermen's responses are also in accord with the known presence

Figure 7-1

Purchase prices of Class I vessels in the questionnaire survey

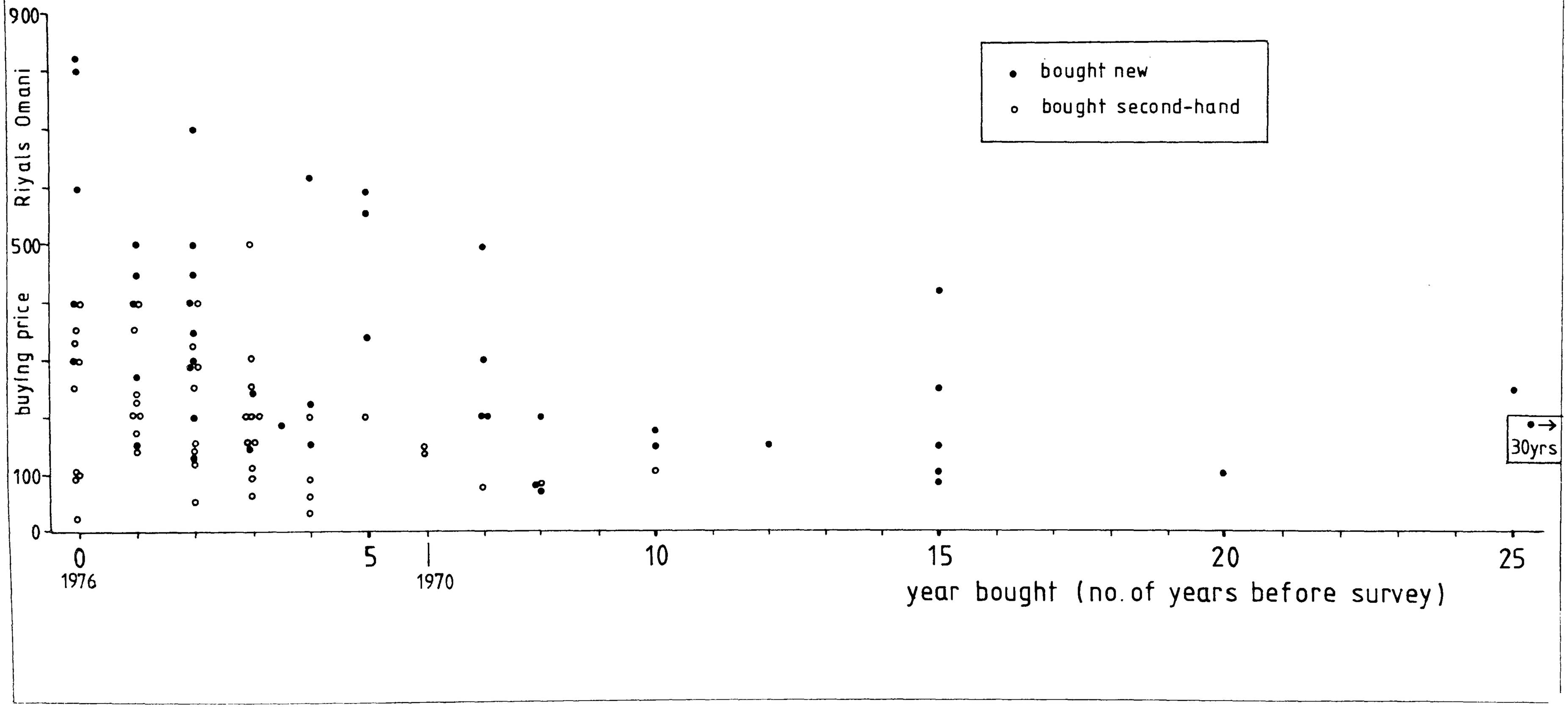
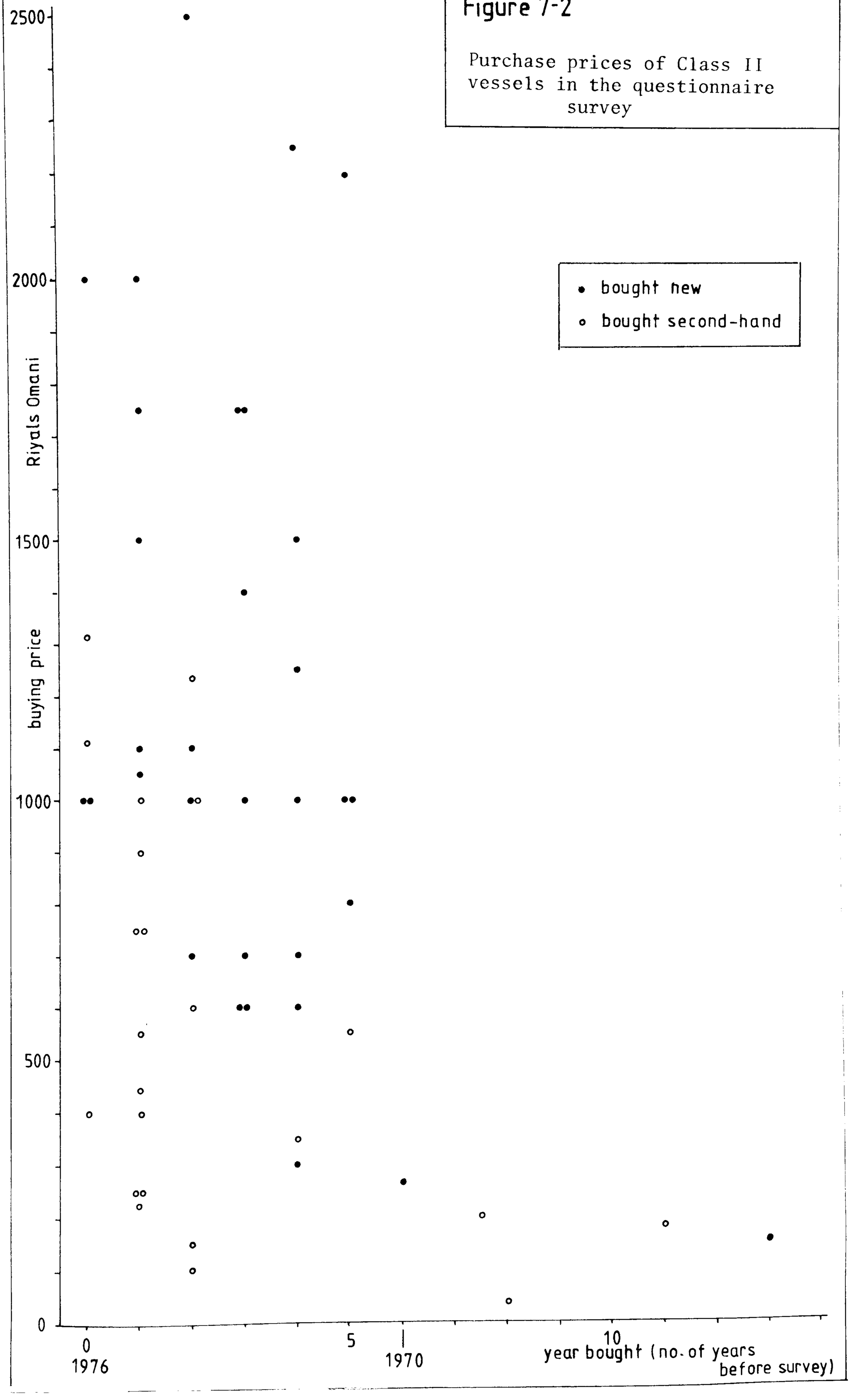


Figure 7-2

Purchase prices of Class II vessels in the questionnaire survey



of that class on the Batina from the early 1960s. These points also confirm the general overall accuracy of the results.

To provide an estimate of the current (i.e. 1976) replacement cost of his craft for a typical fisherman in Groups 1 and 2, the median of the new prices quoted for each class of craft bought within two years of the survey has been chosen on the following grounds. First, with the general rise in prices over time a mean based on all the new prices quoted would give a value unrealistically low to be considered a typical replacement cost current at the time of the field survey. The new prices taken into account have therefore been restricted to the most recent (i.e., within two years of the survey). Second, the number of new prices quoted for boats bought within even two years of the survey (ten of Class I and eight of Class II) is considered to be too small to provide a reliable typical value based on the arithmetic mean, since in the absence of written records one or two cases of highly inaccurate recall on the part of the fishermen could well influence the result to an unduly high degree. It is felt therefore that the median provides a more appropriate mean measure than the arithmetic mean.

On this basis, the 1976 cost of replacing a typical boat would be RO 425 for Class I (Group 1 fishermen) and RO1,300 for Class II (Group 2 fishermen). Class II vessels are therefore typically three times more expensive to buy or to replace than Class I.

A certain amount of corroboration for the general accuracy of these figures was given by interviewing the boat builders. During the period of field survey three large plank-built vessels (Class II) were observed under construction in

different Batina fishing settlements. A partial breakdown of the building costs was obtained for these from the boat builders, and the fishermen who had ordered the craft were asked separately how much the final cost was expected to be. Details of these three cases are set out in Appendix H. In all three cases the boat builder's estimate tallies fairly closely with that of the buyer, and the pairs of estimates are in line with the typical costs arrived at above.

The large majority of wooden craft on the Batina have thus been built within the last ten years or so and have by no means approached the end of their working life. The mean life of these craft is therefore difficult to estimate. The oldest craft on the Batina, Class III, the beach seiners, are relatively few in number, but the owners of eight of the ten who were interviewed knew their ages. Of these eight, four were said to be twenty or more years old. (One gave the age of his badan as sixty years old). Conversations with both fishermen and boat builders, who have had experience in the Arabian Gulf as well as on the Batina over several decades, suggest that many wooden craft last considerably longer than twenty years.

It is therefore considered that a figure of twenty-five years as a typical potential life of a Batina wooden fishing boat is by no means an unreasonable estimate for both Class I and Class II vessels, provided, that is, that circumstances in Omani fisheries do not change so greatly as to make the present vessels redundant before then. Assuming that this is the case, the capital depreciation per year on craft would be RO 17 for a Group 1 fishermen and RO 52 for a Group 2 fisherman on the basis of the typical replacement cost as calculated above.

These figures of course exclude any repair costs which are accounted separately under medium-term running costs below.

It should be stressed that calculating capital depreciation in this way has been done by the present writer only for the purposes of this discussion, and it is not intended to imply that any fisherman considers capital investment in this light. As will be seen in Section 5 below, it is indeed the contention of the present writer that fishermen invest in fishing simply because they are fishermen and because fishing is their way of life, rather than because fishing offers the best returns on their capital. Therefore the concepts of capital depreciation or amortisation are inappropriate for understanding their motivation. However they are useful in the present context, and especially in comparing the efficiency of the different types of craft and other equipment.

A mean price for a shasha is easier to determine than for the wooden craft. First, the variation in prices quoted by the respondents is considerably less than for wooden craft. Second, the inflationary element can be virtually discounted, since shash tend to last only two years. Third, more prices are available for shash from the survey than for any of the wooden vessels. Finally, a more accurate breakdown of their construction costs can be achieved as a result of their much simpler structure.

Ninety-six prices for shash were derived from the questionnaire survey and are shown in Figure 7.3. Although the overall range is great, over half the prices lie in the range RO 10 to RO 16. The median of RO 12 will be taken as the representative 1976 replacement cost in subsequent calculations. A breakdown of the cost of building a shasha is given in Table 7.2.

Figure 7-3 Cost prices of shash quoted by questionnaire respondents

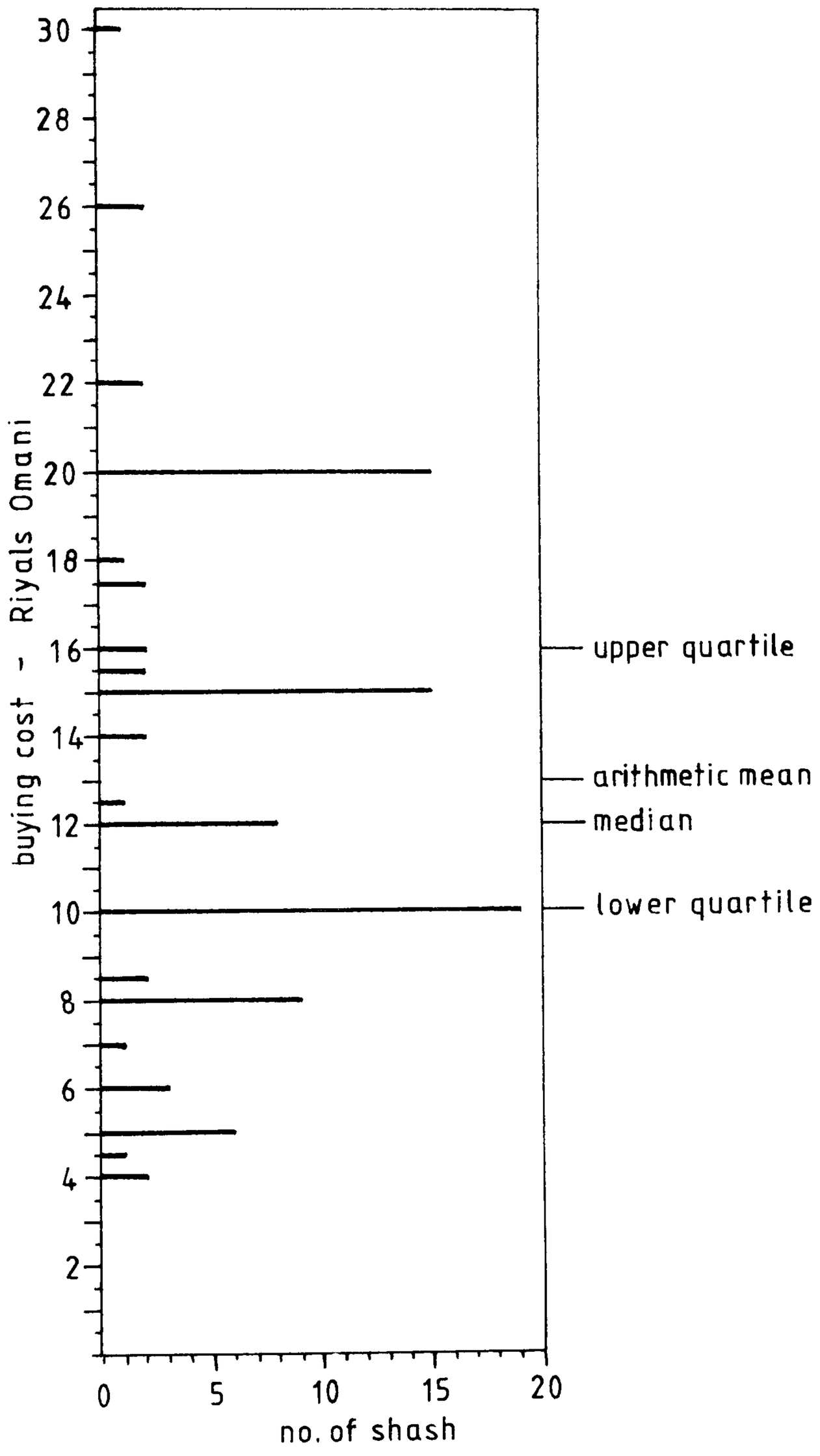


Table 7.2 : Breakdown of the costs of building a shasha

Item	Cost in RO.
zur (stripped date frond midribs)	3
karab (date frond butts) or expanded polystyrene	3 to 5
cord (coir or nylon)	2 to 3
a. cost if fisherman builds himself	8 to 11
fee to shash builder	3 to 5
b. cost if fisherman hires builder	11 to 16

The variations in the price can be accounted for largely by differences in the size of the shasha and by whether a fisherman builds it himself or hires a specialist shash builder. If nylon cord and expanded polystyrene are substituted for the coir and palm frond butts, as has become increasingly usual since 1974, the initial price will be higher, though these two items will probably outlast the shasha and may well be usable again.

(b) Engines

Like craft, many engines were found to have been bought second-hand. Since their length of life is less than that of a wooden boat however a higher proportion of those encountered in the questionnaire survey had been bought new, and it is only the new retail prices which are considered here.

Prices of new outboard petrol engines derived from the fishermen were checked with the prices quoted by the Muscat-Mutrah agents, and in almost every case the two tallied. In the case of inboard diesel engines the word of the fishermen had to be relied on since at the time of the survey it was not possible to visit Dubai, the nearest source of diesel engines, to interview the agents, but the large degree of agreement among the fishermen on diesel motor prices indicates that the figures so derived are accurate enough for present purposes. Table 7.3 summarises the 1976 new prices for the most popular models at that time, Yamaha (petrol) and Yanmar (diesel). These makes are also the cheapest.

As can be seen from the table, inboard diesel motors are more expensive to buy than outboard petrol models of equivalent horsepower - about 1.5 times as expensive in the

Table 7.3 Outboard and inboard engines : prices and frequencies of occurrence of different models in the questionnaire survey

Horsepower	Outboard Petrol		Inboard Diesel	
	No.owned by survey respondents	New price (Yamaha)* in RO	No.owned by survey respondents	New price (Yanmar)** in RO
4	-	na	1	na
5	5	125	-	na
6	3	na	1	na
7.5	1	na	-	na
8	34	165	13	260
9	-	na	1	na
10	-	na	4	450
12	19	215	1	600
14	-	na	1	800
15	13	225	-	na
16	-	na	14	900
18	-	na	1	na
20	-	na	17	1,200
25	16	265	-	na
48	1	na	-	na
totals	92		54	

Notes : * Source : fishermen, checked against sole Yamaha agents in Mutrah (Oman Commercial Enterprises). Price ex agents; transport to home settlement would be a further RO 3 to RO 10.

** Source : fishermen. Price ex agents, Al-Futaym of Dubai-Deira; transport to home settlement would be a further RO 25 to RO 30.

na - price not available: model either does not exist with that horsepower, or else is not popular.

low power range to over four times as expensive for high power models. Against this however the cost of diesel fuel on the Batina is somewhat cheaper than petrol (by about twelve per cent), and inboard owners tend to maintain that their motors are cheaper to run than outboard petrol motors. Certainly diesel engines fit more appropriately (because of their shape and size) into the larger boats than would outboard engines.

Further, there are indications that inboard motors last longer than outboards. The ages of eighty (out of ninety-two) petrol outboards and forty-six (out of fifty-four) diesel inboards were known by the questionnaire respondents (the rest were not known, mainly because of having been bought second-hand), and these are shown in Table 7.4.

No engine in the questionnaire survey according to the responses was more than six years old and still in use (that is, all had been bought since the import restrictions were lifted completely in 1970). However as can be seen from Table 7.4, inboard diesel engines tended to be older than outboard petrol engines: for example, sixty-one per cent of the inboard engines in the survey were bought two or more years ago as against thirty-six per cent of the outboards. This is despite the fact that petrol models have been on sale since the early 1960s, whereas the first diesel inboards appeared only in 1970. While not conclusive, this does tend to suggest that inboard engines last longer on average than outboards. It also coincides with the opinion of the fishermen who generally maintain that petrol outboards typically last no more than two years, whereas diesel inboards are said to last more than double this time. For present purposes therefore two years may be taken as an adequate estimate of typical life expectancy for outboard petrol engines,

Table 7.4 : Outboard and inboard engines : ages of those encountered in the questionnaire survey

Numbers of years old	Outboard Petrol		Inboard Diesel	
	No.	Percentage of class total	No.	Percentage of class total
less than 1 yr.	23	29%	7	15%
1 yr	28	35%	11	24%
2 yrs	14	17.5%	6	13%
3 yrs	10	12.5%	7	15%
4 yrs	4	5%	5	11%
5 yrs	1	1%	5	11%
6 yrs*	0	0	5	11%
total recorded	80	100%	46	100%
not known by respondent	12	-	8	-
Total in survey	92	-	54	-

* no motor encountered in survey said to be over 6 years old and still being used.

while the typical length of life of inboard diesel motors will be assumed to be five years.

Returning to Table 7.3, it will be seen that by far the most popular model of the outboard petrol engines is that of 8 hp., followed by 12 hp., 25 hp. and 15 hp. in order. The typical cost of a new outboard motor for a Group 1 fisherman may therefore be placed at RO 200. The mean annual depreciation would therefore be RO 100 if two years is accepted as the typical life expectancy. With inboard diesel motors, 20 hp. models are the most popular, followed closely by 16 hp. and 8 hp. models. The typical price for a new inboard motor for a Group 2 fisherman can therefore be taken to be RO 800. This gives an annual depreciation of RO 160 if such engines typically last for five years. For Group 3 fishermen, being motorless, this capital cost does not of course apply.

(c) Tackle

The main items of tackle used by Batina fishermen are, as has been seen in Chapter Five, nets and traps together with the ropes, buoys, anchors and other associated equipment. Most fishermen also have handlines, but these are used less than nets and traps, and their cost in comparison with the margin of error involved in calculating the other costs is in any case small enough to be ignored. As has already been indicated, longlines are also used, though by only a small number of fishermen, and these too can be omitted from a consideration of costs.

Nets:

Virtually all the netting now used on the Batina is nylon. The fisherman buys it by the piece and makes it up into the required patterns himself, adding ropes, floats, weights and

anchors as necessary. The cost of a single piece of netting varies considerably with its dimensions, the size of its mesh and its quality, and also with the company by which it is manufactured. Japanese netting tends to be cheapest and the most widely used. The source from which the fisherman buys it tends also to affect the price: the price at Mutrah is said to be ten to twenty per cent higher than at Dubai. As can be seen from Table 7.5, the nearness a fisherman lives to either of these centres will affect his choice, again reflecting the Upper Batina-Lower Batina split. Nearly two-thirds of the Upper Batina questionnaire respondents put Dubai and other Gulf sources as their main source of netting, while over half the Lower Batina respondents said they bought most from Muscat and Mutrah. The table also shows how few of the respondents rely on their local market traders for supplies of netting. This reflects not only the fact that Batina traders tend to stock few fishermen's requisites (which has been mentioned already in Chapter Six (Section 3)), but also that local traders are the most expensive source.

In the questionnaire survey, fishermen were asked to give as precisely as possible the cost of each net they possessed either as netting alone, or else made up with ropes, floats and anchors (where necessary) attached, or if possible both costs. For each fisherman the cost of his individual nets was summed. The results are summarised in Table 7.6 by the three groups of fishermen. As can be seen from the table, the range within each group is very large and the degree of overlap between the three groups is considerable. However, the dispersion diagrams (Figure 7.4) show that the distributions are positively skew, with most of the occurrences in the lower

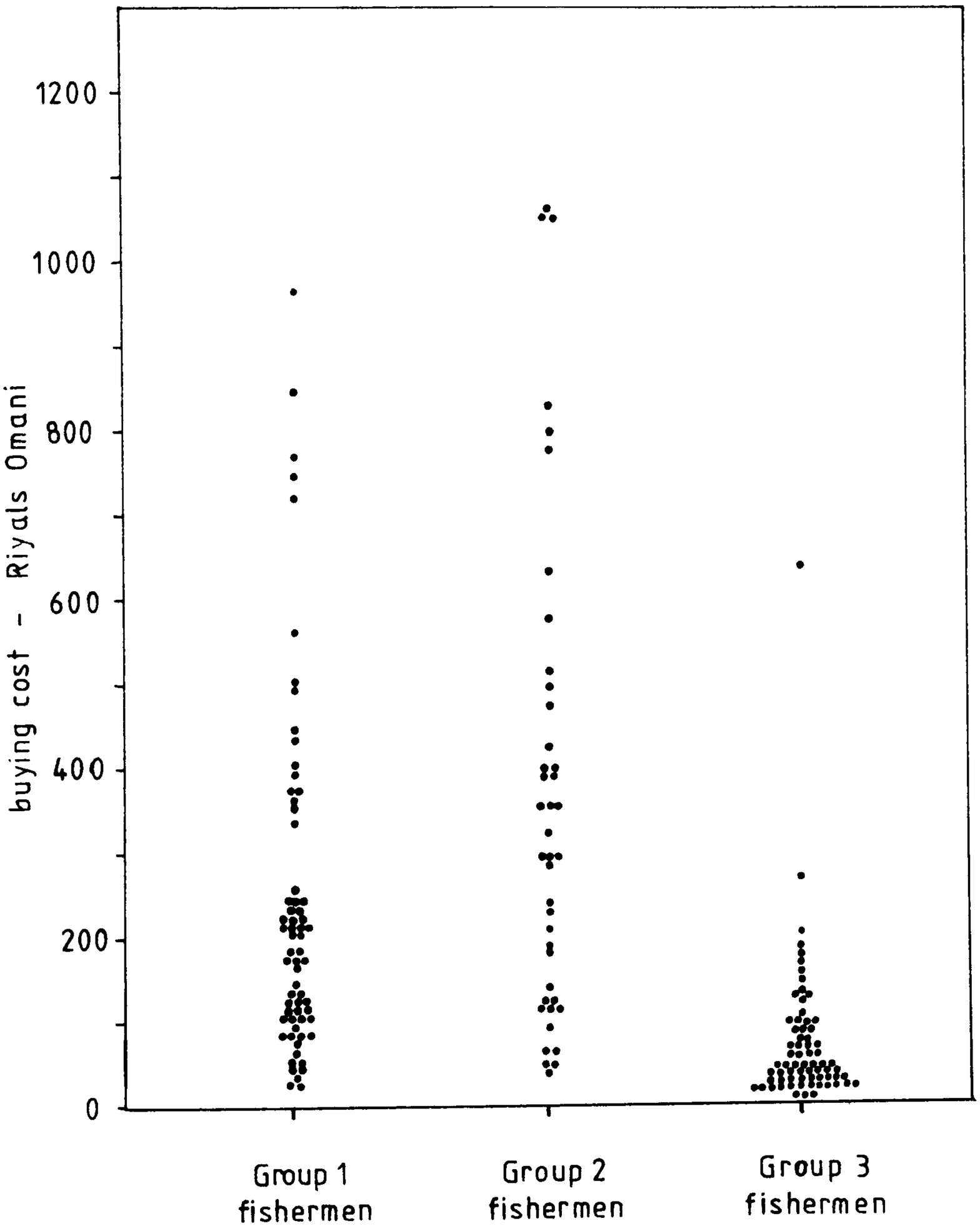
Table 7.5 Sources from which questionnaire respondents usually buy their netting

Usual source of netting	Upper Batina respondents number	%	Lower Batina respondents number	%	All respondents number
Local market	16	12.40	6	6.06	22
Capital Area (Muscat & Mutrah)	17	13.18	54	54.55	71
Dubai & Gulf	82	63.57	18	18.18	100
Mixed Oman & Gulf	14	10.85	21	21.21	35
Total responses	129	100.00	99	100.00	228
no response	13		0		13
Total net owners	142		99		241
no nets	25		1		26
	167		100		267

Table 7.6 Costs of nets per fisherman in the questionnaire survey

	No.of responses	Average per fisherman RO	Median per fisherman RO	Range RO
(a) NETTING ALONE				
Group 1 fishermen (small wooden craft)	65	247	196	23 to 967
Group 2 fishermen (large wooden craft)	41	365	309	44 to 1063
Group 3 fishermen (shash)	68	85	47	5 to 635
All fishermen	174			
(b) NETS INCLUDING ROPES, FLOATS, &c				
Group 1 fishermen (small wooden craft)	45	338	296	36 to 1336
Group 2 fishermen (large wooden craft)	13	551	397	120 to 1422
Group 3 fishermen (shash)	27	127	103	20 to 460
All fishermen	85			

Figure 7-4 Cost of nets (excluding ropes and weights) owned by questionnaire respondents



thirds of the ranges. It is therefore considered more appropriate to use the median of each distribution instead of the arithmetic mean to arrive at estimates of the typical costs of nets for the three groups of fishermen. The typical costs which have been arrived at on this basis are thus RO 300, RO 400 and RO 100 for Group 1, Group 2 and Group 3 fishermen respectively.

Nets have an average life of two to three years, according to most fishermen. Therefore these typical costs represent the capital which must be typically invested over a period of two to three years. The amount typically required by a net-owning fisherman to replace his nets and associated equipment in one year would therefore be RO 120, RO 160 and RO 40 for Group 1, Group 2 and Group 3 fishermen respectively, assuming the quantity of nets owned remain constant overall from year to year.

Traps:

Of the 253 questionnaire respondents who can be assigned to one or other of the three groups of fishermen, almost half (119 or 47%) were recorded as having at least one wire fish trap of the kind described in Chapter Five (Section 2). The average number of traps per trap-owning fisherman was just over six (6.32) and the median was five. One man claimed to have as many as forty traps and two men thirty traps each, but two-thirds of the trap-owning respondents had only six or fewer.

When the fishermen are divided by group, a pattern emerges, as can be seen in Table 7.7. First, some seventy per cent of the Group 2 fishermen interviewed owned traps, as against half the Group 1 fishermen and less than one-third of the Group 3

Table 7.7 Traps and trap-owners in the questionnaire survey

No. of traps owned	Group 1		Group 2		Group 3	
	No.of respon-ses	Percen-tage of group respon-ses	No. of respon-ses	Percen-tage of group respon-ses	No.of respon-ses	Percen-tage of group respon-ses
1 - 4	23	47.91%	9	23.68%	22	78.57%
5 - 9	20	41.67%	13	34.21%	5	17.86%
10 - 15	5	10.42%	10	26.32%	1	3.57%
16 - 20	0	0	2	5.26%	0	0
> 20	0	0	4	10.53%	0	0
total responses	48	100.00%	38	100.00%	28	100.00%
not known by respondent	1		2		2	
total fisher-men owning at least one trap	49		40		30	
percentage of total fisher-men in group	50.52%		70.18%		30.30%	
total fisher-men in group	97		57		99	

fishermen. Part of the reason for this probably lies in the fact that to empty traps requires a large amount of deck space, and they are therefore less suitable for use with Class I craft, and still less with shash, than with the larger Class II vessels. Second, Group 2 fishermen who owned traps tended to own more than Group 1 or Group 3 fishermen: a median of eight per trap-owning fishermen in Group 2 as compared with five in Group 1 and only two per Group 3 trap-owner. This is probably yet another indication of the relative wealth of the three groups of fishermen. For present purposes these median figures will be taken as representing a typical trap-owning fisherman of each of the groups.

Traps are almost invariably made up in the settlement in which they will be used. The maker is either the fisherman himself or more usually a local trap-building specialist after the fisherman has bought the galvanised steel wire. The source of the wire is either Mutrah or more often Dubai where it is cheaper. A roll of wire sufficient for three to four traps cost around Dh 250 (RO 22) at the time of the survey. A break-down of costs is shown in Table 7.8. It will be seen that the maker's fee can raise the cost of the trap by between fifty and one hundred per cent, depending on the size of the trap and the quality of the wire. The cost of rope and marker floats for each trap also represents a substantial part of the outlay. The length of rope needed, and therefore its cost, depends of course on the depth of water in which the trap is to be used. The cost of rope and floats will not generally be less than RO 2, and for deep water traps (100 m or more) it may exceed RO 7.500. In most cases however, both rope and floats will outlast the trap itself.

Table 7.8 Breakdown of costs of trap making

Item		Cost per trap RO
Cost of wire		
Dh 240 to Dh 280 per roll (Dubai price) for 3 to 4 traps Plus Dh 10 transport charge	Dh 63 to 97 per trap	5.500 to 8.500
Cost of hiring trap maker		4.000 to 5.000
		9.500 to 13.500
Cost of rope and floats (approx. minimum)		2.000 to 3.000
Total cost of one finished trap ready for use		11.500 to 16.500

Here the cost of an average sized trap is taken to be RO 10 with a further RO 3 for ropes and floats. The typical cost per fisherman for replacement of all his traps (without ropes and floats) has been calculated by multiplying RO 10 by the median number of traps owned per fisherman in each of the three groups. On this basis the typical replacement cost is RO 50 for a Group 1 fisherman, RO 80 for a Group 2 fisherman and RO 20 for a group 3 fisherman, while ropes and floats would be another RO 15, RO 24 and RO 6 respectively.

The fisherman are generally agreed that a trap lasts between six months and one year before it is rusted through. If the mean life of a trap is nine months, then these costs represent rather less than the amounts needed annually for the replacement of a fisherman's complement of traps (assuming the overall numbers of traps remains fairly constant), though the ropes and floats would be re-usable on two, three or more successive traps. The typical total annual replacement costs including ropes and floats per fisherman which have thus been arrived at are detailed in Table 7.9, namely RO 75 for a Group 1 RO 119 for a Group 2 fisherman and RO 30 for a Group 3 fisherman.

Composite costs of tackle:

What is required now is a composite figure to represent the typical tackle costs for each of the three groups of fishermen. Since different proportions of the different groups of fishermen have nets only, or traps only, or both nets and traps, the typical composite cost of tackle has been obtained by allowing for these differences, as shown in Table 7.10. It will be noted that fishermen owning traps only are in the minority in all three groups, while in Group 2 those with nets

Table 7.9 Calculation of the typical annual replacement costs of traps per fishermen

Column:	a	b	c	d	e	f	g	h	i	
	Unit cost of trap alone RO	Median no. of traps owned	Total cost of traps owned (a x b) RO	Length of life of trap	Annual total cost of trap replace-ment (12 x c/d) RO	Unit cost of ropes and floats RO	Total cost of ropes and floats (b x f) RO	Length of life of ropes and floats	Annual total cost of ropes and floats (g/h) RO	Annual total cost of replace-ment of traps inc. ropes and floats (e + i) RO
Group 1	10	5	50	9 mos.	67	3	15	2 yrs	8	75
Group 2	10	8	80	9 mos.	107	3	24	2 yrs	12	119
Group 3	10	2	20	9 mos.	27	3	6	2 yrs	3	30

Table 7.10 : Calculation of the typical composite annual costs of tackle per fisherman

Group of fishermen	Total no. of fishermen in group	Nets only			Traps only			Nets and traps			Typical composite annual cost per fisherman (b x c + e x f + h x i) RO
		a. no. of fishermen	b. percentage of group	c. typical unit cost of set of nets RO	d. no. of fishermen	e. percentage of group	f. typical unit cost of set of traps RO	g. no. of fishermen	h. percentage of group	i. typical unit cost of nets & traps RO	
Group 1	96	47	48.96%	120	2	2.08%	75	47	48.96%	195	156
Group 2	55	15	27.27%	160	5	9.09%	119	35	63.64%	279	232
Group 3	95	65	68.42%	40	12	12.63%	30	18	18.95%	70	44
Total*	246										

* Note:

A total of 253 fishermen were grouped by the present method (see Table 7.1). However, 7 of these fishermen fish with neither nets nor traps, being dependent only on lines, and are therefore excluded for present purposes.

only and those with nets and traps are in equal proportions. In Group 3 on the other hand two-thirds of the group own only nets. As the table shows, the composite annual replacement costs of tackle have been calculated at RO 156, RO 232 and RO 44 for typical Group 1, Group 2 and Group 3 fishermen respectively.

(d) Composite total capital costs

Table 7.11 summarises the total capital costs for a typical fisherman of each of the three groups as derived from the foregoing calculations. The totals have been rounded to the nearest five riyals. It will be seen from the table that in the case of fishermen with wooden craft (Groups 1 and 2) the biggest single outlay is the cost of the craft itself, followed by that of the engine, though given their respective potential life spans the annual depreciation of the engines is greater than that of the craft. By far the largest single annual cost in all three groups is however for tackle which accounts for just over half the total annual cost in the case of Groups 1 and 2 and over three-quarters the total annual cost in the case of Group 3.

These estimates are believed to be a valid representation of the fishermen who were interviewed by questionnaire, who themselves are considered to reflect adequately for at least descriptive purposes the Batina fishing population as a whole. If this is true, then these conclusions on the costs of the different items of capital expenditure and their relationship with one another have important developmental implications concerning the quantity and quality of inputs that may be considered appropriate and desirable. This will be taken up again later when strategies for development are discussed in

Table 7.11 : Summary of typical composite total capital costs per fisherman

Item	Group 1			Group 2			Group 3		
	total	per annum		total	per annum		total	per annum	
	RO	RO	%	RO	RO	%	RO	RO	%
craft	425	17	6%	1,300	52	12%	24	12	21%
engine	200	100	37%	800	160	36%	-	-	
tackle	-	156	57%	-	232	52%	-	44	79%
total capital costs per annum		273	100%		444	100%		56	100%
		≃ 275			≃ 445			≃ 55	

Part III of this thesis.

7.2.2 Medium-term running costs

Medium-term running costs are here taken to mean the costs of repairs to craft and engines and the cost of periodic (usually monthly) application of oil to protect the timber of the craft. The oil used on the Batina is normally locally made shark-liver oil called *sall*. The medium-term costs therefore apply only to fishermen of Groups 1 and 2, and not to the owners of only *shash* (Group 3).

The cost of applying *sall* to craft was recorded during the interview survey in terms of the number of *tanaks* that were usually used per month. A *tanak* (literally 'tin') is a four imperial gallon kerosene tin in which *sall* is normally sold and stored. The mean amounts used each month are based on seventy-three responses in the case of Group 1 fishermen, giving a median and mode value of half a *tanak* per month, and forty-one responses in the case of Group 2 fishermen, giving a median and mode of one *tanak* per month. The cost of a *tanak* was observed to vary slightly with availability and quality, but RO 6 was the most commonly quoted price. It was never found to be more than RO 8 or less than RO 4. The typical price per *tanak* is therefore here taken as RO 6. On this basis a typical Group 1 fisherman would be spending RO 3 per month on *sall*, and, assuming uninterrupted applications throughout the year, the annual cost would therefore be RO 36. With the same assumptions, a typical Group 2 fisherman would be spending RO 6 per month, or RO 72 per year.

The costs of repair to craft and engines are much more

difficult to determine. The range between fishermen is undoubtedly very great, and since very few respondents to the questionnaire were able to give detailed answers on this point, (and few even of these can be considered wholly accurate), a large degree of estimation has had to be employed here.

Considering first the craft, conversations with the Batina boat builders (who also repair craft) together with the results of the interviews with the fishermen suggest that Class I craft typically require about RO 150 to be spent on their repair every five or so years, while Class II craft typically need about RO 400 over the same period. This would mean approximately RO 30 per annum for a Group 1 fisherman and RO 80 for a Group 2 fisherman on average.

As for costs of engine repair, some fishermen appear to be considerably more fortunate than others. Although probably few motorised fishermen escape wholly without a breakdown during the life of their engine, some would seem to be much more accident prone than others. In some cases at least this may well reflect the care, or lack of it, the owner takes to service his machine regularly. The data collected from the responses to the questionnaire are insufficient alone on which to base an estimate. In the first place, a large proportion of the engines were only one year old or less (fifty-five per cent of the total). The chances of their breaking down therefore would presumably be less than those for engines of average or median age. In the second place, the costs so collected are few in number, since few fishermen were found to be capable of producing a reasonable estimate of how much they had so far spent on engine repairs. Third, even those estimates which were obtained from the fishermen (even if accurate in themselves) include only

the direct cost of spare parts and labour. They do not measure the costs of travelling to Muscat in the case of Group 1 fishermen or to Dubai in the case of Group 2 fishermen, nor do they take into account the potential takings lost to the fisherman while his boat is laid up. As has been pointed out in Chapter Five (Section 3), both can be considerable.

For want of more precise data, it will here be assumed that each engine will require one major repair or the refitting of one major part each year. This is not an unreasonable assumption in view of the number of craft which were commonly found during the survey to be laid up because of engine failure. The cost of this repair, including both parts and labour, will be assumed to be RO 25 for Group 1 fishermen and RO 50 for Group 2 fishermen. To these costs must be added the costs of transport and possibly also food and accommodation in Mutrah (for Group 1) or Dubai (for Group 2) - at least another RO 5 and RO 10 respectively. This gives a total of RO 30 per annum for a Group 1 fisherman and RO 60 per annum for a Group 2 fisherman. These figures will be used in future calculations as the amount a typical fisherman would have to pay out on engine repairs in a year.

If loss of potential takings through the craft being laid up were also included, the real cost to the fisherman would be considerably greater. Takings are discussed in the next section (Section 3), and it would appear from the evidence presented there that if only twenty fishing days per year were lost through the incapacity of either the craft or the engine, and if no shash are available with which to fish instead, the lost potential gross takings could amount to as much as RO 65 for a Class I crew and RO 100 for a Class II crew per year.

Table 7.12 summarises the medium-term running costs per year.

Table 7.12 : Typical annual medium-term running costs per fisherman

Item	Group 1 fishermen RO	Group 2 fishermen RO	Group 3 fishermen RO
sall (shark-liver oil)	36	72	not applicable
boat repairs	30	80	not applicable
engine repairs	30	60	not applicable
total annual medium-term running costs	96	212	nil

7.2.3 Day-to-day running costs

The day-to-day running expenses consist of the costs of fuel and engine oil. An estimate of fuel consumption per fishing trip was asked of the respondents in the questionnaire survey who had motorised boats. Estimates were obtained for 137 engines (from the total of 146 : respondents owning the remaining nine were unable to give any figure). Of these, eighty-five were outboard petrol engines (Group 1 fishermen) and fifty-two were inboard diesel engines (Group 2 fishermen). The average petrol consumption from the responses came to 4.75 imperial gallons per fishing trip and the average diesel consumption to 6.24 imperial gallons per trip. Although one would expect that diesel consumption should be less than petrol consumption, the fishing trips of Group 2 fishermen are probably longer on average than those of Group 1 fishermen. This would

account for the higher diesel consumption.

In the summer of 1976 ordinary grade petrol and diesel fuel were retailing at Shell and BP fuel stations in the central Batina at 52 baisas and 46 baisas per litre respectively - that is, 235 baisas and 210 baisas per imperial gallon respectively. In settlements remote from fuel stations, however, fishermen often rely on an intermediate local trader for fuel. The trader bears the cost of transport from the nearest source to the fishing settlement, and charges a higher price accordingly. It was found during the survey that a price for petrol of 250 baisas or more per gallon was common. At Suwadi (Musan'a Wilaya) a local trader was said to charge 300 baisas per gallon. The diesel price varies similarly. Intermediate traders frequently buy 44 gallon drums of diesel from trading dhows when they call. The usual 1975-76 price at which a drum was sold by the dhows was Dh 100, RO 8.750. By the time the trader's costs and profits were met, the drum rarely reached the fisherman at a cost less than RO 10, or 230 baisas a gallon.

However, taking the fuel station prices of 235 baisas a gallon for petrol and 210 baisas a gallon for diesel as lowest 1975-76 estimates, the fishermen would appear to be spending on average RO 1.116 and RO 1.310 per fishing trip for petrol (Group 1) and diesel (Group 2) engines respectively. Assuming twenty fishing trips per month throughout the year, (i.e. one trip per day every two days out of three), this would be equivalent to an average of RO 268 for Group 1 and RO 314 for Group 2 in a year.

Estimates of oil consumption per month were derived from the questionnaire survey in the same way. In this case fishermen were able to give estimates for 129 engines of the

total of 146 in the survey. At the time of the survey motor oil varied in price (depending on the brand and the seller) between RO 1.500 and RO 2.000 per gallon. Here RO 1.750 will be assumed to be the average cost. The average estimate of oil consumption for petrol engines was calculated from the responses at 3.30 gallons per month and for diesel engines at 4.09 gallons per month. On this basis Group 1 fishermen would appear to be spending an average of RO 5.775 per month on engine oil, or RO 69 per year assuming year-round fishing. The equivalent figures for Group 2 fishermen are RO 7.160 per month and RO 86 per year.

Some evidence for twenty fishing trips per month can be derived from the data on Group 1 fishermen. Outboard two-stroke petrol engines burn a mixture of petrol and oil. Yamaha (the most popular make on the Batina) recommends in a publicity brochure the mixing ratio of one part oil to fifty parts petrol. The outboard motor dealers in Mutrah advise the fishermen to add one orange-juice tinful of oil to each gallon of petrol. The tin in question measures 0.196 litres, 0.0431 gallons. Their suggested mixing ratio would therefore be one part oil to twenty-three parts petrol; that is, more than double the quantity of oil to petrol that the makers recommend. Taking on the other hand the mean quantities of oil and petrol as derived from the questionnaire, the ratio is calculated at one part oil to twenty-nine parts petrol if it is assumed that one fishing trip is made on twenty days of each month. (1) The ratio of 1 : 29 lies nearer the Mutrah dealer's recommendation

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(1) i.e., the ratio $\frac{\text{mean oil consumption per month}}{\text{mean petrol consumption per day x 20 days}}$

$$= \frac{3.30}{4.75 \times 20} = 1/28.8 \simeq 1 : 29$$

of 1 : 23 than to the manufacturer's 1 : 50. The assumption that a fisherman will make twenty fishing trips (generally one per day on twenty different days) per month is therefore not an improbable estimate.

Looked at in another way, the manufacturer's recommended ratio of 1 : 50 oil to petrol would give the mean number of fishing trips per month as thirty-five, assuming the mean petrol consumption per day to be 4.75 gallons and the mean oil consumption per month to be 3.30 gallons. Such a frequency is unlikely since very few fishermen go out more than once a day, and few months are completely free of high seas. On the same basis the Mutrah dealer's ratio of 1 : 23 would give an average of sixteen trips per month. Since most fishermen probably keep closer to the dealer's recommendation than to that of the manufacturer, a compromise of twenty trips per month is acceptable.

7.2.4 Composite costs

Table 7.13 summarises the total annual costs for the different groups of fishermen.

Table 7.13 : Summary of typical composite annual costs per fisherman

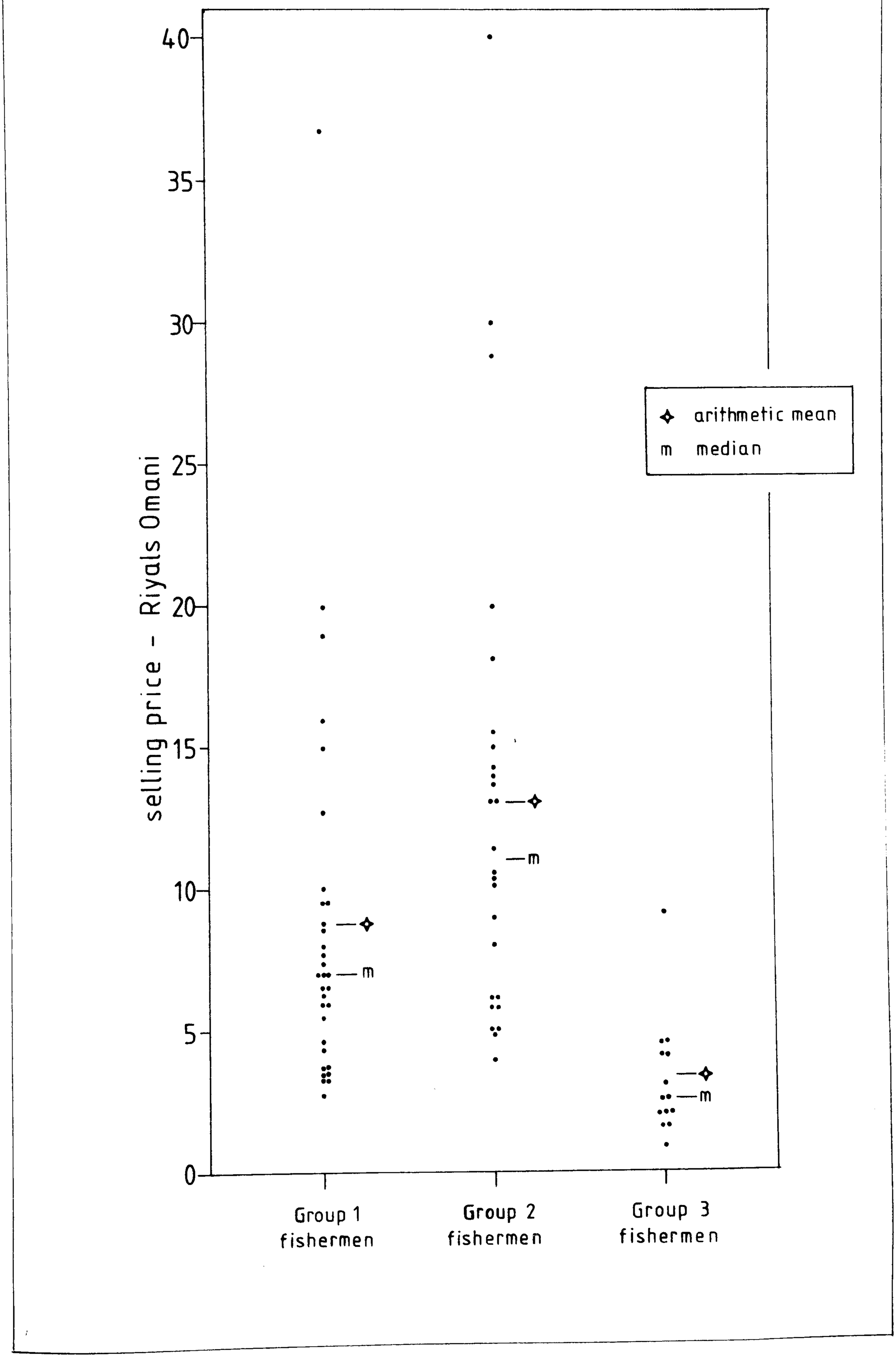
Costs per year	Group 1 fishermen RO	% of total	Group 2 fishermen RO	% of total	Group 3 fishermen RO	% of total
Capital costs	275	62.50%	445	59.90%	55	100.00%
Medium-term running costs	96	21.82%	212	28.53%	nil	
Day-to-day running costs	69	15.68%	86	11.57%	nil	
Total costs per yr.	440	100.00%	743	100.00%	55	100.00%

7.3 Takings

It was found impossible to derive realistic estimates of takings from the questionnaires. The responses provided figures so general as to be of little use, and a question on takings originally included was dropped at an early stage of the survey. A second method had therefore to be relied on. This was to record details of as many catches as possible on their arrival ashore. The details of seventy-two catches were collected on the beach at Khabura market during the course of the marketing survey and a further ten at settlements without markets. Another eleven were noted for beach seine catches. Of the seventy-two market catches, thirty-two were from Class I craft (Group 1 fishermen), twenty-six were from Class II craft (Group 2 fishermen), and the remaining fourteen were from shash (Group 3 fishermen). These are shown in the dispersion diagrams in Figure 7.5.

Several points must be made about these catch data. First, they are limited in number and are largely circumstantial, though this was unavoidable. When delivering their catch at a market, fishermen tend to empty their boat of fish not all at once, but rather in irregular sublots over an hour or more. As will be seen later (Chapter Nine), there is no central buyer and the fishermen can choose to sell to fish traders or directly to consumers. In the latter case especially, the fish from one boat can be sold individually or in small lots over the whole morning by two or more of the crew separately in different parts of the market. To keep track of how much is being paid at each sale is therefore difficult and time consuming. It is not usually possible to discover from the crew directly how much their takings have been, since they do

Figure 7-5 Gross selling prices of recorded loads of fish landed at Khabura market during field survey



not generally reckon up until back at their own settlement. Therefore such sales as came to hand were recorded and no attempt could be made to take a statistically random sample of catches.

The number of recorded takings of shash catches is particularly low and reflects the relative infrequency with which shash fishermen deliver catches to the market in their craft themselves. The part of the market catch from shash fishermen is usually brought by them on foot or donkey along the beach, or else enters the market by an intermediate itinerant trader, as will be seen in greater detail in Chapter Nine.

The second point concerning the catch data is that they are confined almost wholly to Khabura market. Practical difficulties in the field made it impossible to take comparative catch data in other Batina markets for sustained periods. Nevertheless, visits were paid on many occasions to all the other markets on the Batina, and the impression was gained both from these visits and from conversations with fishermen up and down the coast that catch takings in Khabura were by no means atypical of market takings on the Batina as a whole.

Thirdly, the market takings do not take into account the fish that are as a general rule kept back from sale for the use of the fishermen's own relatives and neighbours. With the available data it is impossible to estimate in more than general terms the notional value of this part of the catch. It varies greatly with the type of fish in the catch, the number of the crew, the number of the crew's relatives and friends, and the general plentifulness or scarcity of fish in the market and in the area generally. Circumstantial data from

the survey would tend to suggest that an estimated notional value of about RO 0.500 to RO 1.000 per crew member per catch might be taken as typical. It is these figures which will be used in subsequent calculations.

The final important point to be made is that the market takings data do not reflect those catches which are not sold in a market because they are too small to warrant a trip, or because the home settlement is too far from a market, or for some other reason. In the case of the Group 3 shash fishermen such catches are without doubt in the majority and although a median of RO 2.500 and an average of RO 3.297 (Figure 7.5) may reflect the takings made by shash fishermen on the catches they bring to the market, they say nothing of the mean takings of the Group 3 shash fishermen as a whole. If a shash fisherman lives further than one hour's donkey ride from the nearest market, then it will generally not be worth his while to sell at the market even his best catches. Indeed, no shash fisherman was ever met in Khabura market who had come from more than four kilometres away. Most of his catches will therefore be sold or otherwise disposed of at his home settlement. It will here be assumed that his mean takings per catch will be RO 1.000 (making RO 20 per month of twenty fishing trips) with an additional amount of fish kept back from sale to the notional value of RO 0.500 per catch.

If the median values for the market sales of Group 1 and Group 2 fishermen are accepted as representative (i.e. RO 7 and RO 11 respectively), what is required now is an indication of how frequently a boat may be expected to sell its catch at the market as opposed to the home fishing settlement. For this purpose records were kept during the second and third field

seasons of how many craft delivered fish to Khabura market on each of the thirty-five days that the market survey was carried out. The number varied from nil (when on two days there were no fish delivered because of high seas) to fifteen on two separate days and nineteen on another. Overall however, the mean number of craft is approximately four each for both Class I and Class II motorised vessels (actually an arithmetic mean of 3.86 for Class I and 4.03 for Class II).

A record was also kept of the home settlement of most of the craft which unloaded at Khabura market. It was found that vessels from further away than Qasbiyat Al Bu Saʿid (six kilometres to the north of Khabura) or Ghalil (nine kilometres to the south of Khabura) called only very rarely indeed. The effective catchment area of Khabura fish market can therefore be taken as this fifteen kilometre stretch of coast. On the stretch between these two settlements there were counted forty-three Class I vessels of which thirty-three were motorised, and forty-six Class II vessels of which forty were motorised. Since very few non-motorised craft ever call at the market, only the motorised craft will be considered here.

Taking first Class I craft (i.e. Group 1 fishermen), if an average of four craft call at the market per day, then on average 120 will call during a month of thirty days. Since the approximate total potential fleet of Class I is thirty-three, this will mean that any individual boat of Class I will on average call less than four times per month at the market. If the mean gross takings at the market are RO 7 for the catch of a Class I vessel, then the total gross takings from the market per month will on average be only RO 28, or about RO 336 in a year assuming year-round fishing.

On the same argument, a typical Class II boat will call at the market only 120/40 or three times per month of thirty days, making the average takings from the market only RO (3 x 11) = RO 33, or about RO 400 in a year assuming year-round fishing.

For the rest of the month fishermen of both groups would dispose of their catch in their home settlement either by sale (to neighbours or itinerant traders) or if the catch is very small by distribution without sale. Here it will be assumed : (1) that of the twenty fishing trips made per month four trips for Class I craft and three trips for Class II craft produce sufficient fish to warrant a visit to the market; (2) that five of the twenty trips per month produce no saleable fish at all; and (3) that on the remaining trips (eleven in the case of Class I and twelve in the case of Class II) fish are sold in the home settlement and the cash value received is half that for mean gross takings from market sales (i.e. RO 3.500 per trip for Class I craft and RO 5.500 per trip for Class II craft). Table 7.14 shows the expected total gross takings per month and per year on this basis. Working from this and assuming mean crews of 2.13 men per Class I boat and 3.54 men per Class II boat, Table 7.15 shows what net takings per man per month would be on average if the costs as calculated earlier (Section 2 above) are subtracted directly from the takings and the remainder shared equally among the crew. This takes no account of the different sharing systems that may be used. Nevertheless the low figures it produces are wholly in line with those derived in the next section when systems of sharing are allowed for.

Table 7.14 : Estimation of typical gross cash takings per craft

	Sales per craft at market				Sales per craft at home settlement				Total sales per craft per year
	No. of days sale at market per month	Value of cash takings per catch RO	Value of cash takings per mo. RO	Value of cash takings per year RO	No. of days sale at settlement per month	Value of cash takings per catch RO	Value of cash takings per mo. RO	Value of cash takings per year RO	RO
Class I	4	7	28	336	11	3.5	38.5	462	798
Class II	3	11	33	396	12	5.5	66	792	1,188

Table 7.15 : Estimation of typical net cash takings per fisherman

	Total gross cash takings per craft per year (Table 7.14) RO	Total costs per craft per year (Table 7.13) RO	Total net takings per craft per year RO	Total net takings per craft per month RO	Average crew per craft	Average net takings per man per month* RO
Class I	798	440	358	30	2.13	14
Class II	1,188	743	445	37	3.54	10

* plus RO 0.500 to RO 1.000 notional value of fish per man per day for 20 days per month
≃ RO 10 to RO 20 per month.

It was observed during the survey that certain fishermen regularly made many more trips to Khabura market than the majority. In their case therefore it may be objected that the assumed average frequency of visiting the market of four times a month for Class I craft and three times for Class II craft is unrealistically low. It is considered unlikely however that even in their case the average number of visits to the market over the year exceeds ten per month. If this is so, and if on five further days per month they sell at their home settlements, then Tables 7.16 and 7.17 show what their average takings would be, the other assumptions being the same as in Tables 7.14 and 7.15. The net cash takings per man per month would be somewhat higher (RO 24 instead of RO 14 in the case of Class I craft, and RO 21 instead of RO 11 in the case of Class II craft), though even then they are to be regarded as low, as will be shown in the next section.

7.4 Sharing systems and net takings

How costs and takings are distributed among the crew of a fishing boat depends on what sharing system is adopted by them. The questionnaire survey provided 237 responses to the question about sharing systems, of which there were eighty-eight from Group 1 fishermen, thirty-nine from Group 2 fishermen and ninety-six from Group 3 fishermen. The remaining fourteen were owners of beach seine craft or motorised shash, and therefore do not fall into the present classification. The results are summarised in Table 7.18.

As the table shows, there are marked differences between the groups of fishermen in their preferences for how costs and takings are dealt with. In the case of Group 3 fishermen,

Table 7.16 : Estimation of typical gross cash takings per craft for specially active fishermen

	Sales per craft at market				Sales per craft at home settlement				Total sales per craft per year
	No. of days sale at market per month	Value of cash takings			No. of days sale at settlement per month	Value of cash takings			
		per catch RO	per mo. RO	per year RO		per catch RO	per mo. RO	per year RO	RO
Class I	10	7	70	840	5	3.5	17.5	210	1,050
Class II	10	11	110	1,320	5	5.5	27.5	330	1,650

Table 7.17 : Estimation of typical net cash takings for specially active fishermen

	Total gross cash takings per craft per year (Table 7.16) RO	Total costs per craft per year (Table 7.13) RO	Total net takings per craft per year RO	Total net takings per craft per month RO	Average crew per craft	Average net takings per man per month * RO
Class I	1,050	440	610	51	2.13	24
Class II	1,650	743	907	76	3.54	21

* plus RO 0.500 to RO 1.000 notional value of fish per man per day for 20 days per month
≃ RO 10 to RO 20 per month.

Table 7.18 Types of sharing system and frequencies of occurrence in the questionnaire survey

	Group 1		Group 2		Group 3	
	no.	% of total	no.	% of total	no.	% of total
on own, no sharing	9	10.23%	0	0		87.50%
sirkal: single household, common fund	43	48.86%	9	23.08%	9	9.38%
sharing system used	36	40.91%	30	76.92%	3	3.12%
Total responses	88	100.00	39	100.00	96	100.00

Sharing system:	numbers of responses		
	Group 1	Group 2	Group 3
half to boat & gear, half to owner & crew	1	15	1
one-third to boat and gear, two-thirds to owner & crew	8	6	0
half to boat, gear & owner, half to crew	6	3	1
one-third to boat, gear & owner, two-thirds to crew	2	2	1
one-third to gear, two-thirds to boat, owner & crew	15	1	0
other cases	4	3	0
Total with sharing system	36	30	3

the large majority of the respondents to the questionnaire generally fished on their own, and consequently the need for sharing does not apply. A typical Group 3 fisherman will be considered to be of this type. His gross takings will amount on average to RO 20 per month, as estimated in Section 3 above, or RO 240 per year assuming year-round fishing. Average shash costs are RO 55 per year (Section 2 above)making typical net takings of RO 185 per year, or RO 15.500 per month in cash, plus some RO 10 worth of fish per month.

Nearly half the Group 1 respondents said they operated on what they called the sirkal system, meaning simply that all the crew (usually two or three men, seldom more, who are generally joint owners) come from the same household and all expenses are defrayed from the same common fund. In some cases a certain amount of the takings is consciously put aside to provide particularly for renewing tackle, though often costs are borne from the general household budget only as and when they become necessary.

Most of the rest of Group 1 respondents (thirty-six out of the total eighty-eight) operated one or other of a variety of sharing systems. With Group 2 respondents the large majority (thirty out of thirty-nine) used a sharing system, which undoubtedly reflects in their case the larger crews on the larger Class II boats, and therefore the greater likelihood that two, three or even more households will be involved.

A large variety of sharing systems are used and they differ from one another according to what proportions of the gross takings are allotted to the upkeep of the boat and engine, the replacement of gear, and the shares of the owner and crew.

In nearly every case it was found that day-to-day running costs (i.e., the cost of fuel and oil for each trip) were deducted immediately before the sharing system was applied. The most common methods of the division of what remained were by halves and by thirds. In the case of Group 2 fishermen, by far the most popular method (fifteen cases out of thirty) was to assign half to the upkeep and replacement of the boat and gear (i.e., the medium and long term costs), and to divide the other half into equal shares, one share for each of the crew members and the owner. The size of each man's net takings therefore depends not only on the sharing system, but also on the number of crew members.

With Group 1 fishermen on the other hand the most favoured division (after deduction of the day-to-day running costs) was one-third to the gear, and two-thirds divided into equal shares,one share for the boat and its upkeep, one share for the owner and one share for each of the crew. This accounts for fifteen cases out of thirty-six. Here the gear receives a higher proportion of the takings than with other systems, a fact consistent with findings shown earlier (Table 7.11) that gear is the largest single item of annual capital expenditure and proportionately slightly larger on average with Group 1 fishermen than with Group 2 fishermen. The net takings of a crew member under this system again depends on the size of the crew, though the latter is less variable than with Class II craft.

Frequently crew members contribute gear of their own and take in addition to their share a fraction of the part allotted to capital upkeep, so that the actual range of possible permutations is more complex than is presented here. Even if

a crew member contributes no gear of his own, he generally receives a share equal to that received by the owner, since, as owners frequently complain, they would not otherwise be able to attract enough crew.

Since the number of permutations and alternatives is large, a degree of generalisation is necessary for present purposes. Table 7.19 therefore selects the most common systems according to the questionnaire responses and shows the typical net takings per crew member, using as a basis the gross takings derived in the previous section (Table 7.14). On this basis the mean net takings for a crew member on a Class I craft would be around RO 13 to RO 14 per month, and for a crew member on a Class II craft about RO 10.5 to RO 13 per month. Shash fishermen in comparison would appear to make about RO 15.5 per month. If the higher estimates for the gross takings for Class I and Class II craft are used (Table 7.16), what can be called the typical maximum net earnings per crew member would be about RO 17 to RO 24 for Class I crews and RO 18 to RO 21 for Class II crews, as shown in Table 7.20. All these estimates would of course be typical net cash takings only and would be supplemented by some RO 10 to RO 20 worth (notional value) of fish per month.

On the Upper Batina and in the Sib area some fishermen would derive part of their income from beach seine operations, though as has already been mentioned, probably much less so now than formerly. Only eleven beach seine operations were recorded in detail, the gross takings from which ranged from RO 4 to RO 30 with an average at about RO 15. The most common method of sharing beach seine takings is to reserve one-third

Table 7.19 : Estimation of typical net cash takings per fisherman according to most popular methods of sharing

	Class I craft (average crew = 2.13 men) RO	Class II craft (average crew = 3.54 men) RO
Average total gross sales per year	798	1,188
Typical day-to-day costs per year	69	86
Average total to be shared	729	1,102
sirkal (single household, common fund) :		
Total capital & medium-term costs	371 per year	657 per year
Total net takings per craft	358 per year	445 per year
Net takings per man	168 per year	126 per year
	14 per month	10.5 per month
most popular sharing system :		
A.		
1/3 to gear	243 per year	-
2/3 to boat, owner & crew	486 per year	-
1 share = 1/(av. crew + 1)	155 per year	-
(Total to boat and gear	398 per year)	
B.		
1/2 to boat & gear	-	551 per year
1/2 to owner & crew	-	551 per year
1 share = 1/av. crew	-	156 per year
Net takings per man	13 per month	13 per month

Note : Net takings exclude notional value of fish of ca. RO 10 to RO 20 per man per month

Table 7.20 : Estimation of typical net cash takings per fisherman according to most popular methods of sharing : specially active fishermen.

	Class I craft (average crew = 2.13 men) RO	Class II craft (average crew = 3.54 men) RO
Average total gross sales per year	1,050	1,650
Typical day-to-day costs per year	69	86
Average total to be shared	981	1,564
sirkal (single household, common fund) :		
Total capital & medium-term costs	371 per year	657 per year
Total net takings per craft	610 per year	907 per year
Net takings per man	286 per year	256 per year
	24 per month	21 per month
most popular sharing system:		
A. 1/3 to gear	327 per year	-
2/3 to boat, owner & crew	654 per year	-
1 share = 1/(av.crew + 1)	209 per year	-
(Total to boat and gear	536 per year)	
B. 1/2 to boat & gear	-	782 per year
1/2 to owner & crew	-	782 per year
1 share = 1/av. crew	-	221 per year
Net takings per man	17 per month	18 per month

Note : Net takings exclude notional value of fish of ca. RO 10 to RO 20 per man per month

for the boat, the net and the owner, and to divide the remaining two-thirds among the team, giving two shares to each oarsman and one share to each hauler. The average net takings from each operation would therefore be around RO 10. If there are ten haulers and six oarsmen excluding the owner, the takings per hauler on an average operation would be less than half a riyal. With the larger beach seines the gross takings would probably be greater, but so also would the number of men among whom they are to be shared. Although therefore the available data is insufficient to calculate in detail what typical net takings per man might be from beach seine operations, it is considered likely that they are low and would not significantly alter the pattern described above in the case of crews of Class I and Class II craft and shash fishermen. In any case beach seines are used less now than formerly and work on beach seines has never been available to most fishermen on the Lower Batina.

It would appear then that the typical net takings of Batina fishermen on the basis of the above calculations are low. Few measures of comparison are available in the absence of any detailed socio-economic data from rural Oman. However, according to work undertaken by the present writer in Khabura market (Durham Oman Research Reports 1978 Vol. VI), the average rent of a shop unit in the market in January 1976 was RO 6.600 per month, while the newest cement brick shops were rented at RO 20 or RO 25 per month. At the same time the minimum wage for an unskilled government employee with the agricultural extension centre at Khabura was RO 50 per month, while a government tractor driver would earn RO 75 (information

from Dr. R.W. Dutton, then Field Director of the Durham University Khabura Development Project) - that is, between three and six times the typical net takings of fishermen as estimated here. Although the opportunity availability of such jobs is very restricted, they can serve here as measures of comparison.

Given the limited available data on which they have been calculated, it may be objected that the fishermen's typical takings as estimated here are too conservative. It may well be that in the case of many of the most active fishermen, net takings are indeed much higher than those given here. However, as far as typical or average takings are concerned, the estimates arrived at in Tables 7.19 and 7.20 are believed to be sufficiently representative of the actual situation as to serve as an acceptable basis for further discussion. Net takings of this low order are moreover entirely consistent with the fact that according to the questionnaire survey, some thirty-eight per cent of the Batina fishermen habitually migrate to the Gulf states to work there while a further thirteen per cent regularly work elsewhere in Oman, and that most of the capital invested in craft and motors has not derived from fishing on the Batina (Chapter Six, Section 5).

7.5 Investment in fishing: fishermen's attitudes

To understand why Batina fishermen continue to invest their savings in fishing is a difficult question but one which is important if the prospect for fisheries development are to be assessed and if effective policy is to be achieved. By the time the fieldwork has been completed the present writer had come to the conclusion that fishermen do not invest in

fishing because fishing is perceived by them as offering the best returns on their capital. Indeed it is maintained that the very concept of rates of return on capital investment is foreign to them.

Several pieces of evidence point to this conclusion, some of which have already been mentioned. First, more than one-third of the Batina fishermen migrate regularly to the Gulf, so that for a substantial part of the year their capital equipment is lying unused at their home settlement. If the fishermen were concerned with rates of return it is unlikely that this would be so.

Second, when they are calculated as has been done in this chapter, the rates of return to the fishermen would not appear to increase proportionally with the amount invested. Indeed, the owners of the non-motorised shash would seem to be gaining typically about the same net income from fishing as the owners and crews of the motor powered wooden craft which cost many times as much as shash.

Third, returns from fishing generally seem to be low relative to wage jobs and to other investment opportunities. In theory at least a fisherman could expect to secure a higher rate of return on his savings (and at much less effort) by building and letting a shop in a Batina market than by buying a motorised boat and fishing gear. In practice of course if even only a small proportion of the fishermen did so the demand for rented shops would soon be outstripped by the supply and the purpose would be defeated. However, the fact that no Khabura fisherman is known by the present writer to have invested in shops or in any other property for rent

tends to indicate that such possibilities are not even considered by the fishermen.

The final and most conclusive point in favour of the present author's contention is the fact that no fisherman was ever found who kept accounts of his costs and takings. It is therefore very unlikely that any fisherman calculates and consciously considers the rate of return on how much he invests, still less compares that rate with alternative investment opportunities.

In the view of the present writer, the Batina fishermen continue to invest in fishing simply because they see themselves as fishermen and because they prefer fishing to the prospect of other opportunities. The fact that very few of the respondents to the questionnaire had work on the Batina in addition to fishing is in accord with this, and it is further supported by the observation that the large majority of fishermen who migrate to the Capital Area and to the Gulf remain fishermen there. Locally on the Batina alternative employment or investment possibilities may indeed in practice be restricted in both number and scope, but this is not the case in the Gulf countries.

At first sight this attitude may appear conservative, unambitious and a possible hindrance to fisheries development since to increase the well-being of the fishermen and the fishery generally may mean the acceptance by some fishermen of other types of employment. It has already been shown however that the Batina fishermen react positively to stimuli when they see advantages in doing so. The rapid adoption of appropriate innovations is one example. Their migration to the Capital Area and the Gulf where takings are greater and where services and supplies can more easily be obtained is another. Further,

it will be observed in Chapter Nine that a larger number of fishermen attend the Batina markets than usual at festival times when they can be sure of a larger demand. Their desire to remain fishermen rather than to take up other opportunities must be viewed in the present writer's opinion as an encouraging sign for the development of the Batina fishery. This point will be taken up again in Chapter Thirteen.

7.6 Conclusions on costs, takings and investment attitudes

It has been shown in this chapter that when the fishermen in the questionnaire survey are grouped by type of craft owned, the net takings per fisherman appear to be very similar, and very low, for all three groups. Within acceptable limits it is likely that these findings are representative of the Batina fishermen as a whole. In particular, the Group 3 *shash* fishermen would appear to be earning typically as much as those of Group 1 and Group 2, despite their considerably lower capital investment. Under present conditions therefore *shash* are by no means the least efficient craft on the Batina. Their mean gross takings are without doubt considerably lower than the wooden craft, but then so are their costs. It is also the case that the larger more expensive motorised craft are not at present being used to their optimal capacity.

It has also been shown that Batina fishermen choose to invest in fishing not because it offers the most profitable returns on their savings, but rather because fishing is their way of life and they have preferred at least until now to remain fishermen. That this is so is regarded by the present writer to be a strength of the Oman fishery which augers well for its development, provided government policies foster rather than

stifle it. A parallel will later be drawn between the attitudes of the fishermen in this respect and those of the fish trader-transporters of the Interior (Chapter Ten, Section 5).

The net takings of the low order indicated in this chapter are consistent with the observation already made in this thesis that capital investment in technological fishing innovations has been largely provided by earnings from the Gulf countries and not from local fishing. This has so far been on balance in the interests of the Batina fishery, and contrasts with the situation in other countries. Both H. Pozdena (1975) and T.A. Brun et al. (1977) point out that Baluchi migrants to the Gulf countries do not generally invest their foreign earnings in capital equipment when they return home but rather use them largely on a short bout of conspicuous consumption. The Batina fishermen also contrast with those for example of Ghana (Lawson 1970), Aden (Anon. (UN) 1952 p. 135) and Kerala in India, where earnings from work abroad have not been generally available and where only direct government assistance has made possible any large introduction of innovative technology. If the Batina capital equipment is to be used to its optimal capacity however fishermen must be encouraged to fish at their home settlements in preference to the Gulf countries. This would reduce the flow of capital from abroad, and the ability of the Batina fishery to support itself would then be tested.

At present most fishermen are forced to migrate at some time in their lives if they want to raise their standard of living. The calculations of this chapter have perhaps defined more precisely than was previously possible why Batina fishermen are encouraged to migrate. One main reason would appear to

be the lack of sufficient return for effort expended on the Batina. Another is undoubtedly the difficulty of repairing and servicing engines and the attendant substantial costs, both direct and indirect, that this difficulty causes. If more of the fishermen are to be encouraged to stay at their home settlements in order to increase the supply of fish to the Omani population, these conclusions must be borne in mind.

A further point which emerges from this chapter is that the repairing and replacing of engines and the replacement of tackle constitute a greater problem for the fishermen in terms of their annual expenditure than do the costs of buying craft when the potential length of life of craft is taken into account and the capital cost amortised in the way explained in the chapter. Government action which seeks to attract back to the Batina the fishing manpower at present migrating to the Gulf countries must therefore take this into consideration if it is to be successful.

CHAPTER EIGHT

The catch of the Batina fishery.

CHAPTER EIGHT

The catch of the Batina fishery

8.1 Introduction

The present chapter discusses first the fish found during the survey and how they are here classified (Section 2). An estimate of the total Batina catch is then calculated, using the results of the present fishing and marketing surveys (Section 3), and on this basis the productivity of the Batina fishermen is compared with that of fishermen in analogous areas (Section 4).

It will be shown from these calculations that although the total catch of the Batina like the numbers of fishermen has most probably declined over recent decades, the productivity per fisherman appears at present to be high compared with many traditional fisheries. As will be seen however, comparisons between different areas are difficult and sometimes misleading.

8.2 Classification of the fish of northern Oman

The Indian Ocean is known to be extremely rich in the number of species of fish found in it. Most of them are edible. Munro (1955) describes 846 species for Ceylon (though some of these are freshwater species), while Smith (1961) has recorded over 500 species in South African waters. No entirely comprehensive list has yet been compiled of the fish specifically of the Arabian Gulf and the Gulf of Oman, though Blegvad and Löppenthin (1944) describe 216 species off the south coast of Iran and provide an extensive list of fish names used by Iranian fishermen. Kuronuma and Abe (1972) give descriptions

of 131 species in Kuwaiti waters, while White and Barwani (1971) describe 199 species in what they acknowledge is an incomplete list for the Lower Arabian Gulf and the coast of the Sultanate. MacIvor (1880-81) gives 337 Arabia and Persian fish names used in the two Gulfs and this remains one of the longest lists of local names yet compiled, though very few are identified taxonomically by him. One of the most recently compiled lists of the fish of Oman (Tasnif 1977) gives 250 local names (including variants) representing 105 species.

During the present survey a total of over one hundred edible species was recorded on sale in Khabura fish market. Despite the large total, it was unusual for more than twenty-five or so different species to be represented on any given day. Only a relative few moreover appear in the daily catches with sufficient regularity and in large enough numbers to be individually significant sources of food.

In the present study, recordings in the market and elsewhere were made in terms of the local names the fishermen give to the fish. With some exceptions these local names correctly discriminate between one species and another. In a number of cases, it is true, the local Omani name covers more than one species where there is a large degree of superficial similarity, while in certain other cases one term is given to the young of a species and another to the adult form. As has been pointed out already in Chapter Four (Section 4), however, precise taxonomic identification is not essential in every case for present purposes. In analysing the field data it was found both possible and appropriate to categorise the fish into nine broad groups. Seven of the groups are based on taxonomy, and two comprise species which do not conveniently fit the

other seven groups but which can be classed together on the grounds of palatability. The categories and their main characteristics are summarised in Table 8.1, and further details are given in Appendix D.

It can be seen from the table that the main methods of catching vary with the group, reflecting the different modes of life of the different species. Groups I, II, III, IV and VIII are caught mainly by various types of nets, and Groups V and VII mainly by traps. Further, it will be noted that Groups I to VI are relatively well liked fish, while Groups VII, VIII and IX are less liked by the local population. This division into well liked and less liked will prove useful when prices are compared in Chapter Nine.

8.3 The size of the Batina catch

Table 8.2 summarises the frequencies with which the above categories appeared in Khabura market during the late 1975 and mid-1976 field seasons on the thirty-five days on which market records were kept. The daily counts taken during the winter 1974-75 field season are not considered accurate enough to be comparable and are here omitted. The counts are of the individual medium sized and large sized fish seen in Khabura fish market during the course of each morning's market activity. No adjustment has been made for undercounting since it is considered that, if present, it was small enough to be ignored.

It was found impossible however to count individually the numbers of small fish of under about 0.3 kg live weight, including fresh sardines and the young of larger species. Such fish tend to be lumped together by fish sellers and sold

Table 8.1 : Classification and characteristics of edible fishes encountered during field survey

Group	Fish included	Occurrence & habits	Local estimation	Main methods of catching	Most common local names
I : SCOMBRIDAE	Tuna, tuna-like & mackerel-like family, including yellowfin, skipjack, bonito & kingfish	Pelagic (i.e.surface) shoaling fish. Movements unpredictable from year to year. Main catches in autumn and winter in Oman	Highly regarded by local population, especially kingfish.	Fixed gillnets, drift gillnets, and occasionally handlines.	sahwa, jaydhar, sada : tunas. kanʿad, majdʿ, khubbat : kingfish.
II : SPHYRAENIDAE	Barracudas	Plentiful throughout year.	Moderately well liked.	Fixed gillnets, drift gillnets.	qadd, qadad: medium sized. qandwayh : large ghalya : small
III: CLUPEIDAE, ENGRAULIDAE, MUGILIDAE	Herrings, sardines, anchovies & mullets.	Pelagic shoaling fish. Movements unpredictable from year to year. Main catches in winter in Oman.	Moderately well liked as fresh fish. Most of sardines & all of anchovies dried before use.	Castnets, beach seines, & faruwa nets.	jawwaf, subur : herrings. uma : sardines. barriya : anchovies (qashiʿ when dried) du ,bayah : mullets
IV : CARANGIDAE	Jacks, trevallies, queenfish & other caranx-like species.	Occur throughout year. No individual species caught in consistently large numbers, but together form important food group	Well liked.	Various methods, incl. surface gillnets and sometimes handlines.	dibsi, diyayu, hibs, khayyat, layliya, qasm, qufdar, qushran, sal, tulah, & others.
V : Bream-Snapper Group	Breams & scavengers, snappers, grunts & other similar families.	Occur throughout year. Demersal, i.e. dwell at or near seabed, especially around rocky outcrops.	Moderately well liked.	Mainly traps.	andaq, kawfar, shaʿri, & others
VI : Other well liked fish	Cobia, jack-pomfret, dorado, marlins & sailfish, & others.	Occur throughout year.	Moderately well liked.	Various methods.	sikl : cobia. halwayu : jack-pomfret. anfalus : dorado. salsul : marlins & sailfish.

/Continued

Table 8.1 (Cont)

Group	Fish included	Occurrence & habits	Local estimation	Main methods of catching	Most common local names
VII: SERRANIDAE	Rock-cods (groupers)	Occur throughout year Demersal (cf.Group V)	Disliked by coastal Omanis (though well liked in Gulf).	Mainly traps	hamur, siman.
VIII: Class CHONDRICHTHYES	Cartilaginous fishes - sharks, rays, sand-sharks & sawfish .	Occur throughout year..	Disliked by coastal Omanis. Eaten in cured form by Interior populations.	Handlines & longlines (large sharks); fixed and drift gill-nets & tangle nets (small sharks, rays, sand-sharks & sawfish).	jarjur : shark ils, qasqus : small shark tabaq : ray barbar : sand-shark sayyafa : sawfish
IX: Other less liked fish.	Various flounders & soles, wolf-herrings, lizard-fish, garfish, catfish, & others.	Occur throughout year.	Not well liked in Oman.	Various methods.	kabsh, faras, shanjuh, kharkhur, khann, & others.

Table 8.2 : The catch at Khabura market during the sample periods (medium and large fish only)

	No. of individuals counted				Average weight per individual (kg)		Estimated weight of catches					
	Oct. - Dec.1975 (15 days)		Jul. - Sept.1976 (20 days)				Oct. - Dec.1975 (15 days)		Jul. - Sept.1976 (20 days)		Both field seasons (35 days)	
	No.	Av./day	No.	Av./day	1975	1976	kg.	% of total	kg.	% of total	kg.	% of total
I. SCOMBRIDAE	663	44	59	3	3.48	2.99	2,307	29.32%	176	2.04%	2,483	15.04%
II. SPHYRAENIDAE	880	59	1,259	63	1.20	1.39	1,056	13.42%	1,750	20.24%	2,806	16.99%
III.* CLUPEIDAE & MUGILIDAE	66	4	1	-	0.50	-	33	0.42%	-	-	33	0.20%
IV. CARANGIDAE	384	26	618	31	2.39	1.92	918	11.67%	1,187	13.73%	2,105	12.75%
V. Bream-Snapper Group	893	60	1,232	62	1.35	1.30	1,206	15.33%	1,602	18.53%	2,808	17.00%
VI. Other dear fish	54	4	83	4	2.50	2.50	135	1.71%	208	2.41%	343	2.08%
VII. SERRANIDAE	118	8	204	10	3.31	1.45	391	4.97%	296	3.42%	687	4.16%
VIII. CLASS CHONDRICHTHYES	358	24	1,192	60	2.67	2.46	956	12.15%	2,932	33.92%	3,888	23.54%
IX. Other cheap fish	433	29	247	12	2.00	2.00	866	11.01%	494	5.71%	1,360	8.24%
Total for sample periods							7,868	100.00%	8,645	100.00%	16,513	100.00%

* excluding sardines and anchovies

by the basket or the bundle. These have therefore been omitted from the main part of the table. It is estimated from field observations however that the total quantity of fresh small fish will on an average day weigh one-quarter of the total weight of the medium to large fish.

Considering first the number of individuals counted, it can be seen from the table that in the case of the Sphyraenidae, the Carangidae, the Bream-Snapper Group and the Serranidae, there was very little difference between the average frequencies per day for the winter and summer periods. The Chondrichthyes on the other hand were more than twice as abundant in the summer catch as in the winter catch, while the Scombridae dropped from the third most abundant category in the winter period to the least abundant in the summer period. The Clupeidae-Mugilidae category similarly declined from an already low frequency in the winter period to almost nil in the summer.

These findings are in general terms consistent with the known habits of the fish of the different categories. Solitary, demersal (bottom-dwelling) fish are notably less seasonal in their occurrence than the pelagic (surface) shoaling species.

In their Port Sampling Programme, Mardela (1975 Book II Vol. 1 pp. 1.14 to 1.19) found a pattern of fish seasonality between June 1972 and April 1973 similar in certain respects to the findings of the present survey. They record that demersal fish in the survey showed no significant seasonal trends, which agrees with the pattern shown above. As regards the Scombridae, Mardela found that kingfish were most abundant between November and February, which also agrees with the

findings of the present survey. Other members of the Scombridae Group however were found by Mardela to be most frequent during the summer or the summer and autumn, which was not found to be the case in 1975-76 in Khabura. This suggests that overall pattern is characterised by large variations from year to year as well as by seasonal changes, and confirms that a single year's data are an inadequate basis from which to draw conclusions about longer term trends and patterns.

Returning to Table 8.2, the average weight of individuals of each group is based on the price-weight recordings from Khabura market survey taken in the manner described in Chapter Four (Section 3). The table shows that in Groups I, IV and VII the average weight is appreciably lower in the summer period than in the winter period. Tentatively it might be suggested that the general reduction in average size in the summer might be related to life cycles in which these fish in Omani waters attain adulthood mainly in the winter, though without more data this is unproven.

How representative the field periods of the present survey, or indeed the Mardela survey, are of the overall recurring annual pattern is difficult to say with certainty. Fishermen, fish traders and the general population agree however that the winter of 1975-76 produced an exceptionally poor marine harvest on the Batina. The impression gained from the previous winter field season, that of 1974-75, was certainly that the catch in Khabura market was much larger then than in the 1975-76 winter, especially regarding the Scombridae. Further, according to information from the fishermen and fish

traders gathered during the January 1978 visit to Oman, the winters of both 1976-77 and 1977-78 saw larger catches than that of 1975-76.

The reasons why the winter 1975-76 catch was most probably poorer than the average in recent years lie beyond the scope of this present work. As far as could be judged they were chiefly zoological in nature since no diminution of the fishermen's effort was observed that year. However, the fact that it appears to have been lower than average will be borne in mind in calculating the mean annual Batina catch on the basis of the present survey data.

The two sets of sample days both included days on which little or no fresh fish were brought into Khabura market, on account mainly of rough seas. Assuming that each of the two sets of sample days was representative of its respective half year (winter 1975-76 and summer 1976), the total catch brought to Khabura market could reasonably be expected to amount to 220 tonnes live weight (Table 8.3). If the average winter catch of recent years (i.e. since 1970) is reckoned to be one-third more than that of the 1975-76 winter, the total live weight of fresh fish sold at Khabura market could be placed at 260 tonnes per year for the early to mid 1970s.

There are ten markets on the Batina coast in addition to Khabura (Figure 8.1). Of these, five are of approximately the same size as Khabura, at least in terms of numbers of fish traders and probably also as regards the quantity of fish landed daily. The average annual live weight catch landed at each of these five markets can be equated with that at Khabura. Two of the eleven Batina markets (Sohar and Sib) are almost certainly somewhat larger than Khabura in terms of the amount of

Figure 8-1

The Batina coastal markets

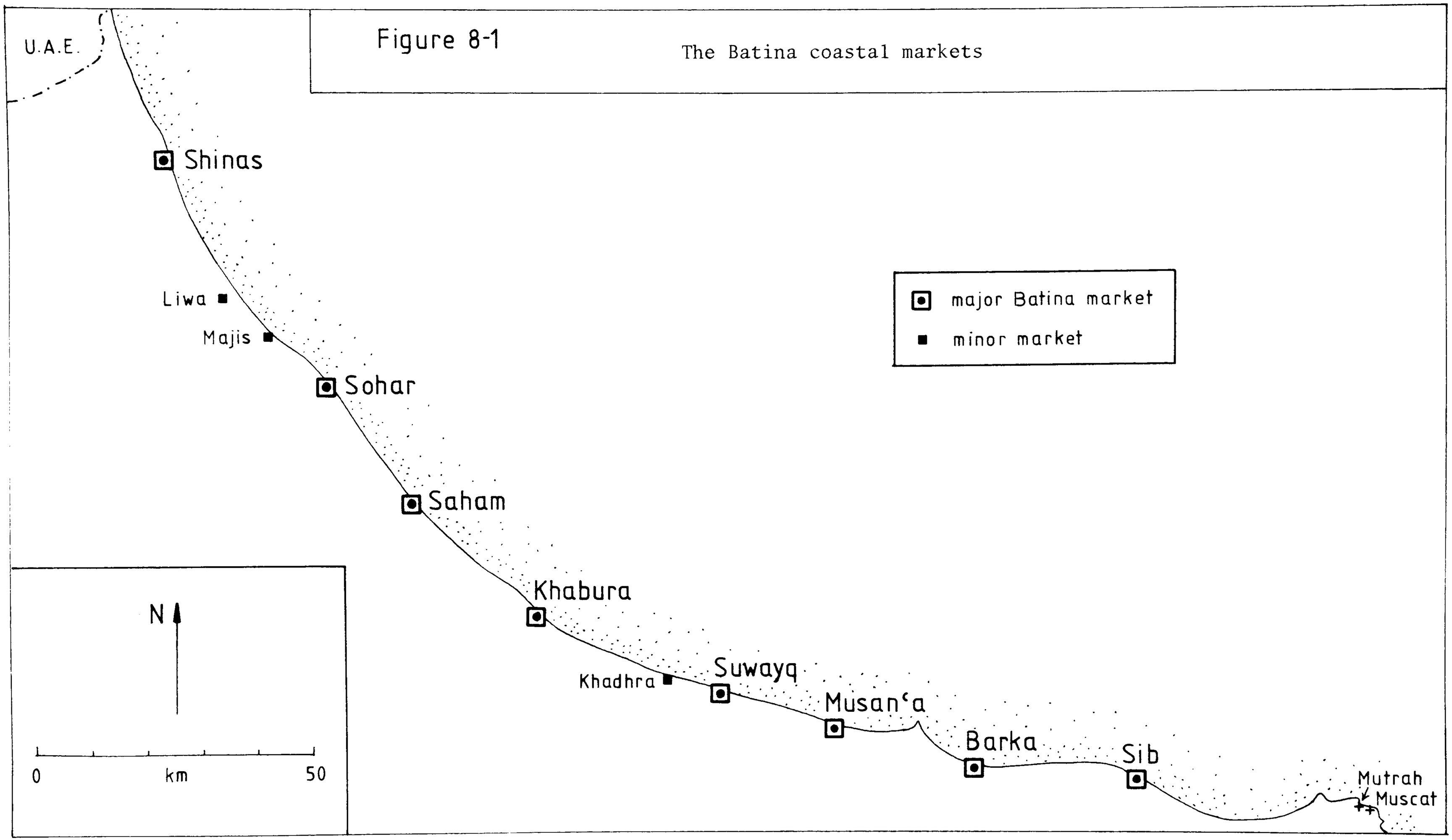


Table 8.3 : Estimated annual catch for Khabura market during the early to mid 1970s

	1975-76 winter	1976 summer
Medium-large fish		
total weight in sample days	7,868 kg	8,645 kg
no. of sample days	15 days	20 days
average weight per sample day	525 kg	432 kg
estimated weight for half-year	95,800 kg	78,800 kg
Small fish		
estimated weight per day (= 25% of med.-large catch)	130 kg	110 kg
estimated weight for half-year	23,700 kg	20,100 kg
Total catch for half-year	119,500 kg	98,900 kg
Total catch for year	218,400 kg ≃ 220 tonnes	
33% of estimated winter 75-76 catch	39,800 kg	
corrected winter catch	159,300 kg	
estimated average annual catch for recent years	258,200 kg ≃ 260 tonnes	

fresh fish sold in them. Their average annual live weight catch will be assumed to be half as much again as that of Khabura. On the other hand, Liwa and Khadhra have only very small fish markets, and will be assumed to receive only half the quantity delivered to Khabura. Majis, the only non-daily market on the Batina, operates only on Wednesdays and Saturdays, and is in any case small even on those days. Its average annual live weight catch will be assumed therefore to be two-sevenths of that of Liwa.

On the basis of these assumptions, an average annual total of 2,640 tonnes live weight of fresh fish has been sold through the eleven Batina markets in recent years (Table 8.4).

As has already been mentioned (Chapter Seven, Section 3), not all fishermen choose to sell all their catch every day at the nearest market. Generally, they bring only the larger catches to the market for sale, and hold back a proportion even of these for their own consumption. The smaller catches, and also those taken by fishermen whose home settlements are distant from a market (in the case of Khabura, more than about ten kilometres away) are normally disposed of in the home settlement. As will later be discussed (Chapter Nine), some of this part of the catch will, it is true, be bought up by itinerant fish-traders to be taken to the nearest Batina market; but most will remain in the home settlement or be taken inland.

It is impossible to say with certainty on the basis of present data what proportion of the Batina catch is taken in a fresh state to the local coastal markets for sale, as opposed to sale as either cured or fresh fish in the home settlements or inland. The quantities of sardines and anchovies which are

Table 8.4 : Estimated catch in Batina markets in recent years

Batina markets	Estimated average annual live weight of fresh fish (tonnes)	
	per market	total
Shinas, Saham, Khabura Suwayq, Musanʿa, Barka	260	1,560
Sohar, Sib ($1\frac{1}{2}$ x Khabura)	390	780
Liwa, Khadhra ($\frac{1}{2}$ x Khabura)	130	260
Majis ($^{2}/7$ x Liwa)	40	40
Total sold through Batina markets		2,640

dried in the fishing settlements and later bought up by itinerant traders who specialise in these dried fish (see Chapter Nine, Section 2) are particularly difficult to estimate since the field seasons coincided with a period when hardly any of these fish were caught. Table 8.5 attempts however to place maximum limits on these elements of the total Batina catch. The non-market part of the fresh fish catch is not thought to exceed three times the part sold through the markets. This maximum working estimate would give a total fresh fish catch for the Batina of 10,560 tonnes per year. If the population of the coast and its immediate hinterland is 200,000, this quantity would provide an average of about 0.145 kg live weight of fresh fish per person per day. This would seem to be rather low when it is considered that one-quarter to one-third of this weight will be waste (see Chapter Nine, Section 2).

From impressions gained during the field work from fishermen and fish traders, the quantities of sardines and anchovies generally caught are considered not to exceed half the live weight of the rest of the catch, bearing in mind that off the Batina the sardine and anchovy season lasts only from November to March. Their maximum live weight has therefore been placed at 5,000 tonnes per year.

On this basis, 16,000 tonnes live weight per year would seem to be the maximum estimate that can be given for the average annual catch for the Batina in recent years. Since there are 123 fishing settlements on the Batina, this would represent an average annual catch of 130 tonnes per settlement.

Such a total production is considerably smaller than any earlier estimate. It will be recalled (Chapter Three) that both

Table 8.5 : Estimate of the total Batina catch in the early to mid 1970s, derived from present survey

	Live weight tonnes per year
Estimated total of fresh fish sold through Batina markets (from Table 8.4)	2,640
Estimated total of fresh fish disposed of through home settlements (= 3 x total through markets)	7,920
Estimated total of fresh fish	10,560
Estimated total of sardines and anchovies subsequently dried	5,000
Estimated total Batina catch	15,560

MacIvor's (1880-81) estimate for northern Oman and Bertram's (1948) estimate for the whole of the Sultanate were of the order of 100,000 tons live weight of fish per year. It was shown however (Chapter Three, Section 3)that this amount was probably at least twice too large, and that of the actual total probably no more than 30,000 or so could be assigned to the Batina. Even this however is of the order of twice the present maximum estimate of 16,000 tonnes.

On the other hand, Bertram (and others before him) reported that Oman exported considerable quantities of cured fish, and a major part of these exports originated on the Batina. In recent years the Batina has ceased to export owing largely to a decline in production. Dawd Hamza al-Asfur, for example, reported in an interview with the present writer that his Saham-based company stopped exporting sardines and anchovies in 1969-70 for this reason. It is to be expected therefore that the current production estimate for recent years should indeed be smaller than earlier estimates.

The decline in production has however not been reflected in current official statistics of the Sultanate. The F.A.O. Fisheries Statistical Yearbooks have consistently continued to report a national fish production of 100,000 tons per year, an estimate most probably based on that of Bertram's 1948 estimate, while the most recent available estimates produced (in 1976) by the Directorate-General of Fisheries, Muscat, are twice as large as Bertram's estimate. These are reproduced in Table 8.6.

In this table the part of the total catch taken by the government vessels (three were actively in operation in 1976)

Table 8.6 : Official estimation of the Omani catch in 1976, in tonnes

	Fish*	Sardines	Anchovies	Total
Batina Coast (Muscat to Shinas)	6,000	29,430	98,000	133,430
Shinas to Musandam	3,000	-	-	3,000
Ra's al-Hadd & Masira	15,000	-	-	15,000
Dhofar	6,000	33,750	-	39,750
Total catch of traditional fisheries	30,000	63,180	98,000	191,180
Government vessels	503	-	-	503
Japanese trawlers (Apr.-Dec.)	6,301	-	-	6,301
Total Omani catch	36,804	63,180	98,000	197,984 tonnes

* i.e. fish other than sardines and anchovies

Source: Directorate-General of Fisheries, Ministry of Agriculture, Fisheries, Petroleum and Minerals, Sultanate of Oman - Unpublished statistics.

and the Japanese trawlers (see Chapter Twelve) can be taken as precise. Concerning the traditional fisheries however (which according to the estimates account for the vast bulk of the total catch) the basis of estimation is unfortunately not provided. Nevertheless, the figure of 6,000 tonnes of fish for the Batina, exclusive of sardines and anchovies, does bear comparison with the estimate of about 10,000 tonnes (Table 8.5) derived from the present survey.

What is surprising is the Directorate-General's estimates for the catch of sardines and anchovies. In the present writer's opinion, it is inconceivable that these totalled over 160,000 tonnes in 1976. The present writer had not visited Dhofar in 1976 and he is not therefore in a position to refute absolutely the 34,000 tonnes of sardines reputedly caught in that province in that year, although his subsequent visits in January and December 1978 would tend to cast doubt on an annual production of this magnitude. As far as the Batina is concerned however, there can be no doubt that 29,000 tonnes of sardines and 98,000 tonnes of anchovies are estimates which are much too high.

Figures of such a magnitude fail to accord with both the evidence of the Batina fishermen who maintain that the catch in recent years, and in particular since 1970, has been much smaller than in the past, and also the fact that whereas once the country exported large quantities of fish, exports are now much smaller and originate almost wholly from Dhofar and not the Batina. Further, the government estimates of the Batina sardine and anchovy catch do not square with the direct observations of the present author. During the winter anchovy season of 1975-76 anchovy catches were small, and confined to

the Sohar and Shinas areas. During the same period no sardine catches of any size were noted anywhere on the Batina despite extensive travelling and questioning. The summer of 1976 was observed to produce only extremely small catches of anchovies and virtually no sardines, though this was to be expected since the summer is the low season for Clupeidae. During the winter of 1976-77 the author was not present on the Batina, but according to Dr. R.W. Dutton of Durham University who was based at Khabura at the time, some anchovies were caught (though no sardines), but the total quantities involved were again small, especially before the end of 1976. In sum, therefore, it would appear that the 1976 estimates supplied by the Directorate-General of Fisheries are entirely unsupported by fact.

It can be seen therefore that the evidence of the fishermen, the fact that exports from the Batina have been virtually nil for several years now, and personal observations during the three field seasons all point to a lower fish production on the Batina than previous estimates indicate and one which is considerably lower than the latest available official statistics. An annual quantity of 16,000 tonnes, including sardines and anchovies, as estimated from the present survey would, it is considered, be of the correct order of magnitude.

Only one other recent detailed attempt at estimating the annual catch of the northern Sultanate exists, that of the Mardela Survey (1975), the field data for which were collected between June 1972 and April 1973. Mardela provided two estimates, the higher of 4,570 tonnes and the lower of 2,570 tonnes, on

the basis of sample data from six fish markets in northern Oman. Their findings are not directly comparable with present estimates, however, for two reasons.

Firstly, two of their six markets are outwith the Batina, namely Quryat and Mutrah. According to Mardela (Book II Vol.1 pp. 1.29 to 1.34), these two markets accounted for about one-third of the total catch. This would leave about 3,000 tonnes of the larger estimate and 1,700 tonnes of the smaller estimate for the four Batina sample markets, Sohar, Saham, Barka and Sib. A further third of the total was landed at Sohar - approximately 1,500 tonnes or 850 tonnes, while the remainder was shared roughly equally between Saham, Barka and Sib - an average of 500 tonnes or 280 tonnes each (Table 8.7). Although the smaller estimates for Saham and Barka compare well with the present writer's estimates of 260 tonnes for those markets and the Mardela estimates for Sib enclose the present writer's estimate for that market (cf. Table 8.4 above), there is still a large measure of difference in the case of Sohar.

The second reason why the Mardela figures are not directly comparable with the Batina catch as estimated by the present writer is that they include only fish sold in the six sample markets, and do not take into account the part of the catch sold elsewhere or kept back for distribution among relatives and neighbours. As has been seen, the catch of the shash in particular is mainly disposed of without entering any market, while present evidence suggests that this is so also of a substantial part of the catch even of craft which regularly deliver to a market (see Chapter Seven, Section 3).

Thus, although Mardela give some potentially useful data on catch sizes at specific markets, they do not present

Table 8.7 : Estimated sizes of catches at six sample markets, derived from the Mardela Survey data, 1972-73.

Market		in tonnes large estimate	in tonnes small estimate
Sohar	Batina	1,500	850
Saham	Batina	500	280
Barka	Batina	500	280
Sib	Batina	500	280
Mutrah & Quryat		1,500	850
Total		4,570	2,570

Note : The estimates of the total are derived directly from Mardela (1975). Assigning to the six markets has been done by the present author on the basis of the proportions of the total landings and deliveries to the markets as given by Mardela (Book II Vol. 1 Tables 18 and 19). Since the calculations have been rounded slightly, the sum of the market estimates is not exactly the total as given by Mardela.

sufficient evidence on which to base a catch estimate for the Batina as a whole.

8.4 Productivity and fishing effort

Direct comparisons of fish production statistics between countries or regions are meaningless unless the comparisons take into account the factors of production. In the present context, these factors are manpower, capital investment and natural abundance of fish. Because of the difficulty of finding comparable data on productivity per unit of investment, it is productivity per unit of manpower which is the chief concern here.

In this section productivity per fisherman is first calculated for the Batina, and the results are compared with analogous areas. Of particular interest are the statistics provided by A.W. White and M.A. Barwani in 1970 for the Trucial States (now the United Arab Emirates), since that country adjoins Oman and some large measure of comparability might be expected. The results of the comparison are however at first sight somewhat surprising, as will be seen.

8.4.1 Estimates of per capita productivity on the Batina from present survey

In Chapter Six (Section 2) the adult male fishing population of the Batina was estimated from the present survey data at 3,500 fishermen, the effective adult manpower in any year at 3,000 when the effects of migration are taken into account, and the effective manpower plus adolescents at 4,000. If the Batina catch is 16,000 tonnes per year (as has been calculated in the previous section), the average per capita production is respectively 4.57 tonnes, 5.33 tonnes and 4.00 tonnes for the three manpower estimates (Table 8.8).

Table 8.8 : Per capita catch of fish on the Batina in the early to mid 1970s

Basis of manpower estimate	Production per year (tonnes)	Manpower	Per capita production per year (tonnes)
Estimated total adult manpower	16,000	3,500	4.57
Estimated effective adult manpower, migration accounted for	16,000	3,000	5.33
Estimated effective manpower including maximum estimate for adolescents of 1,000	16,000	4,000	4.00

8.4.2 Comparison with estimates of per capita productivity derived from the Mardela Survey of 1972-73

On the basis of their market sampling data already referred to in the previous section, Mardela (1975 Book II Vol.1 Table 20) gives estimates of production per fisherman-day for each of the four classes of craft they deal with. These are reproduced in Table 8.9, while Table 8.10 converts these data into terms comparable with the present survey, that is, tonnes per man per year. The relative differences which exist between the productivity of the fishermen on the different types of craft shown in these tables are not surprising, and are indeed comparable with those already discussed in terms of gross takings per craft in Chapter Seven (Section 3) above: inboard diesel craft have the highest, shash the lowest, and dugout huris are intermediate.

Assuming, as Mardela do elsewhere in their report, that there are 300 fishing days in the year, the overall per capita productivity based on Mardela's estimates is calculated at 11.74 tonnes per year. Even if there are considered to be only 240 fishing days in the year (that is, twelve months of twenty days per month, as has been assumed earlier in this present work - see Chapter Seven, Section 2) the per capita productivity would only drop to 9.39 tonnes per year. Both these estimates are considerably higher than those derived from the present survey.

The explanation for the apparent discrepancy lies in the fact that the Mardela survey was taking into account only catches sold at their sample markets. As has already been pointed out (Chapter Seven (Section 3) and elsewhere), only the best catches

Table 8.9 : Per capita productivity per day derived from the Mardela Survey data of 1972-73

	1 Inboard diesel craft	2 Shash	3 Outboard huris	4 Non-motorised huris	5 All craft
Deliveries sampled	116	56	143	35	350
Equivalent fisherman-days	576	80	326	55	1,037
Weight of catch (kg)	25,247	1,466	12,155	1,714	40,582
Catch per fisherman-day (kg)	44	18	37	31	39.13

Source : Columns 1 - 4 : Mardela (1975) Book II Vol. 1 Table 20
Column 5 : present author's calculations on Mardela's data

Table 8.10 : Per capita productivity per year, derived from the Mardela Survey data of 1972-73

	1 Inboard diesel craft	2 Shash	3 Outboard huris	4 Non-motorised huris	5 All craft
Catch per fisherman-day (kg)	44	18	37	31	39.13
Catch per fisherman per year (tonnes), assuming 300 fishing days per year	13.2	5.4	11.1	9.3	11.74
Catch per fisherman per year (tonnes), assuming 240 fishing days per year	10.56	4.32	8.88	7.44	9.39

Source : Present author's calculations derived from Mardela's (1975) estimates

are taken to a market. The majority of catches of the Batina fishermen as a whole are too small to warrant a trip to even the nearest market. If all catches had been taken into consideration by Mardela instead of just those sold in the markets, the weight per catch, and therefore the weight per fisherman, would fall considerably, and would most probably become of a similar order to that found from the data of the present survey.

8.4.3. Comparisons with estimates of per capita productivity from analogous areas

Table 8.11 gives some comparative estimates of annual per capita productivity in other analogous fisheries of the Indian Ocean and elsewhere. Different definitions of 'fisherman' or 'fishing manpower' make direct comparisons between these statistics difficult however. In at least the cases of Sri Lanka and Ghana, adolescents are known to be included in the number given for the fishing force, and the same probably applies also to other cases quoted in the table.

Nevertheless, even if the lowest of the three Batina estimates is taken (i.e., 4.00 tonnes per man per year, which takes into account migration and adolescents), annual per capita productivity is much greater in only three of the cases cited, namely the Trucial States, the South Kanara District of India, and the Seychelles in 1973, while the largest Batina estimate of 5.33 tonnes is exceeded only by the Trucial States and South Kanara.

At face value therefore, a productivity per man of the magnitude of the three measures calculated above for the Batina fishermen appears to be relatively high for an artisanal fishery.

Table 8.11 : Per capita catch of fish in selected developing countries

Area	Date	Artisanal production per year (tons)	Artisanal manpower	per cap. production per year (tons per man)	Source
Northern six Trucial States	1970	42,956	6,445	6.67	White & Barwani 1970
Kuwait	1967			3.8	Boerema & Job 1968
India	1973	1.15M	1.2M	0.96	George 1973
South Kanara District, India	1971	73,000	10,900	6.70	Anon.(Govt. of India) 1971
Sri Lanka	1976	114,300 (90% of 127,000)	58,000*	1.97	Anon.(F.A.O.) 1976.
Seychelles	1927			1.57	Hornell 1927
"	1946			2.72	Wheeler & Omanney 1953
"	1973			> 4.5	Moal 1973
Indonesia	1971	ca. 2M	ca. 1M	2.0	Pownall 1976
Ghana mid	1960s	73,035	ca.56,000*	1.30	Lawson & Kwei 1974
" early	1970s	249,068	ca.60,000*	4.15	Lawson & Kwei 1974
Adriatic	1883				Faber 1883
Italian boats				2.4	Faber 1883
Austrian boats				0.78	Faber 1883

* known to include adolescents

8.4.4. Comparisons with the estimates of per capita productivity of the White and Barwani Survey for the Trucial States in 1970

A further difficuly in comparing regions results from differences in the natural abundance of fish in the different seas in question. Here the statistics provided by White and Barwani (1970) are potentially illuminating as they concern an area adjacent to the Batina. In Table 8.11 the annual production per fisherman for the northern six Trucial States in 1970, calculated from White and Barwani's production and manpower estimates, was given as 6.67 tons. When their figures are broken down by Emirate however a marked difference is evident between those states bordering the Arabian Gulf and those with coastlines on the Gulf of Oman, as can be seen from Table 8.12. Whereas the production per man for the five Emirates on the Arabian Gulf coast averages 5.19 tons, in Fujayra and the east coast part of Sharja it is between eight and nine tons. It is unlikely that lower per capita productivity on the Arabian Gulf coast was the result of lower capital investment in fishing there; indeed, the reverse was more probable since the east coast of the Emirates in 1970 was very much more backward in terms of development generally. If White and Barwani's statistics are accurate, the higher per capita production on the east coast was more probably the result of higher natural abundance of fish in the Gulf of Oman compared with the Arabian Gulf. Whether this is so or not, in the present context the statistics for Fujayra and east Sharja are more appropriate measures of comparison for the Batina than are those of the Emirates whose coasts are wholly on the Arabian Gulf, since the east coast is a continuation of the Batina.

Table 8.12 : Per capita catch of fish in the northern six Trucial States in 1970

Emirate	(1) Estimated total catch per year (tons)	(2) Estimated no. of fishermen locally employed	(3) Estimated per capita catch per year (tons)
Arabian Gulf Coast:			
Dubai	4,510	820	5.50
Sharja (Arabian Gulf Coast)	2,976	503	5.92
Ajman (Trucial States waters)	1,494	233	6.41
Ajman (outside Trucial States)	2,082	432	4.82
Umm al-Qaywayn	1,782	328	5.43
Ras al-Khayma	6,452	1,404	4.60
All Arabian Gulf Coast	19,296	3,720	5.19
Gulf of Oman Coast:			
Sharja (east coast)	9,962	1,180	8.44
Fujayra	13,698	1,545	8.87
All Gulf of Oman Coast	23,660	2,725	8.68
Northern six emirates:	42,956	6,445	6.67

Source : cols. 1 & 2 : White and Barwani (1970) p.38.
col. 3 : present author's calculations from columns 1 and 2

There are strong reasons for supposing that White and Barwani have overestimated by a considerable amount both the numbers of east coast fishermen and the size of the east coast catch. Considering first the numbers of fishermen, official government sources unfortunately differ among themselves. Even the 1968 Trucial States population census and the 1975 U.A.E. population census, which are probably the most accurate sources available, are not internally consistent. Because of the political sensitivity surrounding population statistics in the U.A.E., neither census has officially been published. Although full details have not become available, the present writer has been informed from reliable sources that the number of fishermen in the seven Emirates was recorded as 3,974 Trucial States nationals plus 158 foreigners in 1968, and a total of 2,283 in 1975. A complete breakdown by Emirates is unfortunately not known for either census, but Abu Dhabi fishermen are said to have numbered only 145 in 1968, leaving 3,829 fishermen distributed between the northern six Trucial States in that year. Even allowing for some undercounting in the case of the census figures, White and Barwani's figure of 6,445 fishermen in the northern six Trucial States in 1970 is clearly out of step by a considerable degree.

The problem can be viewed in another way. It was calculated in Chapter Six (Section 2) that the number of fishermen on the Batina is unlikely in the mid 1970s to be more than 4,500 including at most 1,000 adolescents. Spread between 123 settlements the average number per settlement on the Batina is thirty-seven at the most. In the summer of 1971 the present writer visited nearly all the coastal settlements of the east coast of the Emirates. There are twenty-eight fishing settlements

on the east coast, fifteen belonging to Fujayra Emirate and thirteen to Sharja Emirate. In terms of size, they do not appear to differ greatly from those on the Sultanate side of the border. If the average number of fishermen in them was thirty-seven as on the Batina, the total number of east coast fishermen would have been 1,036. Such a figure sounds reasonable in view of the 1968 and 1975 census counts for the whole of the Emirates. In contrast, White and Barwani's total for the east coast of 2,725 is considerably at variance, being over 2.5 times more.

The conclusion that the present writer draws from this is that the numbers of fishermen on the east coast of the Emirates and in the Emirates as a whole in 1970 were much less than White and Barwani have estimated. In view of both the calculations based on comparisons with the contiguous Batina and the figures from the 1968 and 1975 censuses, the number of east coast fishermen is unlikely to have been much more than 1,000 when White and Barwani were conducting their survey.

Considerable doubt must also be cast on White and Barwani's catch estimates. If the number of fishermen was indeed not much more than 1,000 on the east coast of the Emirates, White and Barwani's estimate of the east coast catch of 23,660 tons per year would give an annual catch per man of over twenty tons. Although perhaps not impossible, this is extremely unlikely not only in the light of the equivalent Batina calculation of four to five tonnes per man per year, but also compared with the data on other analogous fisheries in Table 8.11 above: none approaches even half that productivity per man.

Support for a much smaller estimate for the east coast of the Emirates in the 1970s is given by W.J. Gluckian (1976).

His visiting F.A.O. team concluded that "landings from all vessels on this [east Emirates] coast ... could barely exceed 2,500 to 3,000 tons per annum under existing conditions" (ibid. p.2). He does not include beach seine catches in this estimate since he was unable to guess their contribution and because his team's visit coincided with a slack period, and he is prepared to admit that the annual average over a longer period may in fact be higher than he calculates. Nevertheless, it would have to be increased by eight or nine times before it reached magnitude of White and Barwani's estimate. Even allowing for large fluctuations from year to year (and White and Barwani state that the 1970 fishing season was a good one (1970 p.38)), it is considered likely by the present author that White and Barwani's estimates for the east coast catch, like their estimates for the number of fishermen, are too high.

Although they do not explain how they arrived at their estimates, one possible explanation for their high figures is that they calculated them directly from boat counts by multiplying the number of craft by the average crew and by the average catch per boat. Such a procedure would give inflated figures since not all boats are manned at the same time and on any given day only a proportion of the boats will bring in a catch.

Whatever the reason however it would seem probable that White and Barwani have overestimated both the manpower and the catch on the east coast of the Emirates. It follows therefore that no valid comparison can be made between the per capita productivity calculated from their figures and that derived from the present Batina survey.

8.5. Conclusions on the catch of the Batina

The Batina catch in the early to mid 1970s has here been estimated at 16,000 tonnes per year. This is about half the revised estimates derived from MacIvor (1880-81) and Bertram (1948) for the same stretch of coast, but is consistent with the fact that production is known to have declined over recent years and especially since 1970.

According to Khabura market records, the Class Chondrichthyes, and especially the sharks, form the largest part of the annual catch of medium to large sized fish. Miles' (1919 pp. 404-405) suggestion already discussed in Chapter Three (Section 1) that sharks were the most valuable fish in terms of quantity for the Omani population in the late nineteenth century would therefore seem in a large measure still to hold true today.

Much of the rest of the catch of medium to large fish is made up of the Bream-Snapper Group and the Sphyraenidae, and these, like sharks, are relatively plentiful throughout the year.

The pelagic shoaling Scombridae also form a very substantial part of the catch of medium to large fish, though unlike the above groups they appear to be markedly seasonal in their occurrence. On the 1975-76 market evidence from Khabura, the Scombridae are abundant in winter, though in summer they practically disappear. The same is true of the sardines and anchovies, though since 1970 these have been much less frequent even in winter than formerly. The implications of these seasonal and periodic fluctuations for the development of Omani fisheries, and in particular commercial fisheries, will be examined in Part III (Chapters Twelve and Thirteen).

On present estimates, it would appear that Batina fishermen have a relatively high per capita productivity compared with many analogous artisanal fisheries of the Indian Ocean and elsewhere. It is however difficult and occasionally misleading (as has been shown in Section 4 of this chapter) to compare productivity statistics of different artisanal fisheries. Apparent differences in productivity may well be due in many cases more to different definitions of the term 'fishermen', or to deficiencies in the accuracy of the estimated statistics. Even when there is a real difference in the productivity of two groups of fishermen it may well be caused by a difference in the natural abundance of fish in the seas concerned rather than be due to any difference in effort or capital investment on the part of the fishermen. Nevertheless, the apparent relatively high per capita production of the Batina fishermen at present agrees well with the known large production and export of fish in past decades, and is probably a hopeful sign in terms of future development.

This chapter has at least illustrated some of the difficulties involved in calculating, handling, and comparing estimates of artisanal fisheries production where precise statistics and accurately defined terms are lacking. Accurate and comparable definitions and data are required before questions of productivity, capital investment and other problems of artisanal fisheries development can be tackled. One of the aims of the present survey, and the intention of the present chapter, have been to attempt to provide such data for the Batina fishery.

CHAPTER NINE

Fish handling and marketing on the Batina.

CHAPTER NINE

Fish handling and marketing on the Batina

9.1 Introduction

So far in this thesis the discussion of field data has concerned mainly the catching of fish and the methods, the men and the problems associated with it. How the fish are handled and marketed after the catch has been landed is however an equally important aspect of a fishery. Indeed, the catching on the one hand and the handling and marketing on the other are mutually dependent complements. Changes brought about in the one will invariably affect the other, for better or worse. Specifically, any improvement in the size of the catch that may come about through development of the artisanal fisheries will have developmental implications for the artisanal handling and marketing sector, while improvements in the latter will equally cause changes in the operation of the catching sector. As was indicated in Chapter Two (Section 2), the two aspects of fisheries are interrelated and must be viewed as a single operating system.

It is therefore the intention of this chapter and Chapter Ten to discuss the conditions under which fish was handled and marketed on the Batina and in the Northern Interior at the time of the survey. The present chapter discusses first the routes by which fish on the Batina may reach the consumer (Section 2). Among the major points which are investigated are, first, the circumstances under which one path is taken in preference to another, and second, the role of intermediary agents who may be involved, the trader-transporters and the resident market traders. There then follows a discussion of

fish prices in Khabura market during the survey periods (Section 3), and the final section (Section 4) focusses attention on the importance of the freedom of the fisherman to choose how his catch is disposed of.

9.2 Marketing chains

As was mentioned in Chapter Seven (Section 3), the fishermen on the Batina have a choice of methods of disposing of their catch. These are summarised diagrammatically in Figure 9.1. Which method is chosen by any fisherman at any time will depend on a number of factors. The most important of these are: the size of his catch; the distance of his settlement from a market; whether his craft is motorised or not; the size of his family and the claims of his neighbours; whether a local itinerant fish trader is present; whether the fisherman has access to motor transport, either his own or hired; and the degree of his own motivation and initiative. Consequently it is difficult to generalise about methods and conditions of sale.

Nevertheless, one general observation can be made which has held good for at least the first half of the 1970s: that the supply of fish to the Batina coastal population has on the whole not exceeded local demand. Two consequences follow from this observation: first, that the fisherman tends always to find a buyer when he wants to sell; and second, that surpluses of fish left unsold at the end of the day are uncommon.

Two further general observations made during the field survey can be seen as stemming partly from this situation. These are: that only relatively small quantities of fish (whether fresh or cured) find their way far inland from the Batina (this will be discussed in Chapter Ten when marketing

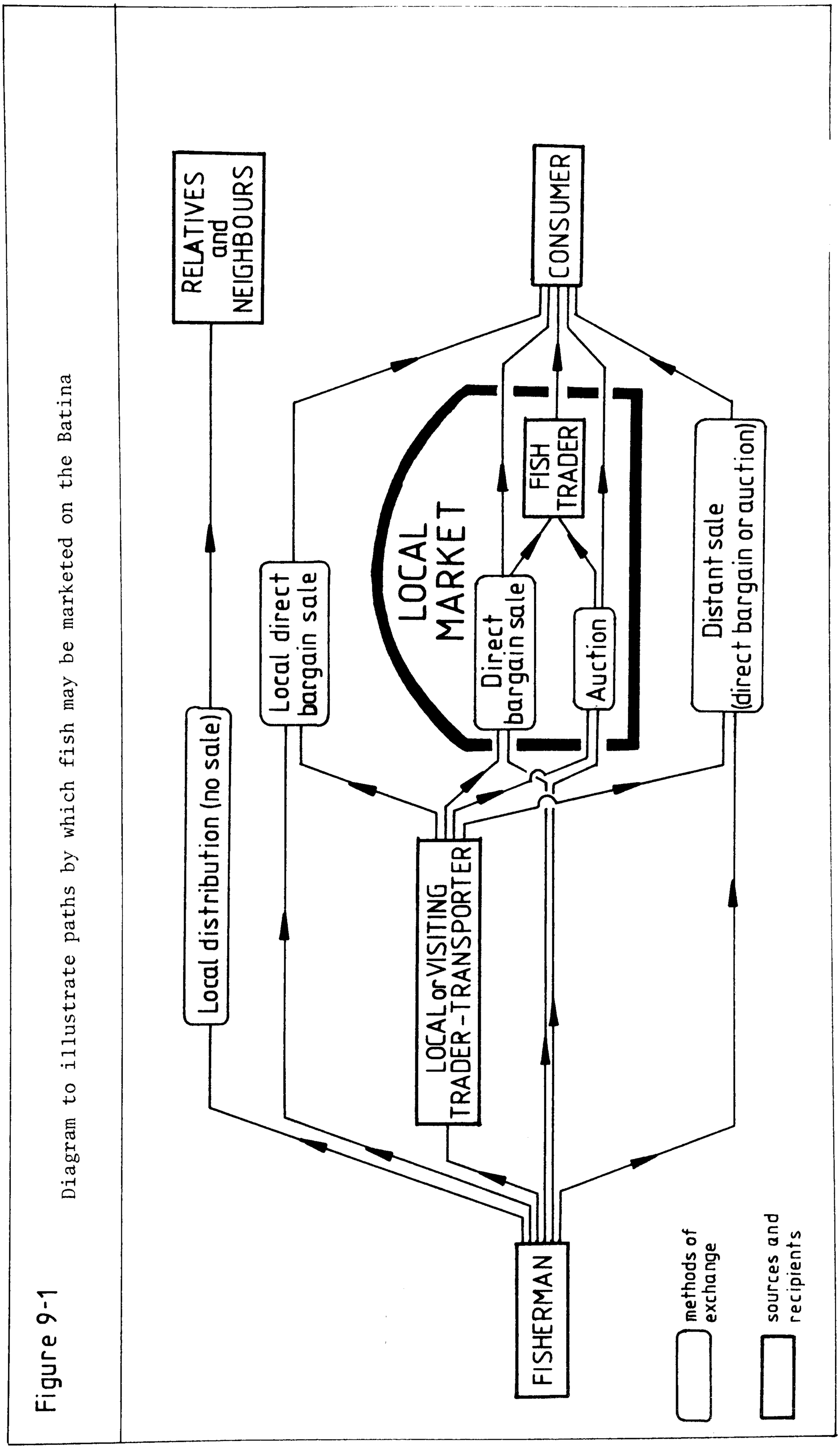


Figure 9-1

Diagram to illustrate paths by which fish may be marketed on the Batina

in the Interior is investigated); and that marketing chains tend to be short. Only rarely does fish pass through the hands of more than two intermediaries between the fisherman and the consumer, while probably most of the Batina catch in fact passes directly from the fisherman to the consumer. Long and complex marketing chains such as are found in West Africa (Lawson and Kwei 1974 p.136) or South East Asia (Lawson 1972 p. 7) and elsewhere are not present in northern Oman. The reasons are undoubtedly partly the smaller population and the shorter distances in Oman; but the general lack of surpluses of fish at the coast can also be seen as a major factor.

9.2.1 Local distribution and sale

From any catch part is almost invariably withheld from sale for the benefit of the fishing crew, their families and relatives, and often neighbours as well. When catches are small the whole may be distributed in this way, since the inconvenience and effort of selling the fish might well be too great in relation to the cash return that could be expected.

When a good catch is taken, however, the quantity so distributed will constitute only a very small part of the total. This was estimated in Chapter Seven (Section 3) to be equivalent on average to a notional monetary value of between RO 0.500 and RO 1.000 per fisherman per catch.

If the catch is larger than the immediate needs of the fishermen and their families, and if the nearest market is distant, fishermen will most frequently sell at least part of their catch on the beach to the villagers of their home settlement. Such sales are invariably direct bargain sales of whole fish. The prices achieved will most probably be lower than

those that would have been attained were the fish to have been sold in the market. Although insufficient field data could be collected to test whether this is indeed so, it is considered very probable for two reasons: first, there are fewer competitive buyers present in the home settlement than in a market; and second, a stronger personal relationship is likely to exist between fishermen and prospective buyers in the same settlement, and therefore the fishermen will be disposed to sell more cheaply. This latter influence accords with the situation found by the present writer in Khabura market where personal relationships between shopkeepers and customers can affect their terms of trade (see Durham Oman Project Reports 1978 Vol. VI pp. 26-27).

9.2.2 Sale at the local market

Assuming a large enough catch and a certain nearness to a market, fishermen will often choose to sell at the market rather than at the home settlement. Motorised craft will usually go straight from the fishing ground to the market, arriving there in the mid-morning, and after the catch has been sold, return coastwise to the home settlement. Non-motorised craft, including shash, generally return from fishing to the home settlement, and then bring such fish as are intended for sale to the market along the beach on foot or by donkey.

In Khabura market, and probably in the other Batina markets also, by far the largest part of the daily supply of fish is landed from motorised craft. The number visiting the market on any given day is however small, usually ten or fewer in the case of Khabura. It was noticed during the field survey however that for two or three days before the Islamic festivals

of al-Fitr and al-Adhha the number increased to nineteen on one occasion and fifteen on two other days. The explanation almost certainly lies in the fact that there is a greater demand for fish at festival time, and the fishermen, knowing this, respond by delivering more fish to the market. This would seem to be a concrete example of the contention made in Chapter Two (Section 2) that demand is a major stimulant on production.

It was observed in Chapter Seven (Section 3) that according to the survey data the effective catchment area of Khabura fish market as far as motorised craft are concerned extends six kilometres to the north and nine kilometres to the south, a total of fifteen kilometres of coast. If, as seems probable, this pattern applies also to the other Batina markets, the following deductions can be made. The number of fishing settlements on the Batina lying within 7.5 km of the eight large Batina markets is sixty-one. If the catchment limit for the three smaller markets is half the coastline of the larger markets, that is, 3.25 km, the total number of fishing settlements within a convenient range by motor vessel of a market is seventy, or fifty-seven per cent of the Batina total of 123 settlements. Therefore probably between one-half and two-thirds of the fishermen of Groups 1 and 2 are within convenient range of a market. As has been pointed out already however (Chapter Seven, Section 3), only a very small percentage of even these will attend the market regularly.

In their Port Sampling Programme, Mardela (1975 Book II Vol. 1 p. 1.4) found that during the winter diesel powered vessels from Sohar and Saham landed fish at Sib and Mutrah on occasions. With what frequency this occurred is not given. At first sight this appears to contradict somewhat the findings of

this present survey. Since a detailed study of neither Sib nor Mutrah market was carried out by the present writer, Mardela's findings can be neither refuted nor expanded with certainty. In the present writer's opinion, however, such observations are not of a diurnal pattern in which the Sohar or Saham fisherman leaves his home settlement, fishes, calls at Sib or Mutrah market and then returns to his home settlement the same day. In no sense can Mutrah or Sib be called the 'local market' of any Sohar or Saham fisherman while he is living in his home settlement.

Mardella's observation can rather be explained by periodic migration. It will be remembered from Chapter Six (Section 5) that over nine per cent of the fishermen interviewed in the questionnaire survey fish seasonally in the Capital Area, remaining away from their home settlements during that time for (generally) two to six months. It is clearly this pattern which is reflected in Mardela's statement, and the present contention that fishermen with motorised craft tend to sell at coastal markets only if living within on average 7.5 km of one of them is not therefore contradicted by Mardela. It is true that fish caught on the Batina were observed on occasions during the present survey being taken to the Capital Area for sale. Such journeys however were made invariably by land transport and not by sea, and were nearly always carried out by an intermediate trader rather than by the fisherman himself.

The opportunity for the non-motorised fishermen, including those with only shash, to sell their catches at a market is more restricted than for those with motor-powered craft as the proportion within convenient reach of a market is considerably lower than the fifty-seven per cent estimated above for those

with motors. During the present marketing survey no shash fisherman was ever observed delivering his fish to Khabura market from further away than Qasbiyat al-Hawasina (5 km to the north) or Khuwayrat (5 km to the south), and even these were exceptional. It is likely that a maximum of 3 km north and south are more realistic limits to the convenient distance a shash fisherman will travel to sell in Khabura market. If this is general for shash and other fishermen with non-motorised craft in relation to the other Batina markets, the total number of settlements which lie within convenient reach of markets for non-motorised fishermen is only thirty-eight, or about one-third of the total of 123 fishing settlements on the Batina. It can therefore be concluded that only about one-third of the non-motorised fishermen on the Batina are within convenient distance of a local market.

As was mentioned in Chapter Three (Section 3), until 1970 all fish brought to a market was obliged to be sold by public auction, and a tax of 13% or 14% was levied on each sale by the auctioneer on behalf of the Muscat government. Since 1970 however the fisherman has had freedom in the market to choose whether to sell his catch by auction or by direct bargain sale. In some fish markets both on the coast (for example at Sib) and in the Interior (the case of Ibri is discussed in Chapter Ten), the auction method is still much used. In Khabura however auctioning usually accounts for well under half the fishermen's sales and direct bargaining tends to be preferred there. The attempt by the wali of Khabura in early 1976 to reintroduce compulsory auctioning after the failure of his pricing order was very quickly abandoned, as has already been described in Chapter Six (Section 4).

9.2.3 Trader-transporters

As has been estimated above, between one-third and one-half of the fishermen with motorised vessels and some two-thirds of those with no motors are generally further from a market than is convenient to make regular sales there. Moreover, it has been pointed out (Chapter Seven, Section 3) that even those within the usual catchment area of the market rarely visit it more than a few times a month on average.

It is easy to imagine therefore that after the needs of the families and neighbours of the fishermen have been met there remains a large quantity of fish on the Batina which it is not worth while for the individual fishermen to take to the market themselves. It is this circumstance which is taken advantage of by the trader-transporters. Large and important fishing settlements, such as Dil (between Saham and Khabura), which have no market of their own and which are too distant from the nearest market are particularly visited by the larger trader-transporters who either own or otherwise have access to motor pickups, though smaller traders, some of whom are without even a donkey and who deal in only a few medium-sized fish at a time, can be found in even the smallest settlements. The importance of the trader-transporters' role generally increases however with distance from a market.

A few cases were found during the field work of a fisherman acting as a trader-transporter. In the 254 questionnaire responses to the question on work other than fishing it will be remembered (Chapter Six, Table 6.4) that six fishermen said they trade in fish as well as fish themselves. Other cases were encountered in which former fishermen, having given up fishing, now only transport and trade in fish. The majority

of trader-transporters however have no past or present connexion with active fishing, and it would seem that in the majority of cases the two roles are separate.

For the smaller trader-transporters whose capital funds are limited the quantities of fish bought up for one journey are generally under RO 20. They typically transport the fish only to the nearest market or large settlement on the coast or a few kilometres inland by donkey, and a net profit of ten to twenty per cent of the purchase price can usually be guaranteed.

Those with larger capital reserves, who can afford to buy up larger quantities of fish from the fishermen at a time, are often able to hire a motor pickup, or in a few cases buy their own, to carry fish further than the nearest market. Such trader-transporters on the Lower Batina, and even a few on the Upper Batina as far north as Sohar, occasionally take fish to the Capital Area where prices, especially at Mutrah, were much higher at the time of the survey than in the Batina markets. Even by December 1978 however, two years after ice had become available at Mutrah, this trade was still not well developed and Mutrah fish market continued to suffer an excess demand over supply. The main reason seems to be the genuine lack of sufficiently large and regular quantities of fish on the Batina.

For those who normally hire motor transport, selling at a distant coastal market other than the Capital Area generally carries more risk than selling at the local market does for the smaller man with only a donkey. This is because the hire of a vehicle is generally expensive and the size of the catch at a distant market cannot be gauged accurately in advance on any

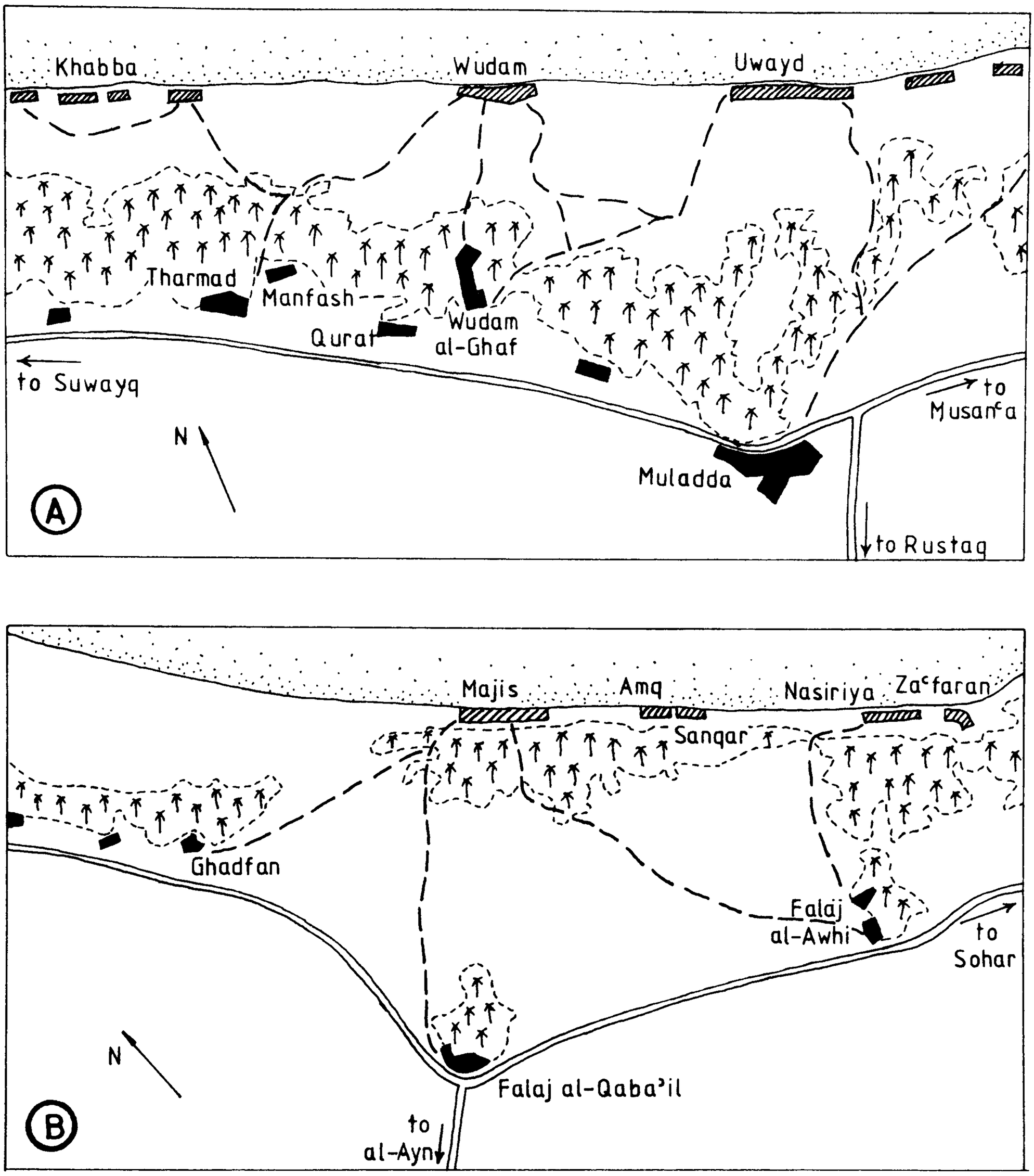
particular day. Several instances were recorded at Khabura during the survey of large net losses being made by over-ambitious, or merely unlucky, trader-transporters.

Greater chance of a profit for those hiring motor transport is generally to be had if the sale is made at an inland settlement. For example, one fish trader was noted in all three field seasons regularly taking fish from the Khabura area by hired transport (usually a part-share in a pickup) to Ghayzayn, a settlement about forty kilometres inland in the Wadi al-Hawasina.

Fish trader-transporters fulfil a particularly useful service at places on the Batina where a substantial part of the coastal population lives on the landward side of the palm gardens, as for example in the areas of Musan'a (Lower Batina) and Majis (Upper Batina) (Figure 9.2). In both these districts the population living in settlements inland of the palm gardens is probably as large as, or perhaps even greater than, that on the shore. Near Musan'a trader-transporters regularly take fish from the somewhat isolated fishing settlements of Wudam and Uwayd to the inland settlements between Muladda and Tharmad. North of Sohar, Falaj al-Qaba'il and Falaj al-Awhi are similarly served by trader-transporters with fish from the Majis area. In both cases the distance travelled is about five kilometres.

Similarly in the Khabura area, the service development which has sprung up since 1970 spontaneously in response to the new Batina tarred road at the small settlement of Bidaya, about eleven kilometres south of Khabura and three kilometres from the sea, now serves as a focus for trader-transporters who buy up fish from the fishing settlements southeast of Khabura and carry it by donkey or by pickup to be sold at the roadside at Bidaya (see Durham Oman Project Reports 1978

Figure 9-2 Two sections of the Batina coast : the Wudam-Muladda area (west of Musanᶜa), and the Majis area (near Sohar)



Vol VI pp. 119-130). The large volume of passing traffic ensures a large demand and prices which often compete favourably from the seller's point of view with those in Khabura market itself.

Even selling at an inland settlement can be risky for the fish trader-transporter with a hired vehicle, however, if the distance is great and if the settlement in question is open to more than one source of fish. On one occasion for example two brothers, who live in Khabura and who trade in fish, bought RO 18 worth of sharks from fishermen in the Khabura area on 1 September 1976, hired a pickup at a cost of RO 8 and set off to sell the fish at Rustaq, some hundred kilometres to the southwest. Unfortunately for them a large quantity of fish had that day arrived at Rustaq, reportedly from the Barka area which is closer to Rustaq by some thirty kilometres than is Khabura. The price the Khabura men wanted could not be met at Rustaq, and, cutting their losses, they brought their fish back to Khabura and sold part of it there that same afternoon. The remainder they cured by sun-drying. The final selling price is not recorded, but given the deterioration of the fish from the five hour return journey in temperatures in the mid 30s Centigrade without ice, it is doubtful whether they recouped even their original buying price, let alone the RO 8 hire of the transport.

Even more spectacular losses were observed being made by long-distance trader transporters from the Batina in Ibri. In this case, two additional sources of fresh fish have become available to Ibri in recent years which have eliminated the profitability of carrying fresh fish from the Batina to the Interior. This is discussed at greater length in Chapter Ten

where the motivation of trader-transporters is also examined.

9.2.4 Batina fish markets and market fish traders

On the Batina coast anyone who trades in fish is called a qammat, whether or not he transports it between buying and selling. Thus the trader-transporters dealt with in the previous subsection are generally known by this term. In addition, in each of the Batina markets there exists a group of resident fish traders who do not generally transport the fish but rather retail it either whole or cleaned and cut. These are also called qammats on the Batina, though as will be seen in Chapter Ten (Section 3) a different term is used for their equivalents in the Interior.

Whether the fish is brought to the market by a fisherman or a trader-transporter, and whether it is sold by auction or by direct bargain sale, the buyer might be either a consumer or one of these resident fish traders. In Khabura market at the time of the survey there were ten established fish traders of this kind. Most of them had in 1976 a palm-frond store in which to keep their tools, rock salt and cured fish, and the front part of which they use for cutting, eviscerating, displaying and selling their fish. Between 1974 and 1976 two had rebuilt such a store in cement brick, but in all cases the cutting, cleaning and displaying of fish are done at ground level. Lack of a convenient supply of clean running water in the market discourages attempts to keep wooden cutting boards and knives clean, and although fish and fish pieces are frequently washed in the sea before being sold, the sea also receives the refuse of the market and the settlement generally. Consequently, the standard of hygiene in the fish market is low.

When questioned, the fish traders at Khabura seemed generally to be aware that hygiene was lacking and the facilities of the fish market were inadequate. Individually, they are prevented from making improvements by physical constraints. The fish market at Khabura occupies a cramped site and the number of individual property owners, both landlords and owner occupiers, is large (see Durham Oman Project Reports 1978 Vol. VI). This would hamper any attempt at comprehensive developments on the same site. No other plot of land of sufficient size is available adjacent to the rest of the market which at the same time has easy access to the beach.

In 1975 the Department of Municipality Affairs arranged for fish waste and other refuse to be collected from the market at Khabura, but as yet no source of clean water is available to the fish traders. In any case the physical conditions of the fish market make the improvement of cleanliness a difficult task. The municipalities of Sohar, Sib and Barka on the Batina and Salala in Dhofar have constructed roofed wooden or cement stalls for the use of fish traders but many of them prefer to continue to work at ground level. Indeed, at Salala where the stalls are substantial and tiled and where provision is made for swilling down with clean water, not one of the fish traders or other sellers of fish uses them since their height and other dimensions make them unsuitable for squatting on. The fish is therefore displayed on the ground in the sun as before. It is therefore clear that any improvements to the physical structure of a fish market that the government or municipalities might consider must be worked out in consultation with the users, in this case principally the fish traders, and must bear in mind their needs and methods of working.

9.2.5 Functions of the market fish traders

The fish traders of the Batina markets fulfil three main functions: the rapid disposal of fishermen's catches; the subdivision of large fish and the removal of waste; and the curing of fish surplus to immediate demand. Offering credit to their customers is not an important service of the fish traders, except on a very small scale (baisas rather than riyals) and only for a period of a day or two at the most. No credit was ever observed being offered by a fish trader to a fisherman. In fact so small are the capital funds available to the majority of fish traders that they can often pay the fishermen for their fish only after they have sold it to consumers. The period over which the fisherman must sometimes wait for payment can be two or three days, payment being made when he next delivers to the market.

The functions the fish trader does perform however are carried out with effect. First, they assist the fishermen by allowing them to dispose of their catches within minutes if they so wish, whereas if the fishermen rely solely on the consumers' buying directly from them the sale can take most of the morning. Further, on the rare occasions when a fisherman makes an afternoon call at the market, few customers are ever available to buy his load from him except the fish traders whose presence in such cases is especially helpful to the fishermen.

Secondly, the fish traders assist the consumer by sub-dividing large fish into more acceptably sized lots for consumption, and by removing head, viscera, fins, scales and where required bones. The amount of such waste as a proportion

of the live weight varies according to the species. Several individual fish of the different species groups were weighed in the market first as whole fish and then as saleable pieces after trimming by the fish trader. The amount of unsold waste as a rule weighed between one-fifth and one-third of the live weight. It was generally lowest with the Sphyraenidae and Scombridae and highest with the Serranidae, Carangidae and the Bream-Snapper Group. Since however the fish are neither bought nor sold by weight in Khabura, the proportion of waste cannot be said to influence consciously the size of a fish trader's mark-up.

The third major role of the fish traders is to preserve excess fish landed during a glut to provide for periods of scarcity. Preserving fish has not been a major activity in recent years on the Batina since, as has been said, there have only seldom been surpluses to deal with, and these small and localised. Surpluses have been much more common on the southeast coasts of Oman, though in the absence of market fish traders there it is usual for the processing to be done by the fishermen themselves. In Dhofar too, large surpluses have been the rule in the case of sardines, though these also are dealt with by the fishermen themselves.

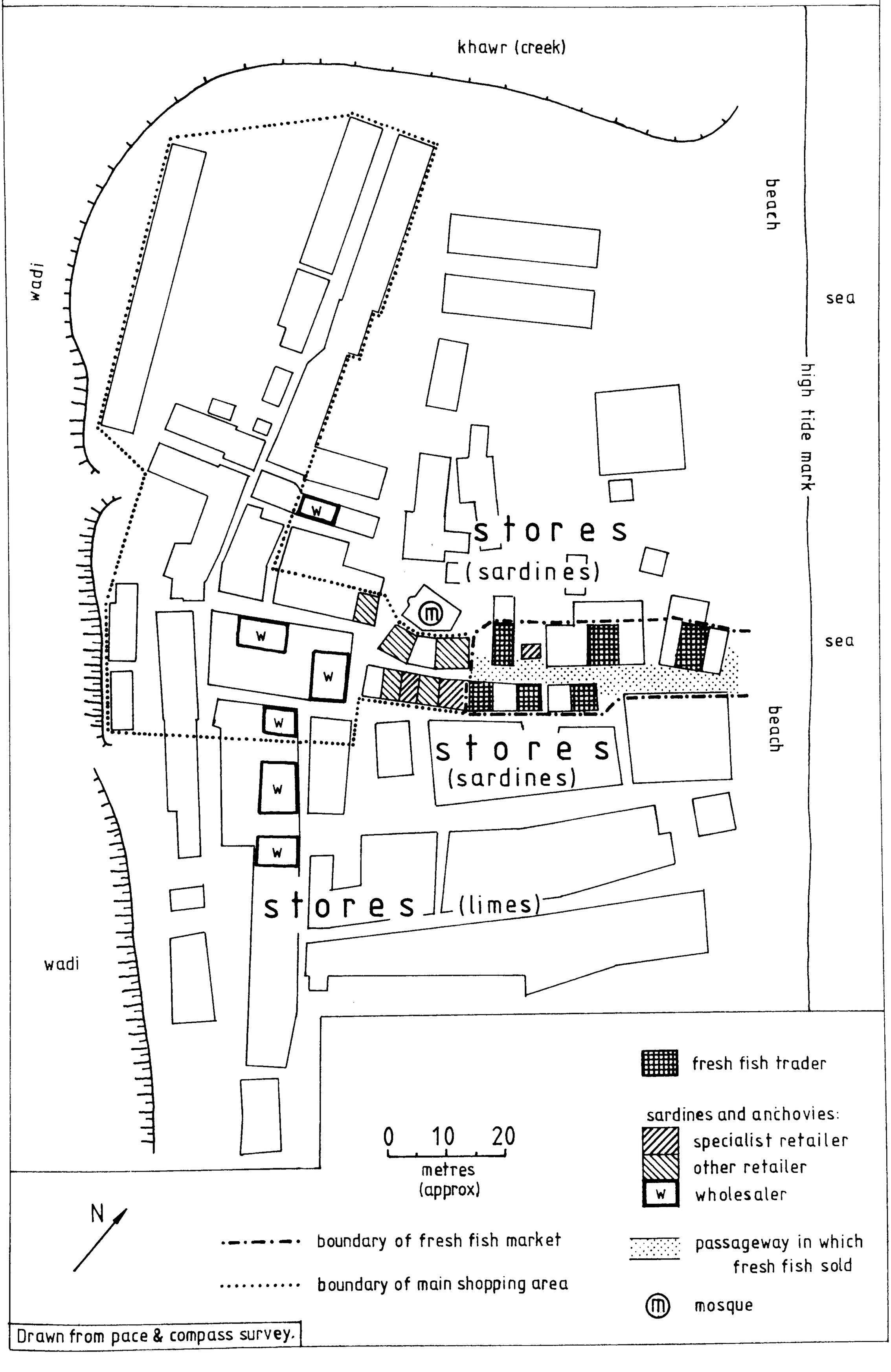
The three main methods of fish curing found in northern Oman, namely sun-drying (for sardines and anchovies), wet-salting (mainly for the Scombridae), and dry-salting and sun-drying (for sharks and rays), have been described in Chapter Three (Section 3). The methods have undergone no real change in recent years, though old imported grain sacks are now used to pack sardines and anchovies instead of date-leaf bags as formerly.

Dried sardines and anchovies in Khabura market are sold not only by the fresh fish traders but also by a few other shopkeepers. At the time of the survey three shopkeepers (other than the fish traders) specialised almost wholly in their sale and several others retailed them along with other commodities. All of these are located close to the fish market which is surrounded by stores used mainly for keeping sardines and anchovies, as can be seen in Figure 9.3

Because of the small catches during the periods of the field survey, very little of the dried sardines and anchovies sold in Khabura market and other Batina markets was produced locally. Yet demand for them in northern Oman, especially away from the coast, remains high. As will be seen in Chapter Ten (Section 4), dried sardines are used particularly by the mountain populations as a fodder supplement. Nearly all the sardines noted on sale in Khabura during the field survey had originated in Dhofar, after having been shipped to Dubai and bought there by the larger Khabura traders who re-imported them into the Sultanate by lorry loads of 100 or 200 sacks at a time. The smaller traders then buy from these larger 'wholesalers'. For quantities smaller than one sack, a customer will usually be obliged to buy from one of the smaller shopkeepers. In such cases, dried sardines and anchovies, unlike fresh fish, have traditionally been sold by weight, the unit being generally the mann Muscat (approximately four kilograms).

Although referred to by several historical sources mentioned in Chapter Three, the use of dried sardines as a fertiliser was never encountered during the field survey. This use may have been abandoned because of the recent scarcity

Figure 9-3 Plan of Khabura market showing fish sellers



Drawn from pace & compass survey.

of these fish locally and the higher price of those imported from Dhofar via Dubai. The viscera and heads of fresh fish are sometimes used for this purpose, especially when dug in with new palm trees, but only very occasionally. Considering the fact that the annual total of fresh fish sold through Batina markets is of the order of 2,600 tonnes (Chapter Eight, Section 3), and that about one-quarter of this is inedible, possibilities might exist for increasing the use of waste as fertiliser, given the cooperation of the Department of Municipalities.

The extensive trade in shark fins already referred to in Chapter Three, in which the fish traders played an important part, has almost disappeared since about 1970. This has been partly the result of the decline in abundance of fish on the Batina, but perhaps the main reason has been that the original exporting merchants in the Capital Area and Dubai no longer send agents to the Batina markets to collect the fins. They have instead found more lucrative commodities in which to trade since the start of the oil boom. Shark livers are however still processed by the market fish traders to extract the oil (sall) by pounding and boiling. As has been seen in Chapter Seven (Section 2), the sall is still of major importance to the fishermen for preserving their craft.

9.3 Fish prices at Khabura

Over the three field seasons a total of 1,435 price-weight records of individual sales of whole fish were taken in Khabura market in the manner described in Chapter Four (Section 3). Of the total, 1,259 records were for medium to large fish (i.e., fish which individually weighed 300 gm or

more) and these were classed by the nine fish species groups described in Chapter Eight (Section 2). The remaining 176 records are for small fish (less than 300 gm each) which are almost invariably sold in bunches, often of mixed species. These have therefore been classed separately.

From the price-weight records the price per kilogram has been calculated in order to provide a means of inter-comparison. Prices quoted here and subsequently are in terms of baisas per kilogram to the nearest baisa, though in fact the smallest coin in common use in Oman is of five baisas, while it will be remembered that in any case fish is not sold by weight but by the piece.

In broad terms the number of price-weight records taken reflects within each field season the availability of the different categories of fish: it was possible to take large numbers of records for commonly occurring species but obviously not for those which were rarer. However, as Table 9.1 shows, the well liked fish (Groups I to VI) are on the whole over-represented to some extent by the number of records and the less liked fish (Groups VII to IX) under-represented. This is known to have occurred in both the second and third field seasons, and is probably true also of the first field season, but was not discovered until the data were analysed. As can be seen in the table, whereas the well liked fish overall made up seventy-one per cent of the counted catch of medium to large fish, the number of price-weight records taken of them was seventy-nine per cent of the total. The less liked fish on the other hand constituted twenty-nine per cent of the counted catch, but only twenty-one per cent of the price-weight records.

Table 9.1 : Numbers of price weight records taken compared with the abundance of fish, Khabura market survey

	First Field Season			Second Field Season			Third Field Season			All Field Seasons		
	no. counted in market	no. of price-weight records	%	no. counted in market	no. of price-weight records	%	no. counted in market	no. of price-weight records	%	no. counted in market (Field seasons 2 & 3 only)	no. of price-weight records	%
I to VI	not known	307	77%	2940	316	83%	3252	366	77%	6192	989	79%
VII to IX	not known	93	23%	909	67	17%	1643	110	23%	2552	270	21%
I to IX	not known	400	100%	3849	383	100%	4895	476	100%	8744	1259	100%
small fish	not known	25	-	not known	93	-	not known	58	-	not known	176	-

The extent of over-representation and under-representation for these two categories is however not considered to be unduly serious.

Of greater concern is the under-representation of the small fish in relation to their abundance. Since neither the total number of sales of small fish nor their exact quantity could be measured, the degree of under-representation in the price-weight records cannot be calculated. Nevertheless it was estimated in Chapter Eight (Section 3) that their total weight was perhaps one-quarter of the weight of medium to large fish. The number of price-weight records taken over the three field seasons was however only 176 compared with 1,259 for the medium to large fish (14%). For this reason, and because they are rarely sold individually, the small fish are dealt with in less detail than are the medium to large fish in subsequent calculations.

Table 9.2 summarises the price records for all three field seasons in terms of the average prices per kilogram and the ranges of prices per kilogram. Because of unavoidably unequal distribution of sampling over all the cells of the table (and in particular the under-representation of the less liked fish already referred to), overall averages do not signify much whentaken alone. It is perhaps significant however that when the average prices for each of the groups is weighted not by the number of samples recorded but rather by the number of individual fish counted in the market on the survey days (from Table 8.2), the averages which result when the groups are combined or when the field seasons are combined do not differ in any marked degree from the averages not so weighted. Such weighting is possible for the second and third field

Table 9.2 : Averages and ranges of prices of fish in sales sampled at Khabura market, by species group and field season (in baisas per kilogram)

Species Group	First Field Season			Second Field Season			Third Field Season			All Field Seasons		
	average price per kg.	range	no. of records	average price per kg.	range	no. of records	average price per kg.	range	no. of records	average price per kg.	range	no. of records
I	523	216-1000	(44)	564	157-923	(61)	497	274-1169	(15)	540	157-1169	(120)
II	410	192-938	(85)	447	207-889	(91)	368	83-667	(169)	399	83-938	(345)
III	440	51-857	(17)	265	129-400	(2)	-	-	(0)	421	51-857	(19)
IV	480	146-1250	(71)	525	231-963	(57)	582	71-1250	(66)	528	71-1250	(194)
V	408	71-741	(64)	458	122-1000	(91)	435	157-833	(98)	436	71-1000	(253)
VI	418	129-833	(26)	331	143-621	(14)	379	176-698	(18)	385	129-833	(58)
I to VI	444	51-1250	(307)	481	122-1000	(316)	430	71-1250	(366)	451	51-1250	(989)
VII	198	87-439	(17)	225	111-455	(18)	261	125-464	(14)	226	87-464	(49)
VIII	171	79-300	(33)	215	79-648	(29)	222	65-483	(86)	209	65-658	(148)
IX	115	14-571	(43)	125	44-400	(20)	114	67-227	(10)	117	14-571	(73)
VII to IX	150	14-571	(93)	191	44-648	(67)	217	65-483	(110)	187	14-648	(270)
I to IX	376	14-1250	(400)	430	44-1000	(383)	381	65-1250	(476)	394	14-1250	(1259)
small fish	318	30-1000	(25)	359	17-733	(93)	521	100-1500	(58)	406	17-1500	(176)
All fish	373	14-1250	(425)	416	17-1000	(476)	396	65-1500	(534)	396	14-1500	(1435)

seasons since an accurate record is known of the numbers of individuals present in the market on the survey days (see Table 8.2 in the previous chapter), and this has been done in Table 9.3. As can be seen the overall weighted average price over both field seasons is 382 baisas per kilogram, compared with the overall unweighted average (Table 9.2)of 396 baisas per kilogram.

Figures 9.4 and 9.5 graph the data for medium to large fish presented in Table 9.2 and add the median and quartiles of each distribution. Three points are clear. First, the average prices and also their respective maxima and minima are higher in every field season for the well liked fish than for the less liked fish. This is to be expected and requires no further expansion, except perhaps to comment that to some extent it justifies the classification used here.

The second point is that there appears to be no unambiguous upward price trend with time, which is contrary to what might be expected in a situation of generally high inflation in commodities as a whole in Oman. A period of one year separates the first field season from the second, and six months elapsed between the second field season and the beginning of the third. The less liked fish do it is true show a continuously rising trend. With the well liked fish on the other hand, which account for over two-thirds of the records, the pattern is by no means as plain, being constantly upwards in only Group IV. Most of the other well liked groups show higher means and interquartile ranges in the second field season (winter 1975-76) than in either of the other two seasons. If authentic, this pattern may be related to the poorer than average catch taken in the 1975-76 winter (see Chapter Eight,

Table 9.3 : Calculation of overall average prices per kilogram weighted by numbers of individual fish counted during the second and third field seasons at Khabura market

Species Group	Second Field Season		Third Field Season		Second and Third Field Seasons	
	no. of individuals counted	average price per kilogram (baisas)	no. of individuals counted	average price per kilogram (baisas)	no. of individuals counted	weighted average price per kilogram (baisas)
I	663	564	59	497	722	559
II	880	447	1259	368	2139	401
III	66	265	1	-	67	265
IV	384	525	618	582	1002	560
V	893	458	1232	435	2125	445
VI	54	331	83	379	137	360
I to VI	2940	weighted price per kg. 481	3252	weighted price per kg. 437	6192	458
VII	118	225	204	261	322	248
VIII	358	215	1192	222	1550	220
IX	433	125	247	114	680	121
VII to IX	909	weighted price per kg. 173	1643	weighted price per kg. 211	2552	197
I to IX	3849	weighted price per kg. 408	4895	weighted price per kg. 361	8744	382

Weighted averages calculated as follows:

$$\frac{\Sigma (\bar{x} \cdot n)}{N}$$

Where $\bar{x}$ = average prices per kg. from Table 9.2
n = no. of individual fish counted per group
N = total no. of individual fish counted

Figure 9-4 Prices of whole fish at Khabura market during field survey, by species group

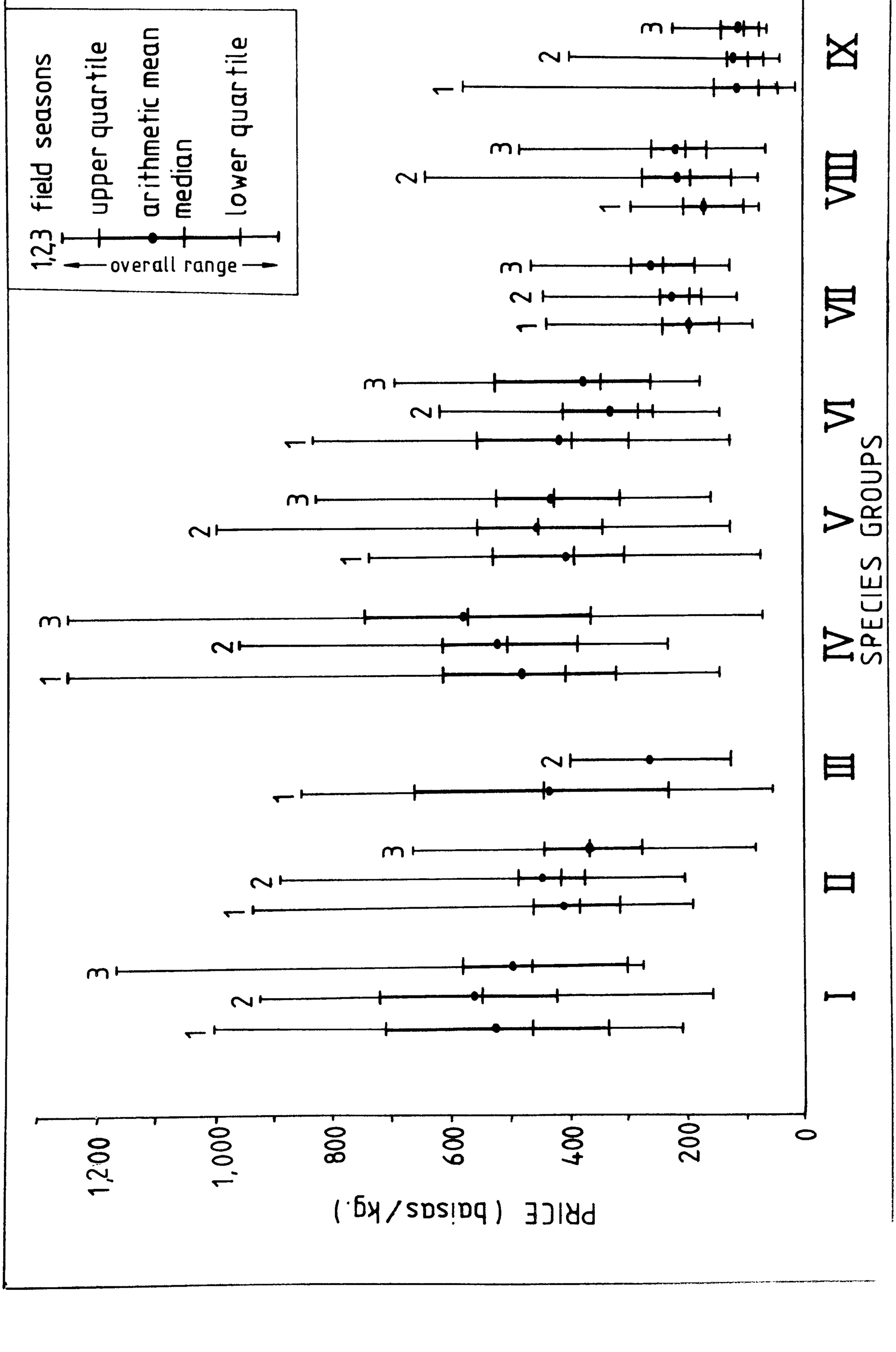
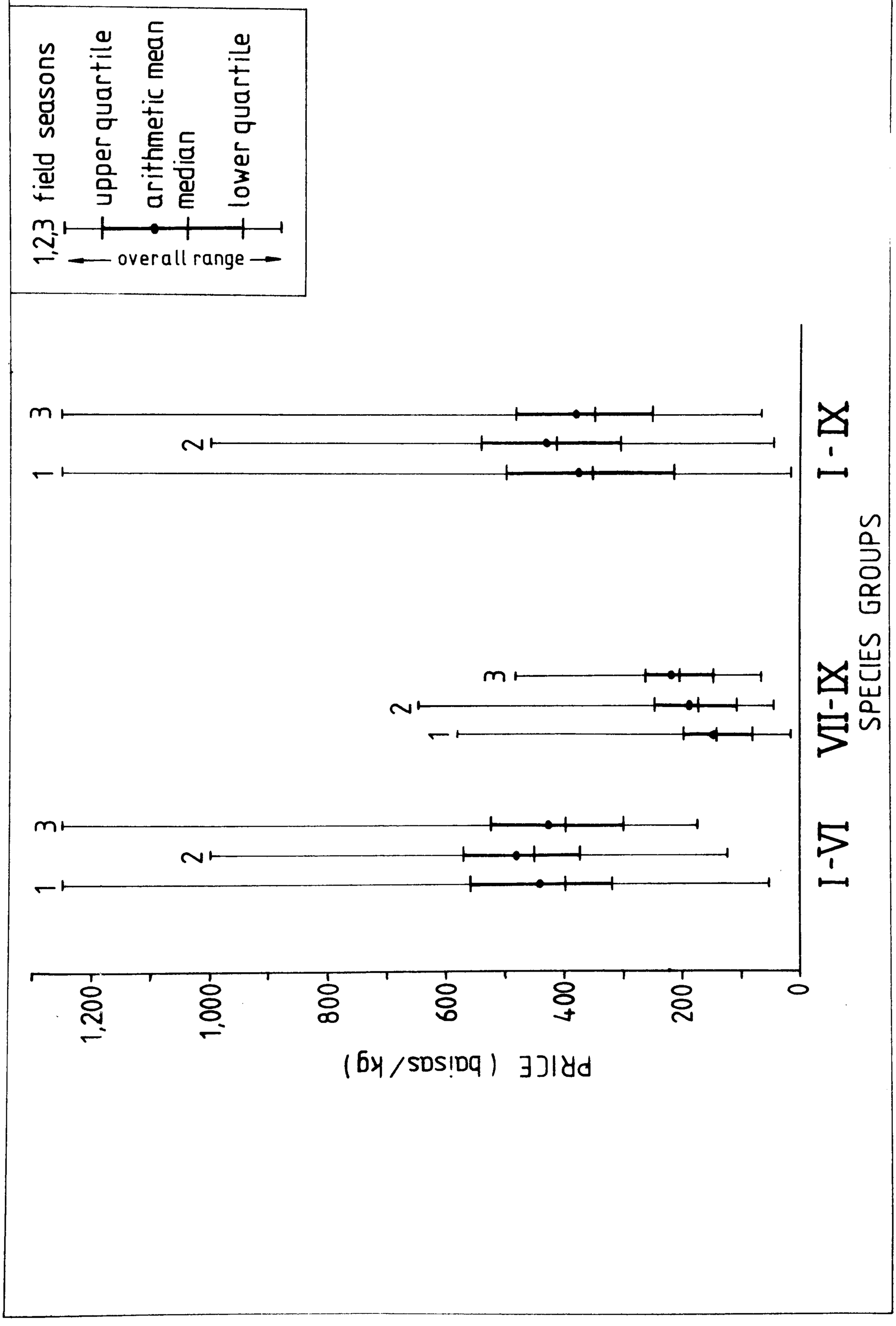


Figure 9-5 Prices of whole fish at Khabura market during field survey : summary



Section 3), or alternatively to a better than average catch (otherwise unattested) in the summer of 1976.

The third point which arises from the data is that, except in the cells where the number of records is small, the overall ranges in every case are very large indeed. The basic reason for the large ranges is undoubtedly the fact that in Khabura as in most other Batina markets fish are sold not by weight but by the piece, as has been pointed out already. There is therefore no common measure by which fishermen or fish traders may adjust their prices. Each individual sale has its own price which is to a large degree independent of all other sale prices. This contrasts with the situation in Ibri market where since 1974 fish has been retailed (though not auctioned) strictly by weight and where there is very little range of prices from one sale or seller to another, as will be seen later (Chapter Ten, Section 3).

Selling by the piece and not by weight therefore allows considerable variation in the price per unit weight when it is calculated. Nevertheless, large as the overall ranges are, most of the records occur within much narrower bands, as the interquartile ranges in Figures 9.4 and 9.5 show. That is to say, the number of extreme values (extremely high or extremely low) in any category is small compared with the clustering around the mean values. In fact, in each of the three field seasons the interquartile ranges (by definition containing fifty per cent of the cases) cover only some twenty per cent of the overall ranges. For the well liked fish the interquartile range is about 225 baisas compared with an overall range of 1,200 baisas (18.75%), while for the less liked fish the interquartile

range is 125 baisas and the overall range 634 baisas (19.72%). Despite the absence of selling by weight, the price range for most sales is therefore very much smaller than the overall range would lead one to suppose.

Part of the variation in prices may be explained by different methods of sale. It will be recalled (Section 2 above) that at Khabura a fisherman (or indeed any other seller who brings fish to the market) has the choice of selling by auction or by direct bargain. It is generally contended by the public that auction prices tend to be lower than those attained by direct bargain. To end the boycott of the market by the fishermen in early 1976 the wali of Khabura agreed to rescind his price order on condition that fish would be compulsorily auctioned on the grounds that auctioning produced prices which were fairer to the customer, and therefore by implication lower, than direct bargain sales. Further, as will be seen in Chapter Ten, auctioning is the rule in Ibri market and the fish trader-transporters allege that it produces lower prices than they would received if they were free to bargain directly, and consequently is the major reason for their frequent losses.

In order to test whether auctioning does in fact produce lower prices than direct bargaining in Khabura market the method of sale was recorded for each sale sampled from the end of the first field season onwards. Unfortunately, there are certain problems involved in testing and interpreting the data. These are caused by the large number of types of fish, by their variable availability, by the fact that auctions in Khabura are less frequent than direct bargain sales, and by the consequent difficulty of obtaining representative and balanced samples. Even though the method of sale is known for a total

of 1,076 of the price-weight records (730 direct bargain sales and 346 auction sales), when broken down by the nine species groups, and by the three field seasons the numbers in the sub-samples become in many cases too small to allow reliable conclusions to be drawn. However, statistical testing of the data was carried out as far as possible and since the conclusions do not refute the popular hypothesis that auctions produce lower prices on average than direct bargain sales, and indeed to a certain extent support it, the explanation of the statistical testing and its results are not included here but may be found in Appendix I.

It may be wondered why the fishermen ever voluntarily choose to sell by auction, since the choice is in their hands, and it is extremely unlikely that they are unaware of the lower average prices that auctioning tends to produce. The only tenable explanation lies in the fact, already mentioned above (Section 2 above), that auctioning allows them to sell their catches more rapidly than they can by direct bargaining. On occasions therefore a fisherman will be content to offset a reduced price against time saved. Even so, as was also remarked earlier, instances of auctioning at Khabura are fewer than direct bargaining.

Another influence on price is whether the seller is a fisherman or a fish trader, and for 753 price-weight records the seller is known. It is to be expected that fish traders' prices will tend on average to be higher for a given type of fish than the fishermen's, and this is generally acknowledged by consumers. That they nevertheless still choose often to buy from fish traders rather than fishermen, even knowing the latter to be cheaper on the whole and even when whole fish which require

no subdivision are involved, can best be explained as the result of convenience. Fish traders are present in the market for many more hours a day than are the fishermen.

Testing the expectation that fish traders' prices are on average higher than those of fishermen is difficult for the same reasons as exist in the case of testing the influence of the method of sale. As far as can be done, Appendix I explains the testing procedure and the results. Actually to quantify the average mark-ups of the fish traders in more than general terms is impossible without vastly more field data, which would be difficult to justify in view of their method of operation and in particular the fact that it would seem unlikely that they consciously calculate percentage mark-ups. On individual sales, profits of 100 per cent or more were occasionally noted by the present writer, but overall it is unlikely that their profits exceed twenty per cent, or RO 2 per day on a daily turnover which may average RO 10.

9.4 The importance of fishermen's choice in marketing: the case of the F.M.C. project at Sohar

The fact that the initiative lies firmly with the fisherman in choosing how to dispose of his catch has been illustrated already in a different context in the incident of the boycott following the wali's price order in Khabura market (Chapter Six, Section 4). A further specific example may be given here and concerns the F.M.C. fisheries operation at Sohar referred to in Chapter Three (Section 4). In 1973 the American organisation F.M.C. International began what it called a pilot fisheries project at Sohar (F.M.C. 1975) at a cost to the Oman government of $3.1 million. Initially it was conceived as both a catching and marketing operation. A group of selected

Omani fishermen were trained in California in the use of eight fibreglass boats, the largest of which were fitted with winches for small trawls and with electronic fish finding equipment. The fish caught by these were to be processed at a shore base which included a small ice making plant, a refrigeration unit, eviscerating, cleaning and packing facilities, and drying racks. A refrigerated lorry was also provided.

For a number of reasons, including both technical problems with the equipment and poor man management, the project craft, despite their advanced design, could bring ashore only a small fraction of the quantities of fish that had been envisaged. It was therefore decided, probably in the latter half of 1974, to attempt to persuade local fishermen to sell their catches to the project. A three-tier scale of prices to be paid to fishermen was laid down: 100 baisas per kilogram (live weight) for sharks and rays, 250 baisas per kilogram for moderately well liked fish (including most of the Bream-Snapper Group), and 350 baisas per kilogram for kingfish and other well liked Scombridae and Carangidae. As will be seen from Section 3 above, these prices are lower than the averages, weight for weight, found in Khabura, and were almost certainly lower than prices at Sohar fish market, only two kilometres along the coast from the F.M.C.site. In April 1975 F.M.C. handed over the project to the Oman government and left Oman, and later in 1975 the price offered to local fishermen was standardised at 350 baisas a kilogram for all species.

Although in 1976 at least the fish that was being handled by the project came mostly from the local fishermen and not from the project's own craft, the total amounts involved were

pitifully small relative to the capital invested in the project and compared with the local artisanal catch. The project records for July 1976 were shown to the present writer, and these indicate that during that month 900 kg of fish were delivered to the project by its own boats, and 1,239 kg were bought from local fishermen. During that same summer Khabura market was handling some 100,000 kg over six months (Table 8.3 in the previous chapter), or about 16.5 tonnes a month on average, according to the present writer's calculations. Sohar market was undoubtedly handling more than this - perhaps an average of 25 tonnes a month. Against this the quantities being attracted from the local fishermen by the F.M.C. project were almost negligible. Since 1976 the amounts handled by the project have been even lower, and on the return visit to Sohar in December 1978 no fish at all were being bought from local fishermen.

No doubt the most obvious reason for the project's inability to attract local artisanal catches was the lower weight-for-weight price offered by the project compared with average prices in the local market. However, at Sohar market, as at Khabura, fresh fish are not sold by weight, and therefore the fishermen could not consciously compare the market prices which might be obtained for any given catch with the prices per kilogram of the project. In the view of the present writer, what the fishermen were reacting against was not so much the lower prices in themselves, but rather the fact that the project prices were fixed and were measured in terms of weight with no possibility of bargaining or of the element of chance involved in an auction. However this may be, the Sohar scheme failed because it did not understand the fishermen, and

especially their freedom of choice in where and how they dispose of their catches. In this respect there is a parallel to be drawn with the failure of the wali's attempt to influence the market in Khabura.

9.5 Conclusions on handling and marketing on the Batina

It has been the main purpose of this chapter to examine in some detail the handling and marketing procedures operating on the Batina in present circumstances. Of particular concern have been the more important factors influencing their operation and the nature of the interfaces between fishermen, traders and consumers. Without some understanding of these no coherent and workable approach to the development of the artisanal fishery of the Batina can be formed. Because of a lack of understanding of the relationship between fishermen and market, the wali of Khabura failed in 1976 in his attempt, described in Chapter Six above, to interfere artificially with the market mechanism. The same lack of understanding doomed the attempt of the F.M.C. pilot fisheries project at Sohar to buy fish from the fishermen.

It has been estimated in this chapter that some sixty per cent of the motorised craft and one-third of those without motors are within convenient reach in present circumstances of a Batina market. Nevertheless only an extremely small proportion of these are to be found unloading at the markets on any given day. This further supports the conclusion drawn earlier from the data both on migration and on takings that the capital invested in fishing is not being used to its greatest efficiency. There are probably several reasons for this, some of which have been mentioned in previous chapters and concern primarily the fishing sector of the fishery.

However, because fishing and fish marketing are interlinked as parts of the one system, it may well be that the marketing sector is partly to blame in that the improvements that have been introduced in fishing equipment have not been matched by equivalent development in marketing, and that improvements there would stimulate the fishing sector to produce more fish. The absence of powerful fish traders and the shortness of marketing chains on the Batina would without doubt ease considerably the task of creating conditions in which handling and marketing improvements might take place.

What stands out particularly clearly from this chapter is that the initiative in influencing the marketing patterns lies almost wholly with the fishermen. The choice to sell in the market, or to sell elsewhere, or not to sell, is in their hands. In the market they can also choose to sell by auction or by direct bargain and so lower or raise prices. The ultimate choice also lies with them - to fish on the Batina or, by going abroad, not to do so.

This situation is quite unlike that found in artisanal fisheries in other widely separated parts of the world. George (1973) for example describes how artisanal fisheries in India and elsewhere tend to be largely dominated by powerful fish traders who monopolise market outlets and to whom many or most fishermen are constantly indebted. Lawson (1972) and Lawson and Kwei (1974) describe a similar situation in both southeast Asia and Ghana. On the world scale a major problem facing many artisanal fishermen would seem frequently to be to break the power the traders have over both their capital equipment and their market outlets.

In contrast, in Oman it is the fish traders who are much more dependent on the fishermen than vice versa. There is no question on the Batina of fish traders' controlling fishermen either by allowing them to become indebted to them through loans for fishing equipment or by monopolising their market outlets. In view of Miles' (1919) descriptions already discussed (Chapter Three Section 1), there is no reason to suppose that indebtedness or subservience to traders has ever been the case with the Batina fishermen.

The conclusion to be drawn from this appraisal is that any change artificially introduced to improve handling and marketing arrangements must have the full support of the fishermen. If this is not secured, the innovation will at best be a waste of effort and resources (as with the F.M.C. project at Sohar), or at worst will encourage more fishermen to fish abroad.

Another example of unsuccessful official intervention has also been quoted in this chapter: the case of the erection of fish market stalls by the Salala municipality. Because they did not meet the requirements of the fish traders they are unused. These findings taken together recall the postulate made in Chapter One (Section 3) concerning the appropriateness of innovations. Further examples will be discussed in Chapter Twelve, but at this stage, the principle can perhaps be restated thus: that before intervening in an established system, governmental, municipal or other authorities must understand, first, how the system works, and second, what the implications of any proposed intervention might have for that system. Otherwise the desired result of the intervention will not necessarily follow.

CHAPTER TEN

Fish marketing in the Northern Interior.

CHAPTER TEN

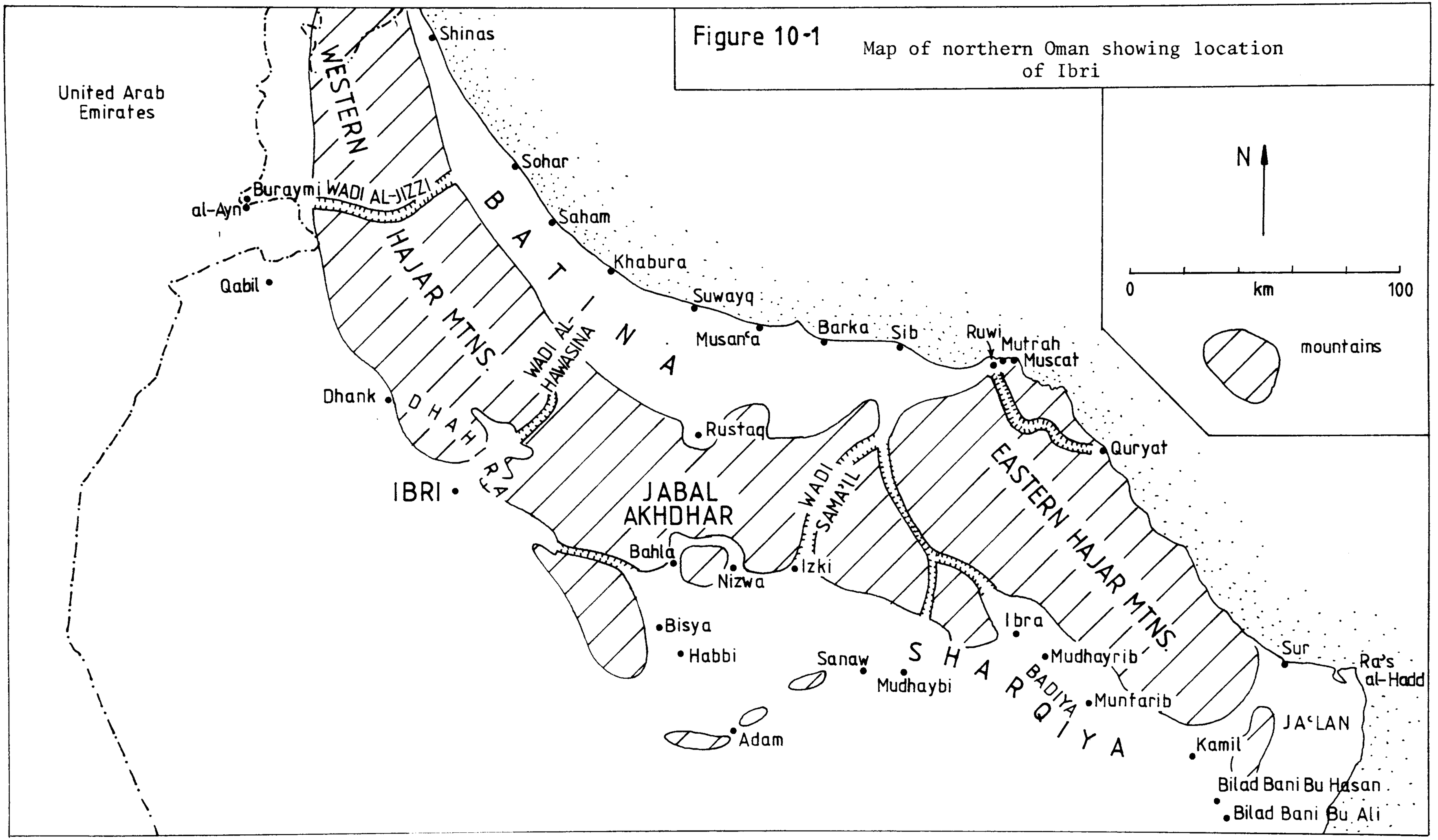
Fish marketing in the Northern Interior

10.1 Introduction

The present chapter seeks to examine in detail the fish marketing patterns found during the field survey in the Northern Interior, and thus completes the study of the marketing aspects of the fishery of Northern Oman begun in Chapter Nine. Sections 10.2 and 10.3 attempt to analyse the marketing survey records of fresh and cured varieties of fish in terms of the quantities which reach Ibri and the origins from which they come. In Section 10.4 the distribution of the different varieties from Ibri to its hinterland are analysed. Significant differences between the varieties and between field seasons are observable both in the supply to Ibri and in the distribution from Ibri, and the importance of these will be noted. Finally, in Section 10.5 the trader-transporters are examined in detail since their role is critical in that the supply of fish to Ibri is wholly dependent on them.

The settlement of Ibri has a population of about 6,000 and lies on the Interior side of the Western Hajar Mountains, some 130 km southwest of Khabura (Figure 10.1). It is the regional capital of the part of the Northern Interior known as the Dhahira and is the headquarters of a local 'governor' or wali, as is Khabura. Ibri's commercial services are however of a higher order than those of Khabura, and indeed Ibri has one of the largest and most important markets outside the Capital Area. Its hinterland in both area and population

Figure 10-1 Map of northern Oman showing location of Ibri



probably rivals or even exceeds those of other large Omani provincial markets such as Nizwa (Durham Oman Project Reports 1978 Vol. VI).

The commercial structure of Ibri market differs from that of Khabura also in that the auction system is extensively used, and it is by means of auctions that most produce originating locally or within the Sultanate or the U.A.E., including nearly all the fish, live animals and dates, enters Ibri market. The auction system is described in detail in Appendix J (see also Durham Oman Project Reports 1978 Vol. VI). Each auction is conducted by an autioneer and a recorder. Of the ten regular auctioneers in the market three deal mainly in fish, and each works usually with the same recorder. It was with the help of these auctioneers and recorders that much of the data to be discussed in this chapter were collected.

Detailed data extending over both field seasons in Ibri were collected for auctions of fish and these will be discussed in this chapter. Similar data were collected for dried dates for both field seasons and for live animals in the first field season. These three commodities make up by far the largest part of the auctions in terms of value. On the basis of field data it would appear that the value of dried dates sold by auction in Ibri was in the winters of 1975 and 1976 between RO 2,000 and RO 2,500 per month and live animals a further RO 8,500 to RO 11,000 per month. The records of fish auctions (both cured and fresh) indicate another RO 20,000 to RO 24,000 per month. Together with auctions of less important commodities it would appear therefore that between RO 32,000 and RO 40,000 worth of produce

was auctioned in a month at the times of the survey, and of this the major part is formed by fish.

10.2 Cured fish in Ibri market

Until the early 1970s when motor transport became readily available in Oman, the sole form of long distance transport was the camel. Journeys to the Interior from even the nearest coast, the Batina, took at least three days, while the Gulf coast is said to have been seven days distant and the southeast coasts of Oman ten or more days away. Consequently in such conditions the only supply of fish in the Interior was of the cured kinds described in Chapter Three (Section 3). MacIvor (1880-81), Miles (1919) and others have mentioned the movement of fish in cured form from the coasts to the Interior.

The arrival in 1970 of the motor pickup and the lorry in the Sultanate produced changes in the supply of fish to the Interior. The survey periods in Ibri coincided with the onset and development of new patterns which these changes caused. By speeding up the journey time from the coasts from days to hours, motor transport has not only allowed the traditional pattern of cured fish supply to the Interior to be modified, but has also enabled iced fish, initially from Dubai, to challenge the importance of cured fish, as is discussed later in this chapter. Nevertheless, as will be seen, at the times of the survey, cured fish still formed a very important commodity in Ibri market and in the Interior generally.

10.2.1 Quantities and values of cured fish

During the two field seasons in Ibri details of sale for a total of seventy-two loads of cured fish were recorded.

Thirty-one of these were sold on forty-one days between 5 February and 17 March 1975 and the remaining forty-one loads on forty-six days between 15 January and 29 February 1976. Other loads were noted from time to time but not recorded in detail. It is estimated that the recorded loads represent approximately two-thirds of all the loads entering Ibri market during these two periods. Over the total of eighty-seven days therefore probably almost one hundred loads of cured fish were sold in the market: that is, an average of 1.1 loads per day.

Table 10.1 gives a breakdown of the number of loads according to type of fish. As can be seen, four important varieties of cured fish were recorded during the periods of stay in Ibri and a fifth variety (mishwi) appeared on only one occasion. According to the fish auctioneers and traders no other form of cured fish has ever heen important in Ibri.

The size of the load depends on the variety of fish. Qashiʿ (dried anchovies) and uma jaffa (dried sardines) are generally transported by lorry or large pickup in sacks. A sack of qashiʿ weighs between six and eight mann Muscat (24 to 32 kg), and one of uma between five and seven mann Muscat (20 to 28 kg). Here average weight has been estimated at 28 kg and 24 kg per sack respectively. Most loads of these varieties would therefore hold between one and two tonnes of dried fish.

Uwal (dried shark) and kanʿad malih (wet-salted kingfish) are almost invariably brought by pickup. In the case of uwal, 1,250 pieces is the average size of the loads recorded, weighing approximately a quarter tonne. The average

Table 10.1 : Recorded loads of cured fish at Ibri market during the two field seasons and estimation of total weights sold monthly at Ibri

	usual transport-ing vehicle	average size of load	estimated average weight per unit	estimated average weight per load	number of recorded loads		estimated average no. of loads per month		estimated average total weight per month	
					1975 (41 days)	1976 (46 days)	winter 1975	winter 1976	winter 1975	winter 1976
qashi' (dried anchovies)	lorry or pickup	74 sacks	28 kg per sack	2072 kg	6	13	6.59	12.72	13,654 kg	26,356 kg
uma jaffa (dried sardines)	lorry or pickup	60 sacks	24 kg per sack	1440 kg	5	7	5.49	6.85	7,906 kg	9,864 kg
uwal (dried shark)	pickup	1250pieces	1 kg per 5 pieces	250 kg	14	14	15.37	13.70	3,843 kg	3,425 kg
kan'ad malih (wet-salted kingfish)	pickup	133 fish	4 kg per fish	532 kg	5	7	5.49	6.85	2,921 kg	3,644 kg
mishwi (roasted fish)	pickup	-	-	-	1	0	-	-	-	-
All cured fish loads					31	41			28,324 kg ≃ 28 tonnes	43,289 kg ≃ 43 tonnes

recorded load of kan'ad malih contained 133 fish, weighing approximately half a tonne.

With the exception of qashi', the number of loads recorded for each of the main varieties is very similar in both field seasons. When allowance is made for the slightly longer record for the second field season and an average number per month is estimated (assuming the recorded loads represent two-thirds of the total received by Ibri), there is very little difference in frequency of occurrence between the first and second field seasons. In the case of qashi' however the number of loads doubles. Reasons for this will be examined when sources are discussed in the next subsection. In terms of total weight qashi' form by far the largest quantity of any variety, even in the first field season.

On this basis, Table 10.2 attempts to estimate the average total live weight per month represented by the cured fish sold in Ibri. The margins of error are large, but it is believed that the final figures are generally of the right order. The large increase of the 1976 total over that of 1975 is accounted for almost wholly by the increase in the quantity of qashi' . Although it was not possible to collect any data for a summer period, it is known from the Ibri auctioneers and others that the quantities of cured fish are reduced in summer. The total live weight for a year therefore might be of the order of 1,000 tonnes. If the other major central markets of the Northern Interior and Central Oman are added (Buraymi, Bahla and Nizwa), the total live weight sold in cured form in the Northern Interior might be placed very roughly at around 3,000 tonnes.

Table 10.2 : Estimation of total live weight represented by cured fish sold at Ibri

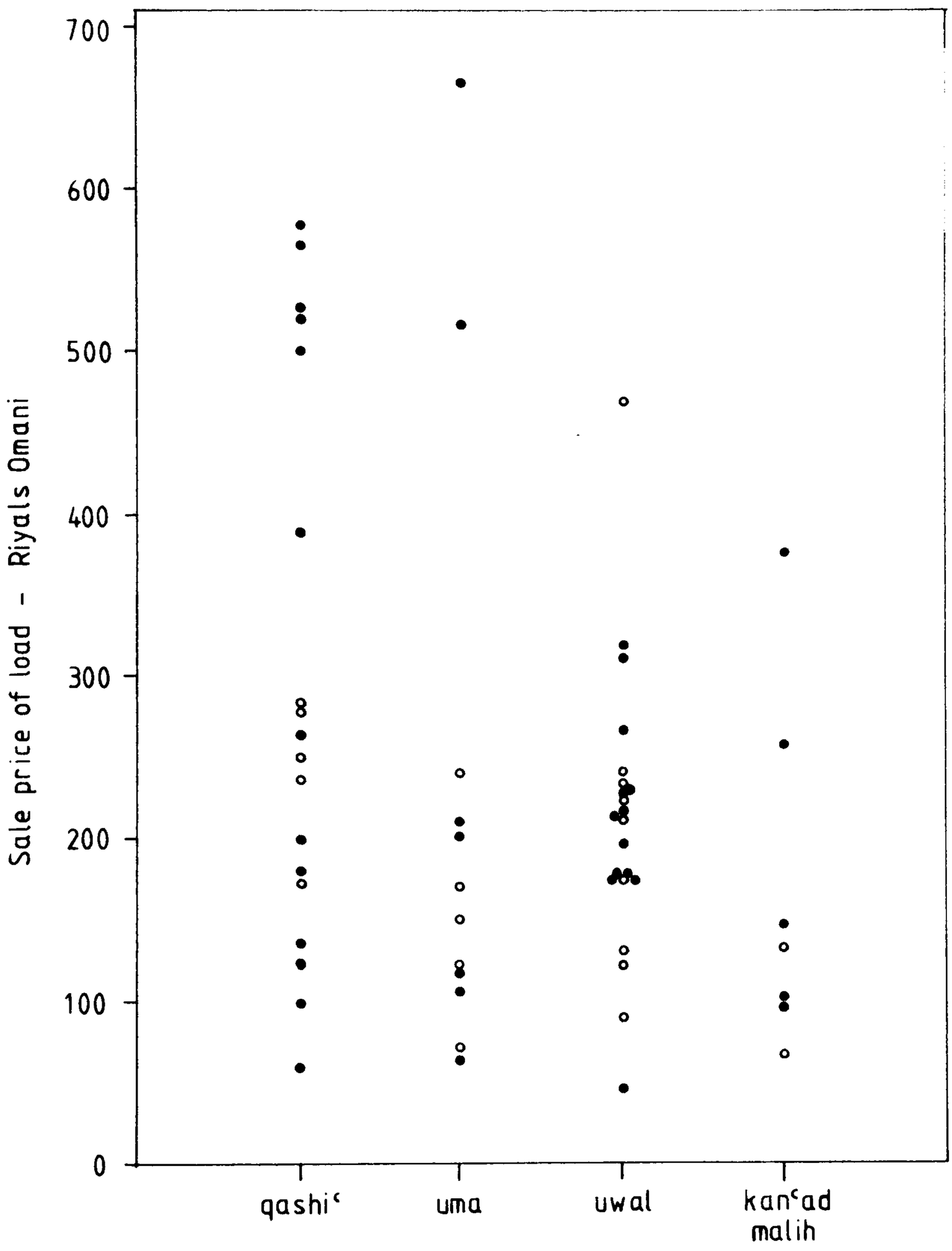
Variety of cured fish	estimated average total cured weight per winter month in tonnes		estimated ratio of cured weight to live weight	estimated average total live weight per winter month in tonnes	
	1975	1976		1975	1976
qashiʿ	13.7	26.4	1 : 4	54.8	105.6
uma jaffa	7.9	9.9	1 : 4	31.6	39.6
uwal	3.8	3.4	1 : 4	15.2	13.6
kanʿad malih	2.9	3.6	4 : 5	3.6	4.5
all varieties	28.3	43.3		105.2	163.3

Of the total of seventy-two loads recorded, the auction value of fifty-nine is known. These are plotted by variety of fish in Figure 10.2. The first and second field seasons records are distinguished in the diagram, and were inspected separately for each of the varieties of fish and tested for statistically significant differences by the Mann-Whitney U-test (Siegel 1956). Although the average value of loads for each variety except uwal was higher in 1976 than in 1975, the U-test indicates that the difference in no case is statistically significant at even the 90% ($p = 0.10$) level. In consequence the samples for both years can be combined.

Table 10.3 summarises the values of the recorded loads at the sale prices attained in the Ibri auctions and an estimation of the total values of loads in a month. The qashi‘ loads have on average the highest value at nearly RO 300. Because of the consistently greater frequency of loads of uwal, however, this variety has overall the largest total value. In comparison uma and kan‘ad malih are much less important than qashi‘ and uwal.

It will later be shown that on the same basis an estimated value of RO 13,000 to RO 14,000 per month can be placed on fresh fish sold in the winter months in Ibri. Although lower than this, the estimated total value of cured fish (RO 7,000 to RO 10,000) is nevertheless very substantial. It is indeed of the same order as the RO 8,500 to RO 11,000 per month estimated for sales of live animals and far above the RO 2,000 to RO 2,500 per month for dried dates (Durham Oman Project Reports 1978 Vol. VI). Viewed in this light the continuing importance of cured fish in the Interior is apparent even despite the advent of fresh fish.

Figure 10-2 Auction values of loads of cured fish recorded at Ibri during field survey



o = 1975 record

• = 1976 record

Table 10.3 : Values of recorded loads of cured fish at Ibri auction prices and estimation of total monthly values

Variety	total value of recorded loads (RO)	Sale price of load (RO) Average	range	no. of loads for which sale price is known	estimated average no. of loads per winter month 1975	1976	estimated average total value per winter month (RO) 1975	1976
qashiʿ	5,341	297	59 to 577	18	6.59	12.72	1,957	3,778
uma jaffa	2,624	219	63 to 665	12	5.49	6.85	1,202	1,500
uwal	4,607	209	45 to 468	22	15.37	13.70	3,212	2,863
kanʿad malih	1,165	166	65 to 375	7	5.49	6.85	911	1,137
all varieties				59			7,282	9,278

10.2.2 Origins of cured fish

The place of origin of the cured fish loads was found to vary with the variety. As can be seen from Table 10.4, the qashiʿ and uma loads were brought from the Batina and U.A.E. coasts to the north and east, but the uwal and kanʿad malih originated wholly on the southeast coasts of Oman. Tables 10.5, 10.6 and 10.7 show the origins of each of the varieties of cured fish for each field season separately.

Qashiʿ derived almost wholly from the Batina coast (ten loads) or from the east coast of the U.A.E., the northern extension of the Batina (five loads), and all are known to have been caught there. Only four came from the Gulf coast of the U.A.E., and none from elsewhere. As Table 10.5 shows, however, all but one of the Batina loads were noted in the 1976 field season and were from the Upper Batina. This reflects the observation already referred to in earlier chapters (see e.g. Chapter Nine, Section 2) that from about 1970 until late 1975 anchovy shoals were not as frequent as formerly on the Batina coast, though to the north in the U.A.E. they continued to be caught to some extent.

The pattern with uma was rather different. All loads were found to have originated on the Gulf coast of the U.A.E. and were brought in both field seasons in similar quantities. Table 10.6 shows this. Six loads came from Dubai direct and six from Dubai via an intermediary market which in all but two cases was al-Ayn. Although these were the recorded origins of the loads as such, the sardines themselves had not been caught on the Gulf coast. This has already been mentioned in the previous chapter (Chapter Nine, Section 2). According

Table 10.4 : Origins of recorded loads of cured fish sold at Ibri in both field seasons

	number of loads					
	qashiᶜ	uma	uwal	kanᶜad malih	mishwi	all varieties
Batina coast	10	0	0	0	0	10
UAE East coast	5	0	0	0	0	5
UAE Gulf coast	4	12	0	0	0	16
Southeast coasts	0	0	28	12	0	40
Quryat	0	0	0	0	1	1
All sources	19	12	28	12	1	72

Table 10.5 : Origins of qashi' (dried anchovy) loads recorded in Ibri market

Source of loads	No. of loads recorded	
	First Field Season (1975)	Second Field Season (1976)
Lower Batina	1	0
Upper Batina	0	9
UAE East coast	4	1
UAE Gulf coast	1	3
All sources	6	13

Table 10.6 : Origins of recorded loads of uma jaffa (dried sardines) by field season

	No. of loads recorded	
	First Field Season (1975)	Second Field Season (1976)
UAE East coast	0	0
UAE Gulf coast -		
- from Dubai direct	2	4
- via intermediary market	3	3
	5	7

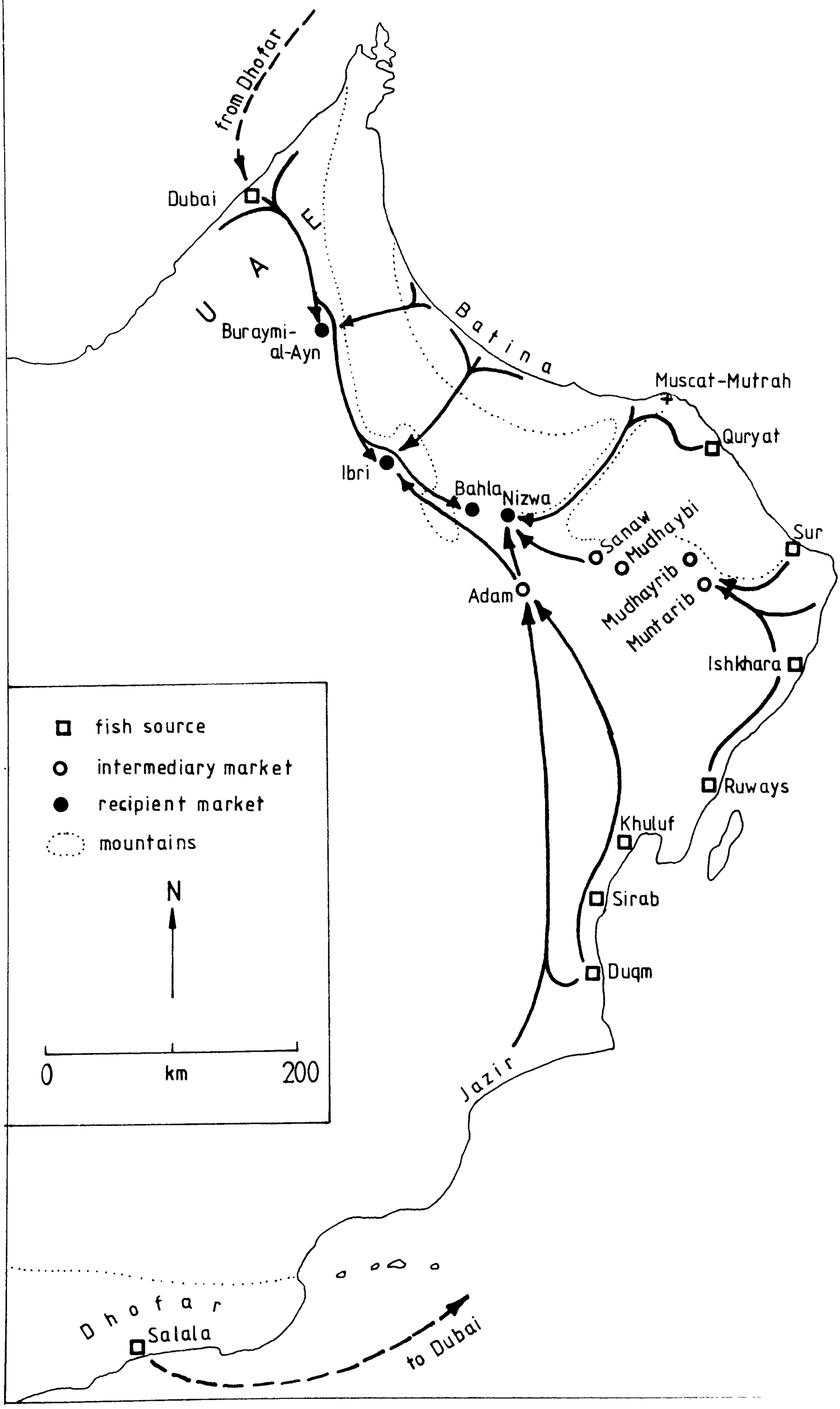
Table 10.7 : Origins of recorded loads of uwal (dried shark) and kan'ad malih (wet-salted kingfish) by field season

	First Field Season (1975)		Second Field Season (1976)		Both Field Seasons	
	uwal	kan'ad malih	uwal	kan'ad malih	uwal	kan'ad malih
Direct from SE coasts:						
Duqm	3	0	5	4	8	4
Sarab	2	1	5	1	7	2
Khuluf	1	0	1	0	2	0
Jazir	0	0	0	2	0	2
exact loc.not known	1	0	1	0	2	0
Totals direct	7	1	12	7	19	8
via Intermediary market:						
Adam	6	0	2	0	8	0
Sanaw	0	3	0	0	0	3
Mudhaybi	0	1	0	0	0	1
Bahla	1	0	0	0	1	0
Totals via Intermediary market	7	4	2	0	9	4
All sources	14	5	14	7	28	12

to the traders in both Ibri and Khabura, the ultimate source of the dried sardines during all the survey period was Dhofar Province. From there they are shipped by native craft to Dubai, sold and reimported back into the Sultanate by land.

In the case of both uwal and kan'ad malih, all loads without exception originated where they were caught, on the southeastern coast of Oman. As can be seen from Table 10.7, the loads fall into two categories: those reaching Ibri direct, and those which are sold at an intermediary market before being brought to Ibri. These intermediary markets have already been referred to in Chapter Three (Section 3). Before 1970, the usual pattern of cured fish marketing from the highly productive but sparsely populated southeast coasts was for the fish to be cured at the coast and then taken northwards to be sold at the settlements which lie in a crescent on the edge of the Sharqiya from Bilad Bani Bu Ali and Bilad Bani Bu Hasan through the Badiya to the oasis outpost of Adam. At one of other of these settlements the fish changed hands before being carried further northwards into Oman Proper and the Northern Interior to be sold again (Figure 10.3). Trival rivalries and political and civil unrest in the Sharqiya, the Interior and the desert borderlands which had erupted periodically until recent years were probably the main reason for this two-stage marketing pattern. Even after the rival allegiances of the Ghafiri and Hinawi factions had been deprived of their importance and the pretended Imamate had been finally erased in 1959, tribal distrust and rivalry between the Janaba, Wahiba and Duru' tribes, over whose dars (tribal areas) the routes from the southeast coasts to the Northern Interior must cross, made transit from one area to

Figure 10-3 Map showing routes by which fish reaches Interior of Oman



another in the Interior difficult. In these circumstances it can be imagined that the intermediary markets allowed the transit of fish to take place with the minimum of contact between traders of opposing tribes and factions.

Since 1970 not only has motor transport reduced the journey from the southeast coasts from days to hours, but also the general pacification of the country has made movement from one tribal dar to another much safer. Thus Janaba tribesmen from the southeast are no longer deterred from entering the Duruᶜ dar and can visit the markets of the north as a result. The consequences to the trade in uwal and kanᶜad malih has been that the intermediary markets have begun to be by-passed. This by-passing was still taking place when the field data were being collected, and is evidenced by Table 10.7. The effect can be seen more clearly in Table 10.8. Whereas the total numbers of loads of uwal and kanᶜad malih recorded in Ibri were approximately the same in both field seasons, over one-half of the 1975 loads came via the intermediary markets, while all but two of those in 1976 arrived direct.

The market of Adam (see Miles 1910 p.168) has traditionally handled the largest part of the supply of uwal and kanᶜad malih which reached Ibri. Adam was therefore visited during the 1976 field season by the present writer to see at first hand how this by-passing had affected its market. Some cured fish was noted still to be changing hands at Adam, but according to the Adam fish auctioneers and others, the amounts in 1976 were only a small fraction of what they had been until two or three years before. Such cured fish as is still sold there is bought mainly by the surrounding bedu for their own consumption rather than by trader-transporters for resale

Table 10.8 : Table showing the by-passing of the intermediary markets of the desert edge of the Sharqiya : Loads of uwal and kanʿad malih from the southeast coasts recorded in Ibri

	First Field Season (1975)	Second Field Season (1976)
Loads via intermediary market	11	2
Loads direct from southeast coasts	8	19
Total	19	21

further north. The fish auctioneers were aware of the change that had so rapidly occurred and naturally (from their point of view) deplored it, but acknowledged that they were powerless to prevent the decline of the market which has been the result.

10.3 Fresh fish in Ibri market

Until 1970 lack of motor transport was the constraint on the sale of fresh fish in any part of the Sultanate other than the coastal fringe of a few kilometres width. It was unknown in the Northern Interior. The relaxation of prohibitions in 1970 altered circumstances and it was soon found that the population of the Interior, when given the opportunity, liked fresh fish quite as much as the coastal populations. Indeed, as will be seen later in this section, they have been prepared on average to pay double the coastal price for it.

The Interior of Oman quickly became the target of private entrepreneurs who saw there the possibility of a new market for fresh fish, though it was not without risks, as will be shown when the trader-transporters are discussed in Section 5 below. Despite the risks however, the potential demand has produced entrepreneurs capable of meeting it.

10.3.1 Quantities and values of fresh fish

Records for loads of fresh fish were kept for a total of seventy-six days at Ibri, thirty-eight in each field season. During the first field season the total number of loads which arrived in the market was sixty-six and in the second field season seventy-three loads arrived. This makes an average of 1.74 and 1.92 loads per day for the field seasons respectively. On most days one or two loads arrived, and on no day did the number of new loads exceed five. Figure 10.4 summarises the frequencies of arrival of new loads of fresh fish for each field season.

On many days however, and especially where the number of new loads was three or more, sellers did not sell all their load on the day on which they arrived, but kept part back for sale on the second or even third day. This was possible since all sellers except those from the Batina had insulated ice boxes in which to keep the chilled fish. The number of sellers present on any given day was therefore often larger than the number of new loads which arrived. The number of sellers present per day averaged 2.13 in the first field season and 2.21 in the second field season. The numbers of sellers present on the survey days are graphed in Figure 10.5.

Figure 10-4 Frequency of loads of fresh fish per day arriving at Ibri during field survey

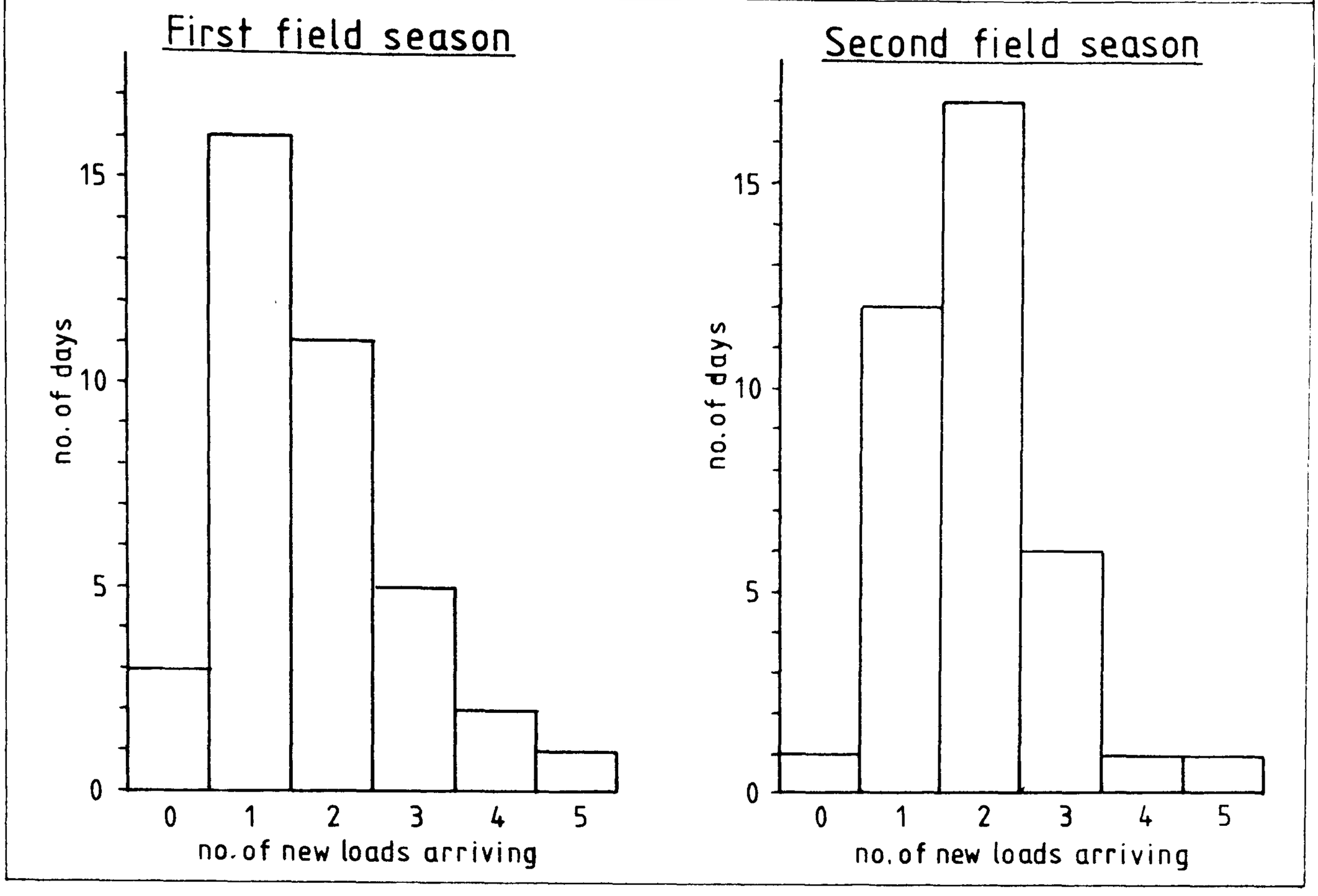
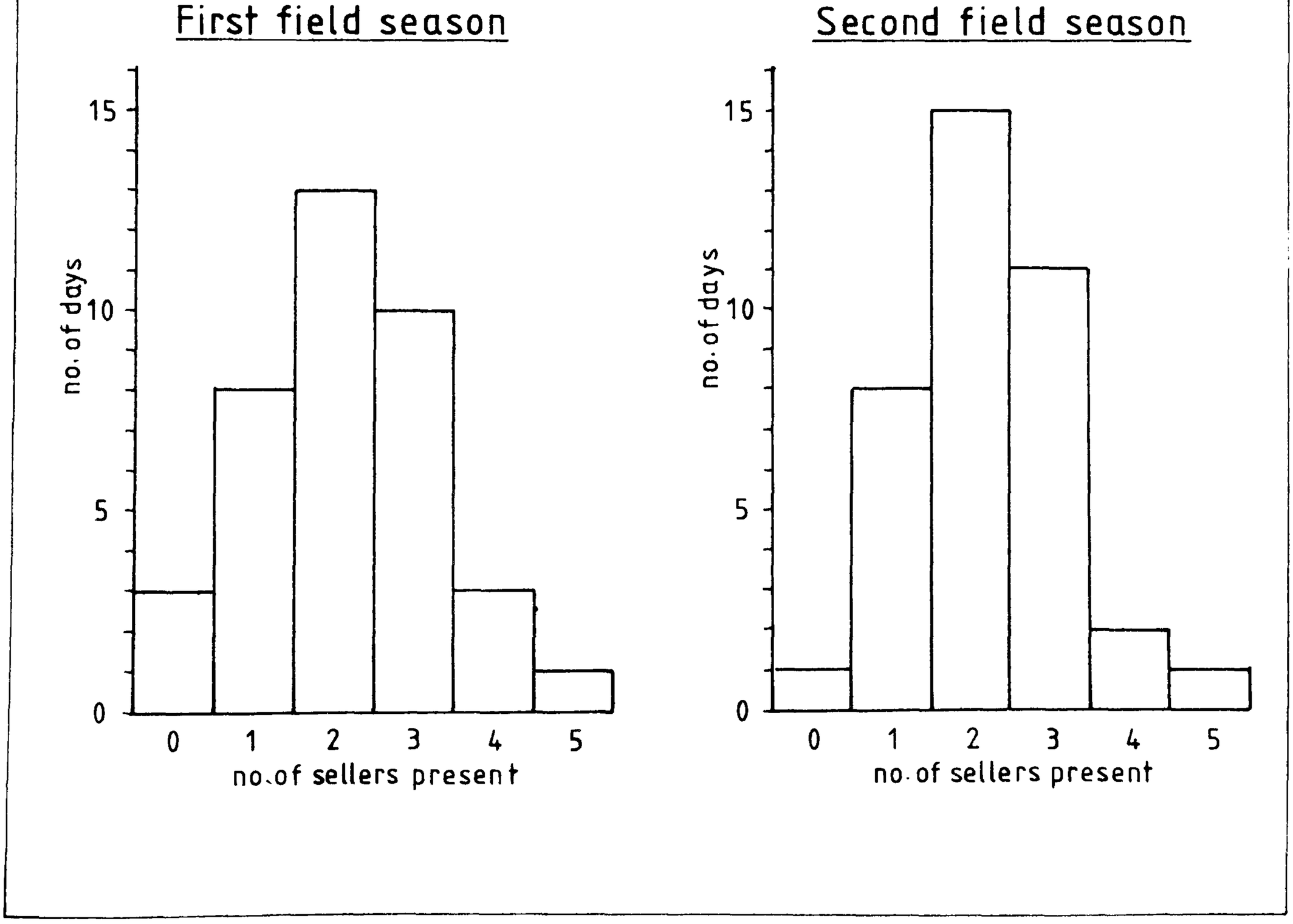


Figure 10-5 Frequency of sellers (pairs of trader-transporters) of fresh fish present per day at Ibri during field survey



Although both the number of new loads per day and the number of sellers per day averaged slightly higher in the second field season than in the first, a χ^2 test applied to the respective frequency distributions indicates that there was no statistically significant difference between the two field seasons in these respects at even the 90% ($p = 0.10$) level of probability.

The weight of fish represented by these recorded loads is impossible to calculate with much certainty on the basis of present data because of the diverse nature of the contents of the loads. Bearing in mind the size of the vehicles (large pickups in the main) and the typical size of ice boxes (3 m x 1 m x 2 m), an average load would probably weight between 250 kg and 500 kg, excluding ice, though loads from the Batina would be considerably smaller at around 50 kg on average. The average total weight sold per day would therefore probably be between 450 kg and 900 kg making the total weight per month during the survey periods (i.e., a winter period) some 13 to 27 tonnes. Comparison with Table 10.2 which estimated the average monthly live weight of cured fish sold during the same periods in Ibri indicates that, in terms of catch weight, cured fish was much more important than fresh fish in Ibri. As will now be shown however, the reverse is true when the value of the two types of fish are considered.

Of the 139 loads noted during the two field seasons, the Ibri sale value was recorded for 124, fifty in the first and seventy-four in the second field season. Nearly all the loads were sold wholly by auction, and the net auction value (i.e., after the fees of the auctioneers and recorders had been deducted) is the value considered here. Occasionally,

a small quantity of the load was sold by direct bargain after the main part had been auctioned. In these cases the amount so sold was added to the net auction value.

On this basis the average values per load in the first and second field seasons were little different, at RO 215 and RO 235 respectively. Figure 10.6 shows graphically the distribution for each field season.

If these average values per load and the average numbers of loads per day calculated above are typical of at least the winter months, approximate values for the total value of fresh fish sold at Ibri market in an average month can be estimated. This is done in Table 10.9. As can be seen, on the basis of the data collected in the two field seasons and the above calculations, between RO 11,000 and RO 14,000 worth of fresh fish was sold in an average month. This is somewhat above the estimate for cured fish of RO 7,000 to RO 10,000 derived in the previous section (Section 2) and is also above the estimate for the value of live animals (RO 8,500 to RO 11,000 per month). When fresh fish and cured fish are added together, giving a total estimate of RO 18,000 to RO 24,000 per month, the prime importance of fish in Ibri is unquestionable.

10.3.2 Origins of fresh fish

As with cured fish, the trader-transporters of fresh fish were asked where they had bought their loads. The origins of fifty-seven of the 1975 loads and seventy-four of the 1976 loads are known, and Table 10.10 shows that the data present several significant points. Fresh fish noted in the 1975 period came from only two groups of sources, namely the Gulf coast of the U.A.E. which provided over sixty per cent of the

Figure 10-6 Auction values of loads of fresh fish recorded at Ibri during field survey

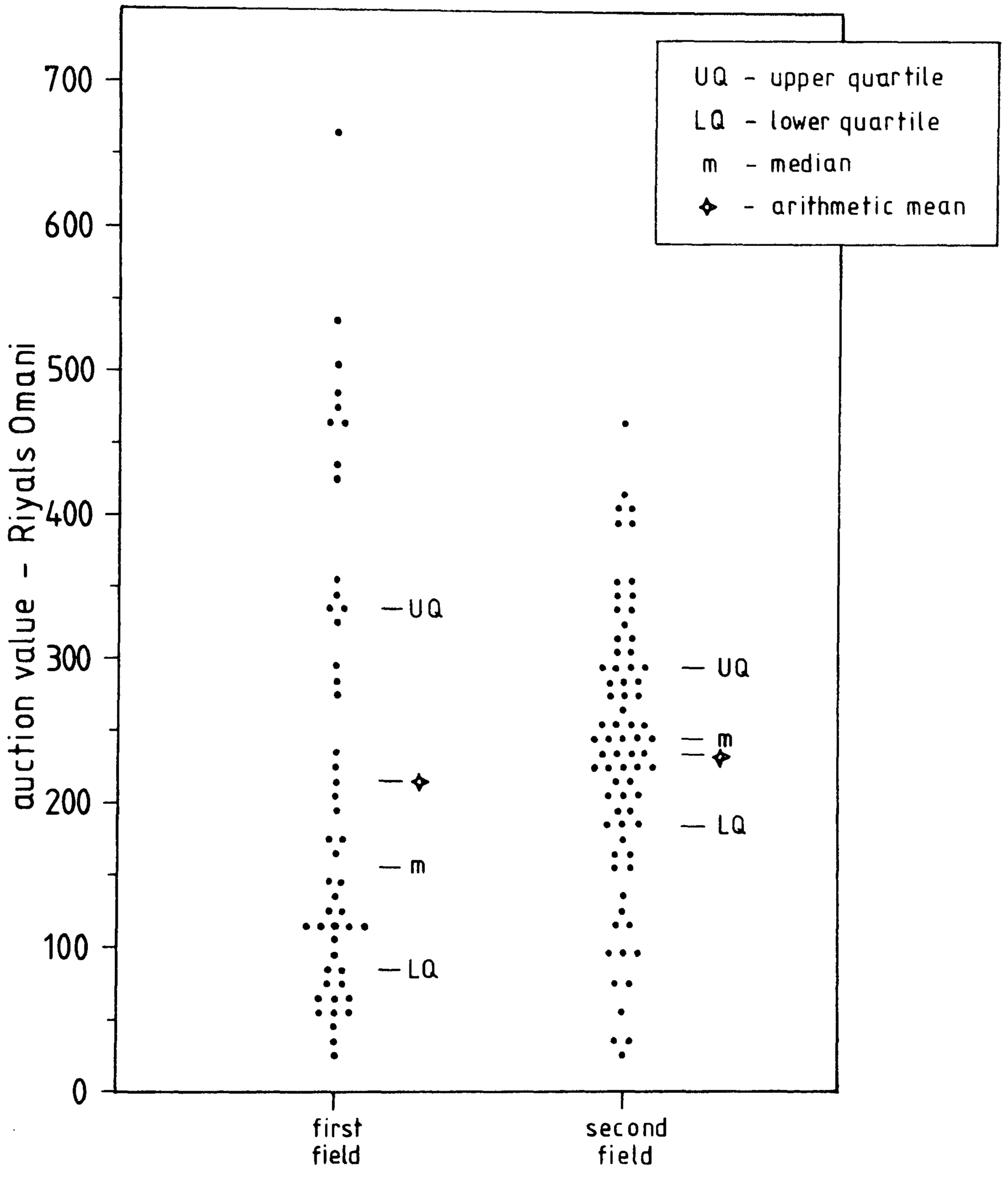


Table 10.9 : Estimation of average value of fresh fish sold at Ibri in an average winter month

	average no. of loads		average value per load (RO)	average total value per month (RO)
	per day	per month		
First Field Season	1.74	52.2	215	11,223
Second Field Season	1.92	57.6	235	13,536

loads, and the Batina coast from which came the remainder. A year later however no loads at all came from the Batina, while the coasts of the Eastern Hajar and the southeast, which already provided cured fish as has been seen, emerged as important new sources of fresh fish also. The U.A.E. coast continued in the 1976 period to be the major single source even though the proportion of loads originating there had declined, but by then al-Ayn had become important as an intermediary market. Whereas all loads from the U.A.E. Gulf coast came direct in the 1975 period, a year later fifteen out of forty changed hands at al-Ayn.

The reasons for these changes are interrelated and will be discussed in detail in Chapter Eleven. They concern the decision making of the trader-transporters in relation to spatial differential costs of overheads (transport in particular), the location of ice sources, and the relative plentifulness or scarcity of fish on different coasts.

Table 10.10 : Sources of loads of fresh fish recorded at Ibri

Source of load	First Field Season No. of loads	% of total	Second Field Season No. of loads	% of total
UAE - Gulf coast				
direct: Dubai	20		15	
direct: Abu Dhabi	14		2	
direct: Ra's al-Khayma	1		6	
direct: Ajman	0		1	
direct: exact location not known	0		1	
direct (total)	35	61.40%	40	54.05%
via al-Ayn	0		15	
UAE - East coast				
Fujayra area	0		2	2.70%
Batina				
Khabura area	13		0	
exact location not known	9		0	
(total)	22	38.60%		
Eastern Hajar coast				
Quryat	0		10	
Sur	0		3	
(total)			13	17.57%
Southeast coasts				
Ishkhara	0		10	
Ruways	0		3	
Qurun	0		1	
Khuwayra	0		1	
Khuluf	0		1	
exact location not known	0		3	
(total)			19	25.68%
All Sources	57	100.00%	74	100.00%

The average value of a load was found to vary considerably with the source of fish. This is shown in Table 10.11 at Ibri sale values and in Table 10.12 at the cost prices quoted by the trader-transporters. Since it is possible that there was some imprecision in the case of a few trader-transporters in their recall of the exact buying prices, it is considered that the Ibri sale values give more dependable averages. On the whole however comparison of the two tables indicates that they both show the same general pattern.

Loads from the Batina were without doubt of much lower value than loads from any other source however the value is measured. This is mainly due to the fact that loads from the Batina were noticeably much smaller (in terms of weight of fish) than loads from elsewhere: none of the Batina trader-transporters had an insulated ice box. Further, as was noted in Chapter Nine (Section 2) when marketing on the Batina was discussed, loads brought from that source consisted at the time of the survey almost wholly of shark and other less valuable fish. The demand for the well liked fish on the coast precluded any general surplus for sale to trader-transporters to take inland.

If the Batina loads are excluded, the average values of loads from other sources fall within a relatively narrow band. It would appear also that loads from the U.A.E. in the first field season were on average rather higher in value than those from the same source a year later. This point will be taken up again in Section 5 below.

Table 10.13 attempts to estimate the values of loads of fresh fish reaching Ibri in an average winter month, allowing

Table 10.11 : Values of loads of fresh fish by place of origin, at Ibri sale prices

Source of loads	First Field Season			Second Field Season		
	Average value of load (RO)	range of values of load (RO)	no. of recorded load	average value of load (RO)	range of values of loads (RO)	no. of recorded loads
UAE Gulf coast:						
- direct	313	113 to 666	29	229	33 to 419	25
- via al- Ayn	-	-	-	273	123 to 468	15
Batina coast	80	23 to 130	21	-	-	-
Eastern Hajar coast	-	-	-	250	50 to 398	13
Southeast coasts	-	-	-	209	30 to 352	19

Table 10.12 : Buying costs of loads of fresh fish by place of origin. (Trader-transporters' quotations, not including transport, ice and other expenses)

Source of fish	First Field Season			Second Field Season		
	Average buying cost per load (RO)	range of buying costs (RO)	no. of recorded loads	average buying costs per load (RO)	range of buying costs (RO)	no. of recorded loads
UAE Gulf coast*						
- direct	385	158 to 900	32	245	44 to 674	20
- via al- Ayn	-	-	-	238	96 to 429	15
Batina coast	75	20 to 160	11	-	-	-
Eastern Hajar coast	-	-	-	268	226 to 350	8
Southeast coasts	-	-	-	177	40 to 264	15

* values converted in the case of UAE loads from Dirhams to Riyals Omani at the rate of Dh 10 = RO 0.875.

Table 10.13 : Estimation of average value of fresh fish sold at Ibri in an average winter month by source of loads

Source of load	observed no. of loads		average value per load (RO)		estimated total values per month			
	1975 (29 days)	1976 (37 days)	1975	1976	1975 RO	1975 % of total	1976 RO	1976 % of total
UAE Gulf coast direct	35	25	313	229	11,334	86.15%	4,644	33.61%
via al-Ayn	0	15	-	273	0	-	3,317	24.01%
Batina coast	22	0	80	-	1,822	13.85%	0	-
Eastern Hajar coast	0	13	-	250	0	-	2,633	19.06%
Southeast coasts	0	19	-	209	0	-	3,223	23.34%
All Sources	57	72	-	-	13,156	100.00%	13,817	100.00%

for the differences in values of loads from the different sources. As in Table 10.9, the basis of calculation is the Ibri sale value. In terms of the value of load the drop in the proportion from the U.A.E. between the two field seasons from eighty-six per cent to fifty-eight per cent is even larger than the drop in terms of the number of loads (from sixty-one to fifty-four per cent, Table 10.10). This is caused of course by the small unit value of the loads from the Batina, which results also in the overall total estimated monthly value being somewhat higher for the 1975 period (at RO 13,156) than was calculated in Table 10.9 (RO 11,223). This does not however alter to any large extent the overall estimates or the conclusions arrived at above. Rather it emphasises even more the importance of fresh fish in Ibri and the small role the Batina played even in 1975 in supplying it.

10.3.3 Retailing of Fresh Fish

By 8.30 or 9.00 am all loads of fresh fish have generally been auctioned. A proportion of the fish will have been bought by fish traders and others from Dhahira settlements dependent on Ibri, including Sulayf, Araqi, Dariz and Yunqul. This proportion varies from day to day and will be discussed in the next section (Section 4).

The remainder goes to Ibri buyers. Some fish, especially those of small to medium size, are bought by Ibri consumers directly. However, large fish suffer less damage in travelling than small fish, and consequently the supply to Ibri market consists mainly of fish individually too large for a single consumer. Most therefore are bought by the resident fish

traders of Ibri market who eviscerate and generally dress the fish and subdivide it into pieces for retail sale. In the case of shark the backbone is usually left in; with other fish it is generally removed.

In Ibri, these fish traders who retail the fish are called qassabs (literally 'butcher'). Their role is very similar to the resident fish traders of Khabura market. Because of the larger average size of individual fish at Ibri however, the Ibri fish retailers are most probably even more important than their counterparts at Khabura as links in the marketing chain.

In the early 1970s the government of the Sultanate began setting up municipal authorities, called baladiyas, in major settlements in Oman. Since 1973 Ibri has had a baladiya. As far as the fish market is concerned, the Ibri baladiya has made itself responsible for the collection and disposal of fish viscera and other waste and the regular spraying of the retailing area with insecticide at the end of the day's selling. The baladiya also regulates to some extent the conditions of retail sale of fish so that the Ibri retailers are more circumscribed in their operation than the fish traders in Khabura where there is no baladiya. In 1974 all market retailers in Ibri including those who deal in fish were obliged to register with the baladiya, and this has effectively limited the number of people who are permitted to retail fresh fish in Ibri. At the time of the present field survey there were ten fish retailers in Ibri market. About the same time Ibri traders were required by the baladiya to buy official sets of kilogram weights and scales, and a maximum limit of RO 1.500

per kilogram was set for the retail sale of fresh fish.

These circumstances contrast with the situation in Khabura where anyone who wishes can buy and sell fish, and where the only known attempt to regulate retail prices by introducing weighing and by setting maximum price limits was a failure, as was seen in Chapter Six (Section 4). The reason why it has been possible for the Ibri baladiya to continue to maintain the maximum price limit lies partly in the fact that it does not directly impose on those responsible for bringing the fish to Ibri since the auction system intervenes. In Khabura on the other hand the attempt at price fixing by the wali hit directly at the suppliers (i.e., the fishermen) and encouraged them to take a united stand against it. The main reason however is that the Ibri baladiya's price limit of RO 1.500 is considerably higher than the average retail prices obtaining at the time of the survey, as will be shown below, while in Khabura the wali's maxima were only about half the market prices. Evidence from Kuwait market which will be discussed in Chapter Twelve suggests that even with an auction system as a buffer between the supplier of fish and the retailer a statutory limit on retail prices will be breached if that limit is significantly lower than the retail prices which would otherwise be set by market forces.

The collection of daily fresh fish retail prices during the field seasons was simplified considerably by the Ibri baladiya's institution of sale by weight when compared with the situation in Khabura. A high degree of uniformity of price was found on any day among the fish retailers at Ibri, and prices were simply quoted by them as so many baisas per kilogram.

Once selling was underway, most retailers had decided on a unanimous price and haggling was exceptional.

The number of species of fish available in Ibri was very limited and this too made price collection easier. By far the most common fresh fish available in the survey periods were sharks (jarjur) and the Scombridae. Of the latter, kingfish (Scomberomorus spp., locally kanʿad) appeared on most days. Other species in the Family were more intermittently available. A selection of other fish was occasionally brought in, but none so commonly as to allow meaningful representative prices to be calculated. Discussion here is therefore limited to the well liked kingfish and the less liked shark.

Over the two field seasons market retail records were kept for fresh fish on eighty days, forty-seven days between 8 February and 8 April 1975 and thirty-eight days between 14 January and 29 February 1976. Of these days no fresh fish was available in the market on two days of the first field season and one day of the second. On the remainder either shark or kingfish, or more commonly both, were present. Table 10.14 summarises the retail price data so collected.

Both kingfish and shark rose in price between the 1975 and 1976 field seasons, kingfish on average by 170 baisas per kilogram or 16.5%, and shark by considerably more - 290 baisas per kilogram or 57%. Nevertheless, even in 1976 shark remained much cheaper than kingfish. The reason for the considerably larger increase in the average price of shark can probably be explained in part by the price limit of RO 1.500 per kilogram imposed by the baladiya. Whereas during the 1975

Table 10.14 : Retail prices for the two most common fresh fish types in Ibri market during the two field seasons

	kingfish (kanʿad)			shark (jarjur)		
	average price per kg. (RO)	range of price per kg. (RO)	no. of days for which prices recorded	average price per kg. (RO)	range of price per kg. (RO)	no. of days for which prices recorded
First Field Season (8 Feb.-8 Apr. 1975)	1.030	0.750 to 1.375	44	0.510	0.350 to 0.750	31
Second Field Season (14 Jan.-29 Feb. 1976)	1.200	0.750 to 1.500	35	0.800	0.500 to 1.000	28

period the price of kingfish touched the RO 1.500 limit on only two days out of forty-four (and then only from some sellers on those days), in the 1976 period all sellers sold at RO 1.500 on fourteen days out of the thirty-five and some on a further one day. Shark on the other hand was well under the RO 1.500 limit even at its most expensive (RO 0.600 in 1975 and RO 1.000 in 1976). It would appear therefore that whereas kingfish would be constrained from further price rise on a large proportion of the days on which it was available in the second field season, shark was not so constrained.

These Ibri prices cannot be compared directly with the retail prices in Khabura since they are for cleaned or partly cleaned pieces and not for whole fish as was the case with the Khabura records. It was pointed out in the previous chapter (Chapter Nine, Section 1 above), however, that the amount of unsold waste under fish market conditions in Oman generally weighs between one-fifth and one-third of the live weight. Assuming that the average waste is one-quarter of the live weight, a notional average live weight price per kilogram can be derived from the Ibri average cleaned weight prices to make them roughly comparable with those from Khabura. Table 10.15 presents the results of the comparison. As can be seen, Ibri prices would on this basis appear to have been over fifty per cent higher than the Khabura prices in the case of the Scombridae and about 150 per cent higher in the case of the sharks.

10.4 Ibri as an intermediary market for fish supply to the Dhahira

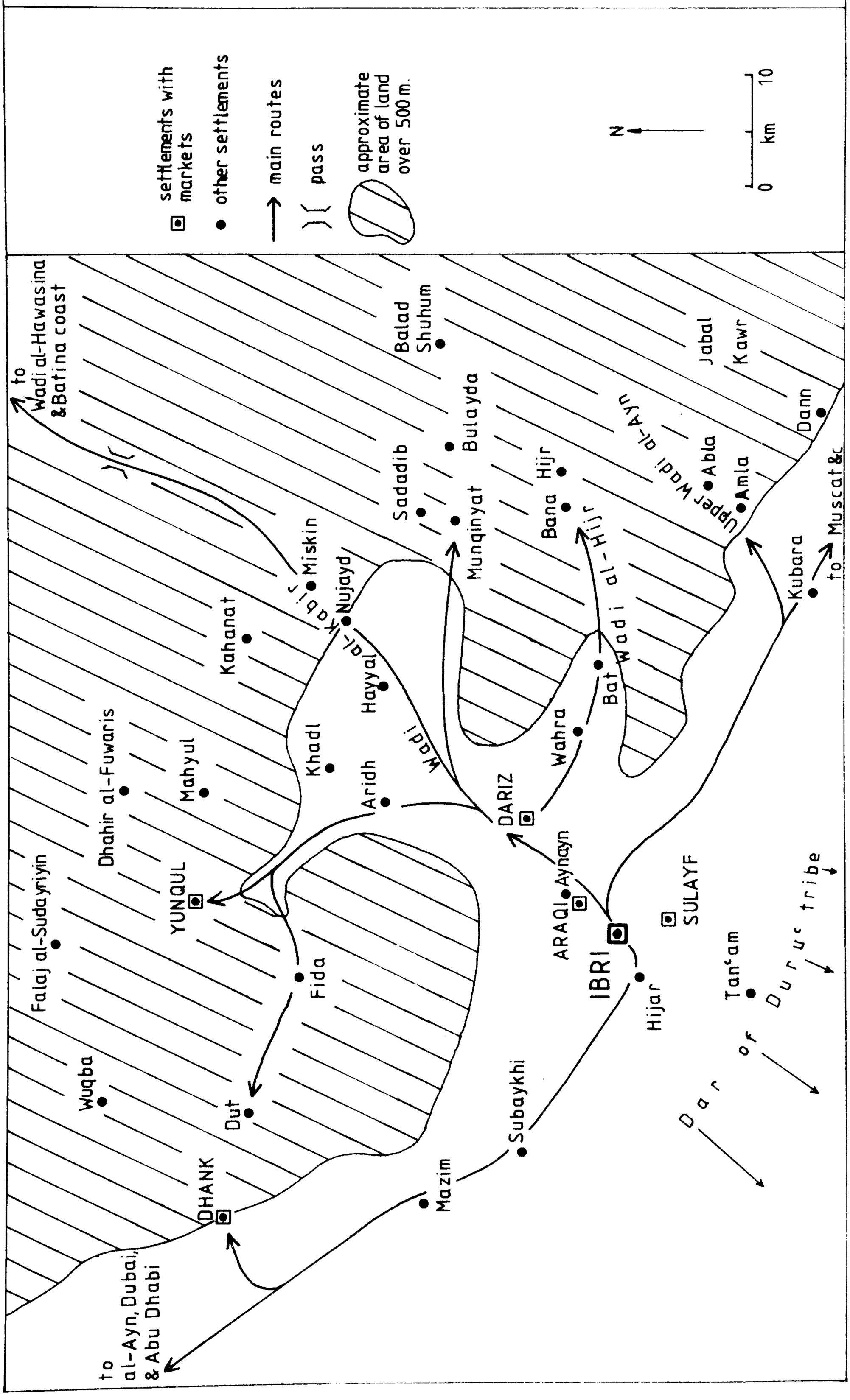
Ibri is an important market not only for the population of Ibri itself, but for the settled and bedu population of a hinterland, the region called the Dhahira (Figure 10.7). An

Table 10.15 : Notional average live weight retail prices at Ibri compared with actual average live weight retail prices at Khabura

	Notional average live weight retail price of kingfish at Ibri (baisas per kg)	Actual average live weight retail price of Scombridae at Khabura (baisas per kg)	Ibri price as percentage of Khabura price
First Field Season	824	523	158%
Second Field Season	960	564	170%

	Notional average live weight retail price of shark at Ibri (baisas per kg)	Actual average live weight retail price of Class Chondrichthyes at Khabura (baisas per kg)	Ibri price as percentage of Khabura price
First Field Season	408	171	239%
Second Field Season	640	215	298%

Figure 10-7 Location map of the Dhahira



investigation of the extent of the importance of the hinterland relative to the Ibri population itself and the routes by which the fish reaches the hinterland populations, are the primary aims of this section. Further details of the Dhahira as the Ibri hinterland are given in Appendix K.

In terms of distribution patterns, there are four possible sets of buyers of the fish auctioned in Ibri: consumers resident in Ibri; consumers resident in the hinterland; retailers in Ibri; and trader-transporters who sell (and live) in the hinterland. Thus Ibri consumers can receive fish in two possible ways: either directly from the auctions, or else via the Ibri retailers. For hinterland consumers there are three possible routes by which fish may reach them: directly from the auctions, indirectly from an Ibri retailer, or indirectly from a hinterland trader-transporter. Figure 10.8 shows this schematically and applies both to cured fish and to fresh fish, though the proportions of the respective totals passing by these alternative routes vary with the type of fish, as will be shown.

10.4.1 Distribution of fresh fish

In the two field seasons the home location of the buyer was recorded for a total of over 2,000 auction lots of fresh fish - 445 in the period February and March 1975 and (when the data collection system was improved in the second field season) 1,655 in January and February 1976. These lots were sold for a total of RO 3,298 and RO 15,815.65 in the two field seasons respectively. For a considerable proportion of the loads of fresh fish auctioned in Ibri during the field periods the destination is therefore known.

Figure 10-8 Diagram to indicate the possible routes fish may take on being auctioned at Ibri

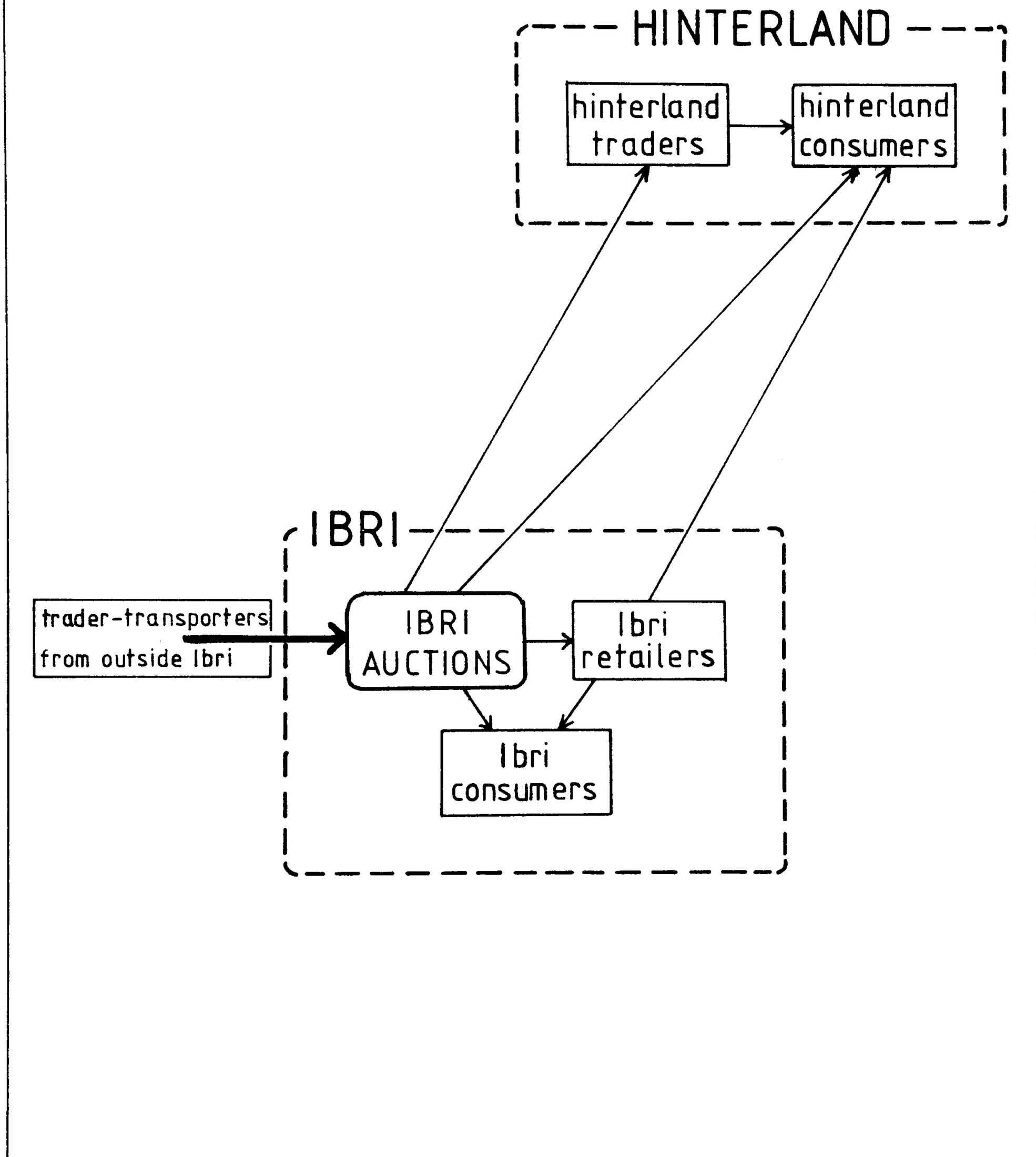


Table 10.16 shows the proportions of the sampled lots bought by Ibri buyers as opposed to buyers from the hinterland. It is clear that there is very little difference between the samples from the two field seasons in the proportions going to Ibri buyers and hinterland buyers. The small difference that does occur could well be the result of chance sampling. As a best estimate therefore it will be assumed here that sixty per cent by value of the fresh fish that enters Ibri market goes to Ibri buyers and forty per cent to buyers from outside Ibri.

Considering first the forty per cent by value which is bought by hinterland buyers, Table 10.17 indicates that over ninety per cent in the first field season and over eighty per cent in the second field season was accounted for by buyers from the five settlements in the vicinity of Ibri which are the largest after Ibri and which additionally have markets of their own. Almost all the buyers from these five settlements were fish traders who bought from Ibri in the mornings in order to sell in their home settlements in the afternoons. After these five market settlements, most of the remaining buyers of fresh fish came from only another six settlements.

It will be noted that there is a general close similarity between the two field seasons in Table 10.17. This was expected since after the introduction of fresh fish in the early 1970s in the first place no subsequent development between the two field seasons was observed which would affect the hinterland settlements unequally. For this reason a weighted composite percentage incorporating the data from both field seasons has been used as a basis for Figure 10.9 which maps the distribution of the ex-Ibri quantity.

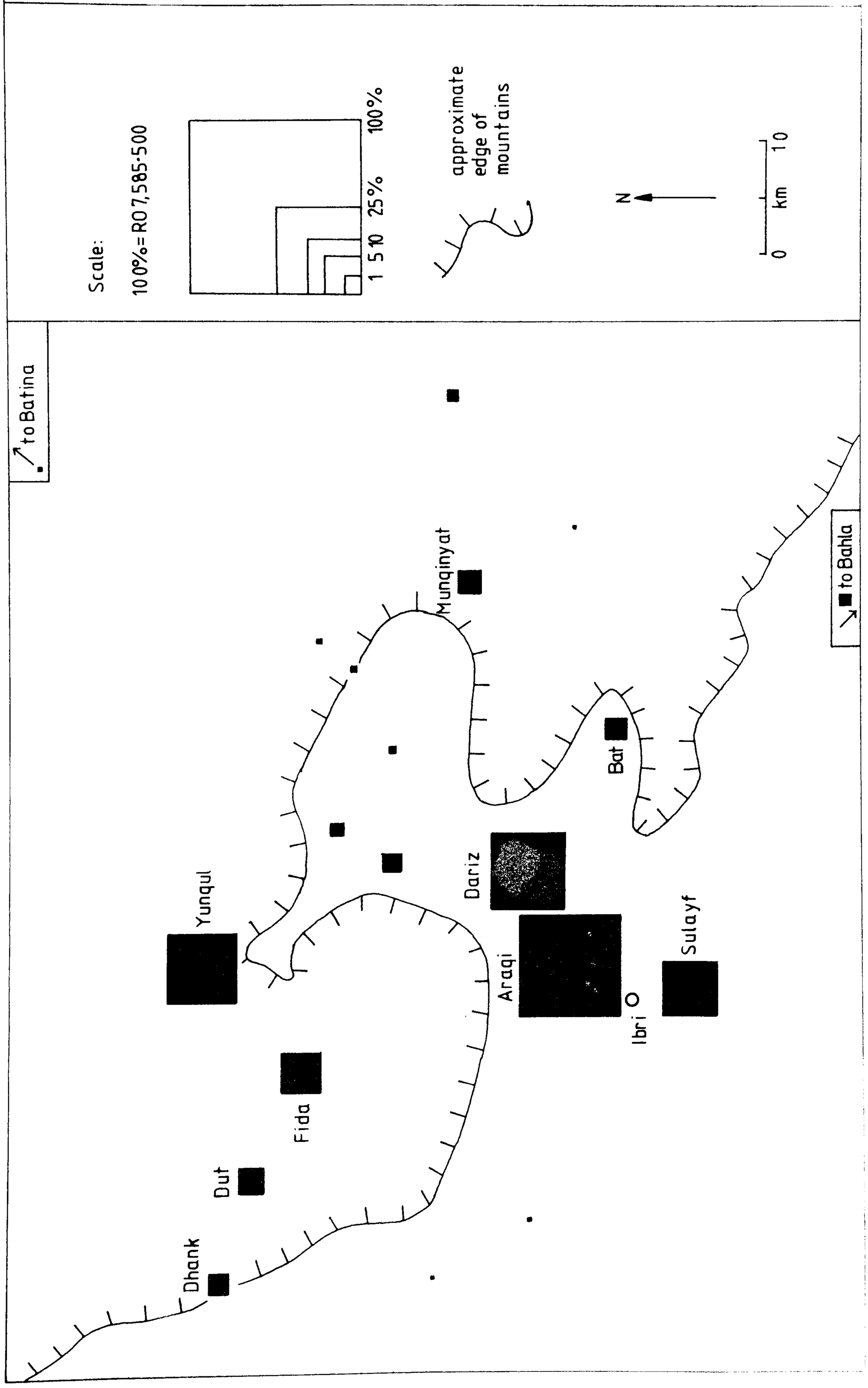
Table 10.16 : Division of the sampled lots from Ibri auctions of fresh fish according to whether buyer is from Ibri or from the Ibri hinterland

Home of buyers	First Field Season Feb.-Mar. 1975		Second Field Season Jan.-Feb. 1976		Both Field Seasons	
	RO	%	RO	%	RO	%
in Ibri	2,093.500	63.48	9,434.650	59.65	11,528.150	60.31
outside Ibri	1,204.500	36.52	6,381.000	40.35	7,585.500	39.69
Totals sampled	3,298.000	100.00	15,815.650	100.00	19,113.650	100.00

Table 10.17 : Distribution of the ex-Ibri fresh fish from the Ibri auctions, by field season

	First Field Season		Second Field Season		Both Field Seasons	
	Value RO	% of ex-Ibri total	Value RO	% of ex-Ibri total	Value RO	% of ex-Ibri total
Settlements with markets:						
Sulayf	141.600	11.76	664.450	10.41	806.050	10.63
Araqi	483.500	40.14	2,219.800	34.79	2,703.300	35.64
Dariz	231.300	19.20	1,325.000	20.76	1,556.300	20.52
Yunqul	245.700	20.40	953.650	14.95	1,199.350	15.81
Dhank	10.700	0.89	114.100	1.79	124.800	1.65
	1,112.800	92.39	5,277.000	82.70	6,389.800	84.24
Other settlements with over 1% of total						
Bat	14.800	1.23	108.200	1.70	123.000	1.62
Munqinyat	23.700	1.97	112.500	1.76	136.200	1.80
Dhahir al-Fuwaris	24.200	2.01	72.050	1.13	96.250	1.27
Aridh	0	0	85.700	1.34	85.700	1.13
Fida	8.000	0.66	399.150	6.26	407.150	5.37
Dut	0	0	185.000	2.90	185.000	2.44
	1,183.500	98.26	6,239.600	97.78	7,423.100	97.86
other settlements and buyers:	21.000	1.74	141.400	2.22	162.400	2.14
Total ex-Ibri	1,204.500	100.00	6,381.000	100.00	7,585.500	100.00

Figure 10-9 Distribution of fish from Ibri auctions to the hinterland during field survey : FRESH FISH



In the case of two settlements however the differences between the two field seasons are considered large enough to require comment. It will be observed that whereas the value of fresh fish taken by Yunqul buyers dropped from twenty per cent of the total in 1975 to fifteen per cent a year later, that bought by buyers from Fida rose from less than one per cent to over six per cent. This can largely be accounted for by the following circumstance. In the 1975 period a certain fish trader whose family were resident in Yunqul habitually sold in Fida, a settlement near Yunqul and predominantly of the same tribe (Bani Zid). The fish he bought from Ibri was however recorded as going to Yunqul. In the 1976 field period either this man had taken up residence in Fida or else a Fida resident not previously noted buying in Ibri took over the supply to Fida. Consequently in the second field season the amount of fish going to Fida apparently increased and that to Yunqul declined by about the same relative amount, though in fact the actual distribution probably did not change.

Three further observations from Table 10.17 can be made. Firstly, Araqi maintained a dominant position in the proportion of fresh fish it received - over one third of the ex-ibri total value in both field seasons. Araqi market serves two contiguous settlements, Araqi itself and Aynayn, and the combination most probably forms the largest concentration of population in the Dhahira after Ibri. Further, Araqi market lies only ten minutes' drive from Ibri. Its relatively large receipt of fresh fish is therefore a function of its size and its nearness to Ibri.

Secondly, the relative position of Dhank is interesting. Dhank is a market settlement about the same size as Yunqul

and lying at about the same distance in terms of time as Yunqul from Ibri. It is therefore at first sight surprising that the amount of fresh fish it receives from Ibri is so small (under two per cent) compared with Yunqul (about sixteen per cent). The explanation lies in the relative spatial locations of the two settlements in relation to Ibri and to the main source of fresh fish, the U.A.E. Dhank lies on the route between the U.A.E. and Ibri, and when Dhank market was visited by the present writer the main source of fresh fish was found to be the U.A.E. by the direct route, even though Ibri is much closer. The quantity reaching Dhank from Ibri is therefore only a small part of its total supply. Yunqul on the other hand lies well into the mountains, and its connexion with Ibri is less difficult than that directly with the U.A.E. When Yunqul market was visited it was indeed found that all its supply of fresh fish came from Ibri.

Thirdly, only a very small proportion of the fresh fish from Ibri was recorded as going to bedu buyers - well under one per cent of the total in either field season. This is probably an underrecording since it is considered likely that many bedu would give the settlement nearest their usual area of habitation as their home. Even so, it is felt that the amount of fresh fish bought in auctions by bedu would nevertheless be only a very small proportion of the ex-Ibri total.

Concerning the quantity sold to buyers from Ibri, that is, sixty per cent of the total auction value, part is bought directly by consumers, as was shown in Figure 10.8. However it is known that this part forms only a very small part of the total auction value and will here be estimated at ten per cent at the most. The remainder - some fifty per cent of the total

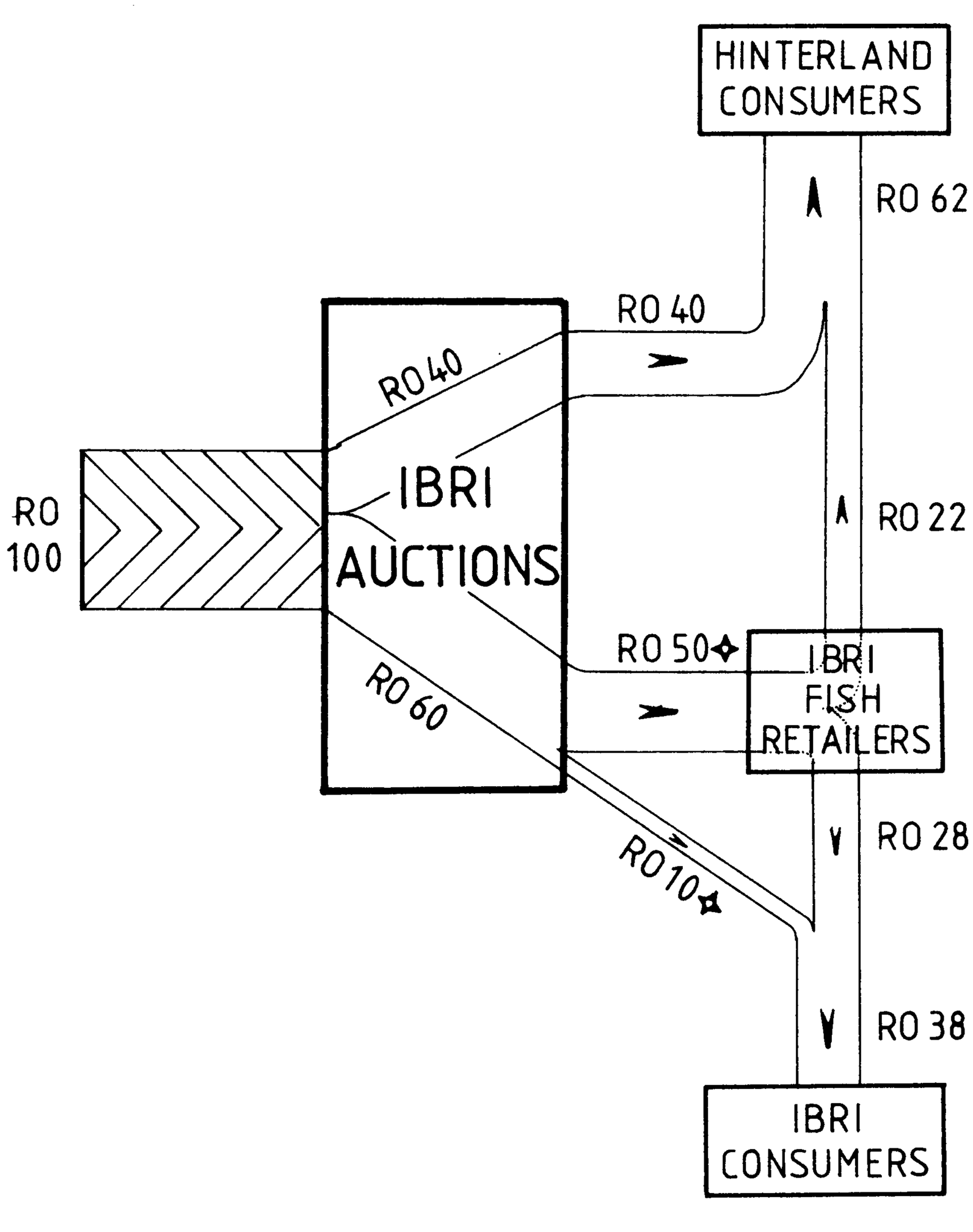
value - is bought by the Ibri fish retailers. Records were kept during the second field season to determine how much of the retailers' total was bought by Ibri residents and how much by buyers from outside Ibri. The number of sales so recorded was 234 over thirteen days and the results are shown in Table 10.18. In terms of both weight and value the poportion retailed to Ibri buyers was fifty-six per cent and to buyers from the hinterland forty-four per cent.

On the basis of the combined evidence discussed above Figure 10.10 has been constructed to quantify the flows in the pattern of fresh fish marketing in the region of which Ibri is the centre. It will be noticed that although RO 60 worth of every RO 100 of fresh fish auctioned in Ibri is bought initially by Ibri residents, the amount reaching Ibri consumers is only RO 38. Some sixty-two per cent of the fresh fish entering Ibri therefore is actually consumed in the hinterland. This pattern for fresh fish will be compared with that for cured fish varieties in the next subsection.

Table 10.18 : Distribution of sample of buyers of fresh fish from retailers in Ibri in February, 1976.

Home of buyers	no. of sales sampled	weight		sale value	
		kg	% of total	RO	% of total
in Ibri	139	114.55	55.65%	122.425	55.79%
outside Ibri	95	91.30	44.35%	97.000	44.21%
total Sample	234	205.85	100.00%	219.425	100.00%

Figure 10-10 Diagram to illustrate fresh fish marketing flows through Ibri



✦ case where half or more of quantity is an estimated proportion.

10.4.2 Distribution of cured fish

Table 10.19 gives the number of recorded auction lots of cured fish for which the origin of the buyer is known. These totalled just over 1,000. The relative frequency of the recorded lots in each field season for each variety of cured fish generally reflects the respective volumes of fish that were available. The total value represented by the records is just over RO 10,000. Thus as with fresh fish the quantity of cured fish for which the origin of the buyer is known is a substantial part of the total of cured fish auctioned during the field seasons.

Taking first all cured fish together, irrespective of type, the breakdown by Ibri and hinterland buyers is given in Table 10.20. As can be seen, the difference in the proportions going to Ibri buyers and to hinterland buyers differed very little between the two field seasons. Overall, almost exactly half of the value went to Ibri buyers and the other half to hinterland buyers.

No detailed records could be kept of what proportion of the Ibri buyers were traders in Ibri or of the proportions of their stocks which went to Ibri consumers or hinterland consumers, and therefore the distribution cannot be broken down further as accurately as for that of fresh fish. However, personal observation in the market indicates that a much larger proportion of the cured fish is bought directly by Ibri consumers from the auctions than the estimated ten per cent in the case of fresh fish. That is to say, Ibri retailers of cured fish are less important in the marketing chain than are the retailers of fresh fish. As a working estimate, half of

Table 10.19 : Numbers of auction lots of cured fish for which origin of buyer is known

	First Field Season	Second Field Season	Both Field Seasons
qashiʿ	52	301	353
uma	37	59	96
uwal	210	278	488
kanʿad malih	17	61	78
mishwi	13	0	13
All varieties	329	699	1,028

Table 10.20 : Division of the sampled lots from Ibri auctions of cured fish according to whether buyer is from Ibri or from Ibri hinterland

Home of buyers	First Field Season Feb-Mar. 1975		Second Field Season Jan.-Feb. 1976		Both Field Seasons	
	RO	%	RO	%	RO	%
in Ibri	1,482.325	48.90	3,571.180	50.91	5,053.505	50.30
outside Ibri	1,549.300	51.10	3,443.570	49.09	4,992.870	49.70
Total sampled	3,031.625	100.00	7,014.750	100.00	10,046.375	100.00

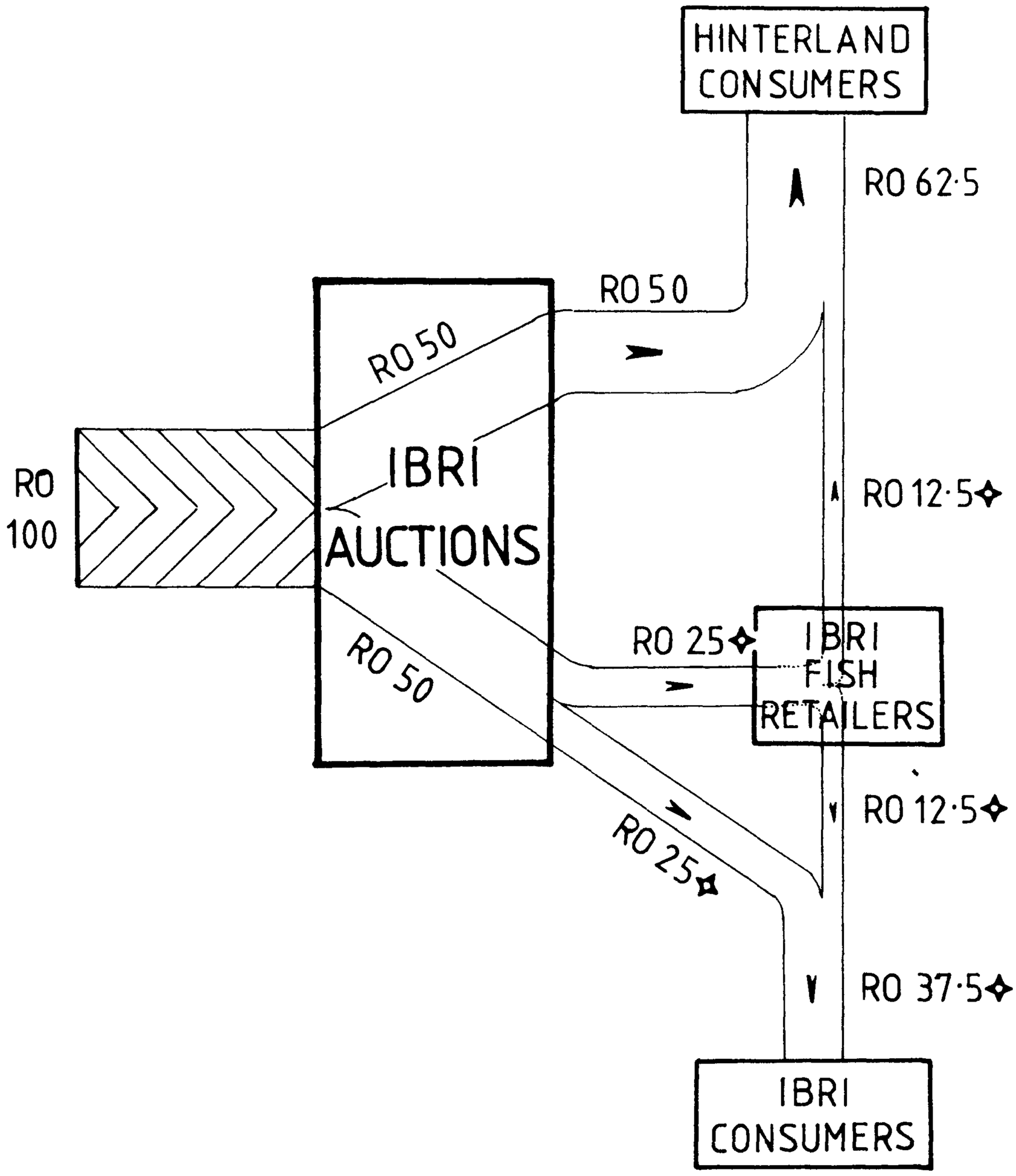
the cured fish bought by Ibri buyers will be assumed to go to Ibri retailers, and half of that again will be assumed to be bought by Ibri consumers and half by hinterland consumers. On this basis Figure 10.11 has been constructed. Comparison with Figure 10.10 shows immediately that the final relative proportions reaching Ibri and hinterland consumers are essentially the same for both fresh and cured fish, even though the routing differs.

So far all cured fish has been considered together. However, the value of the total lots in the first field season was heavily weighted by uwal which comprised 52.23% of the total value in that season, and in the second field season by qashiʿ which made up 53.65% of that season's total sample. When the auction lots are broken down by the five varieties of cured fish certain differences are noticeable both between varieties and between field seasons within a single variety. This can be seen diagrammatically from Figure 10.12 and in more detail from Table 10.21 on which the figure is based.

Concerning firstly the differences between the two field seasons, it will be noticed that there is no difference in the case of qashiʿ in the proportions from auction sales going to Ibri buyers and hinterland buyers (fifty-two per cent and forty-eight per cent respectively in both years), and the difference is small enough in the case of uma to be disregarded (28-30% and 70-72% respectively to Ibri and hinterland buyers). Since mishwi appeared only in the first field season, the comparison between the two periods does not of course apply to that variety.

With the other two varieties (uwal and kanʿad malih)

Figure 10-11 Diagram to illustrate cured fish marketing flows through Ibri



✦ case where half or more of quantity is an estimated proportion.

Figure 10-12 Diagrams to show division of sampled lots of cured fish from Ibri auctions to Ibri buyers and hinterland buyers

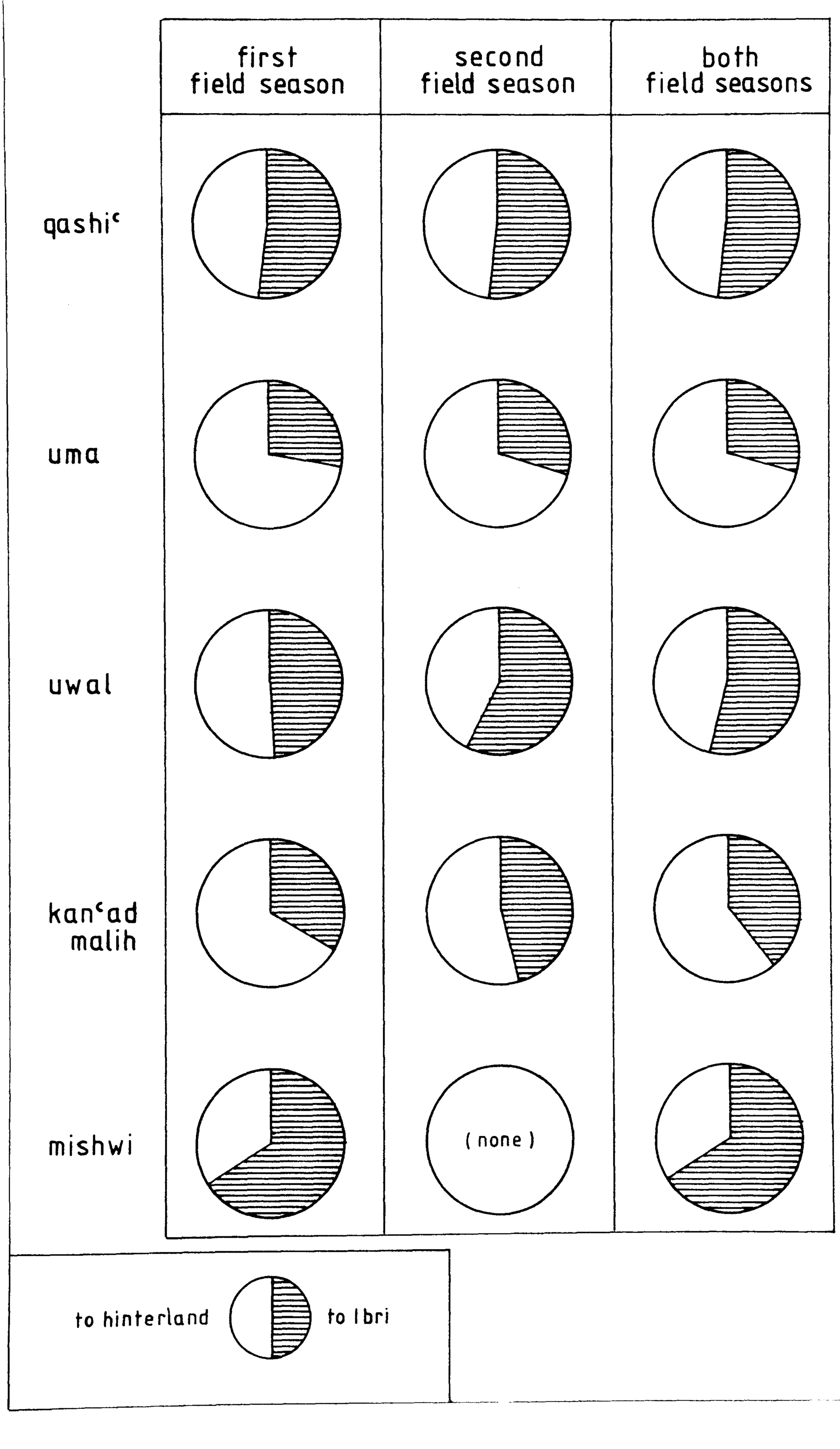


Table 10.21 : Division of sampled lots from Ibri auctions of cured fish according to whether buyer is from Ibri or from Ibri hinterland, by variety of cured fish

Home of buyers	First Field Season		Second Field Season		Both Field Seasons	
	Value RO	% of sub-totals	Value RO	% of sub-totals	Value RO	% of sub-totals
QASHI[c]						
in Ibri	202.400	51.93	1,944.150	51.66	2,146.550	51.69
outside Ibri	187.350	48.07	1,818.950	48.34	2,006.300	48.31
Total qashi[c]	389.750	100.00	3,763.100	100.00	4,152.850	100.00
UMA	76.900	27.68	326.000	29.79	402.900	29.36
in Ibri						
outside Ibri	200.900	72.32	768.400	70.21	969.300	70.64
Total uma	277.800	100.00	1,094.400	100.00	1,372.200	100.00
UWAL						
in Ibri	776.775	49.07	1,186.850	57.56	1,963.625	53.87
outside Ibri	806.300	50.93	874.950	42.44	1,681.250	46.13
Total uwal	1,583.075	100.00	2,061.800	100.00	3,644.875	100.00
KAN[c]AD MALIH						
in Ibri	92.750	33.65	114.180	46.05	206.930	39.52
outside Ibri	182.850	66.35	133.770	53.95	316.620	60.48
Total kan[c]ad malih	275.600	100.00	247.950	100.00	523.550	100.00
MISHWI						
in Ibri	333.500	65.99	0		333.500	65.99
outside Ibri	171.900	34.01	0		171.900	34.01
Total mishwi	505.400	100.00	0		505.400	100.00

however, the proportion going to Ibri buyers increases substantially between the two field seasons, and a χ^2 test applied to each of these two varieties in turn indicates that the differences are statistically significant at least at the 99% (p = 0.01) level (two-tailed) (Table 10.22). In the case of these two varieties therefore the inter-field season difference is very unlikely to be due to chance sampling of auction lots.

In view of the fact that the same difference does not occur with qashiʿ or uma, it is difficult to account for the second field season increase in the proportion of the value going to Ibri buyers in the case of uwal and kanʿad malih. However, the Ibri traders who deal in uwal and kanʿad malih are different from those who retail qashiʿ and uma, and so the quantities bought by Ibri traders of uwal and kanʿad malih need not necessarily be linked to the amounts bought by Ibri traders of qashiʿ and uma. An increase in the activity of uwal and kan ad malih traders could perhaps account for the difference between the two field seasons, and this explanation would not necessarily affect the final proportion reaching the hinterland consumers since, as has been seen, hinterland consumers buy from Ibri traders as well as directly from auctions and locally in their home settlements. It must be said however that no independent evidence for such an increase in the activity of the uwal and kanʿad malih traders was noted in the second field season.

Of perhaps more consequence are the differences in the proportions going to Ibri and hinterland buyers between the varieties of cured fish. Returning to Figure 10.12 and Table 10.21, it can be seen that in the case of qashiʿ, uwal and

Table 10.22 : Results of χ^2 test of significance of difference between the two field seasons in amounts by value of cured fish varieties going to Ibri buyers and hinterland buyers. (two-tailed test)

variety of cured fish	significance of difference between two field seasons
qashiᶜ	N.S.
uma	N.S.
uwal	signif. at p = 0.01
kanᶜad malih	signif. at p = 0.01
mishwi	(not applicable)

p = level of probability at which the null hypothesis can be rejected.

N.S.= not statistically significant at even the 95% (p = 0.05) level.

mishwi the proportion of the auction value bought by Ibri buyers is at least one-half of the total. With mishwi indeed it is nearer two-thirds, though since only one load consisting of thirteen lots was recorded, little emphasis can be placed on this. Nevertheless the in-Ibri and ex-Ibri proportions of mishwi (66% against 34%) bear a close similarity to those of fresh fish distribution (60% against 40%) already described above in the previous subsection. This doubtless reflects the high perishability of mishwi compared with the considerably more durable other cured forms and its consequent greater similarity to fresh fish in this respect. In constrast, in the case of uma the proportion going to Ibri buyers is nearer a quarter of the total than a half. With kanʿad malih too the proportion bought by Ibri buyers is under half the total though much less so overall than with uma.

When the values taken by hinterland buyers are broken down further (Table 10.23), uma and kanʿad malih continue to stand out on their own. The proportions of the ex-Ibri total value taken by buyers from the five subsidiary market settlements is over sixty per cent in the case of qashiʿ and uwal and over eighty per cent in the case of mishwi. (Thus again mishwi behaves more like fresh fish than cured fish). With kanʿad malih on the other hand the proportion was only one-third while in the case of uma the subsidiary market settlements accounted for less than one quarter of the ex-Ibri total, and nearly all of even this was taken by only one of these five settlements, Yunqul.

It would seem therefore that the distribution of qashiʿ , uwal and mishwi from Ibri auctions to the Ibri hinterland follow a similar pattern, while uma and kanʿad malih show an

Table 10.23 : Distribution of sampled lots from Ibri auctions of cured fish going to ex-Ibri buyers, by variety of cured fish : the five market settlements against the remainder of the hinterland. (Both field seasons' data combined).

Home of buyers	qashiʿ		uwal		mishwi		kanʿad malih		uma	
	value RO	% of ex-Ibri total	value RO	% of ex-Ibri total	value RO	% of ex-Ibri total	value RO	% of ex-Ibri total	value RO	% of ex-Ibri total
Sulayf	422.850	21.08	200.400	11.92	22.800	13.26	15.170	4.79	9.500	0.98
Araqi	534.000	26.62	304.950	18.14	42.500	24.72	17.200	5.43	14.000	1.44
Dariz	203.400	10.14	196.250	11.67	59.700	34.73	19.100	6.03	5.500	0.57
Yunqul	47.500	2.37	272.250	16.19	18.700	10.88	23.800	7.52	171.000	17.64
Dhank	45.250	2.26	88.200	5.25	0	0	27.750	8.76	26.500	2.73
Total five market settlements	1,253.000	62.45	1,062.050	63.17	143.700	83.60	103.020	32.54	226.500	23.37
Remainder of Ibri hinterland	753.300	37.55	619.200	36.83	28.200	16.40	213.600	67.46	742.800	76.63
Totals ex-Ibri	2,006.300	100.00	1,681.250	100.00	171.900	100.00	316.620	100.00	969.300	100.00

altogether different pattern.

This is indeed so in the case of uma, and the reason for it will be discussed in due course. With kanʿad malih, however, a further factor intrudes which, although of interest in the broader view of fish supply in Northern Oman, is of little relevance in the present context of the manner in which Ibri acts as an intermediary market for its hinterland. It will be remembered from Section 3 above that in the first field season a proportion of the fresh fish sold in Ibri came from the Batina (in fact twenty-two of the fifty-seven loads recorded). On three recorded occasions the trader-transporter of a load of Batina fish bought kanʿad malih at the Ibri auctions to carry back to the Batina to offset some of the loss on the fresh fish which he realised he had made. On two occasions the trader-transporter was from Khabura and on the third occasion he was from Ghayzayn in the lower Wadi al-Hawasina. The value of these three loads of kanʿad malih totalled RO 164.600, that is over half the kanʿad malih recorded in both field seasons going to ex-Ibri buyers. In terms of the Ibri hinterland these three occurrences unduly influence the pattern of distribution of this variety. When this value is removed from the data (Table 10.24), the pattern changes markedly. The five market settlements now take two-thirds of the value of the ex-Ibri kanʿad malih recorded, a pattern very similar to that for qashiʿ, uwal and mishwi. It is maintained therefore that the distribution pattern of kanʿad malih follows the same basic pattern as that for these other three varieties.

No such exceptional consideration affects uma however since all the recorded lots leaving Ibri were bought by buyers

Table 10.24 : Distribution of sampled lots from Ibri auctions of kan'ad malih, with Wadi al-Hawasina and Batina buyers removed from Ibri hinterland total. (Both field seasons' data combined).

Home of buyers	Value RO	% of total to Ibri hinterland
Sulayf	15.170	9.98
Araqi	17.200	11.31
Dariz	19.100	12.56
Yunqul	23.800	15.66
Dhank	27.750	18.25
all five market settlements	103.020	67.77
remainder of Ibri hinterland	49.000	32.23
total to Ibri hinterland	152.020	100.00
Wadi al-Hawasina and Batina	164.600	-
Total bought by buyers ex-Ibri	316.620	-

from the Dhahira, in no case more than seventy kilometres from Ibri. The explanation as to why the pattern of uma marketing differs from that of the other cured varieties lies elsewhere. Whereas uwal, kanʿad malih and mishwi and predominantly qashiʿ are for human consumption, uma is used almost wholly for fodder or as an additive to fodder. Descriptions dating from Marco Polo onwards of animals being fed dried sardines, and in particular Hartley's (1948) description of the importance of dried sardines from the coast in the livestock economy of the mountains of Dhofar, were discussed in Chapter Three. In this lies the key to the interpretation of the differences between the distribution of uma and that of that of the other cured fish.

Figures 10.13 and 10.14 map the distribution of the ex-Ibri values of cured fish in the same way as did Figure 10.10 for fresh fish. The distribution for the four varieties of cured fish excluding uma shows essentially a similar pattern as that for fresh fish. The five subsidiary market settlements do it is true take a rather smaller relative share of the four cured varieties than of fresh fish, and the cured fish does penetrate to a large number of smaller and more remote settlements than does the fresh fish. This is undoubtedly the result of the high perishability of fresh fish and the need for consumers to buy quantities no larger than their immediate needs, a restriction which does not apply to the cured varieties. This has already been mentioned above. Apart from this however the two distributions are very similar and can be taken to be in general terms reflective of a function of population distribution in the Dhahira, that is, population size against distance from

Figure 10-13 Distribution of fish from Ibri auctions to the hinterland during field survey : CURED FISH for human consumption (qashiᶜ, uwal, kanᶜad malih and mishwi).

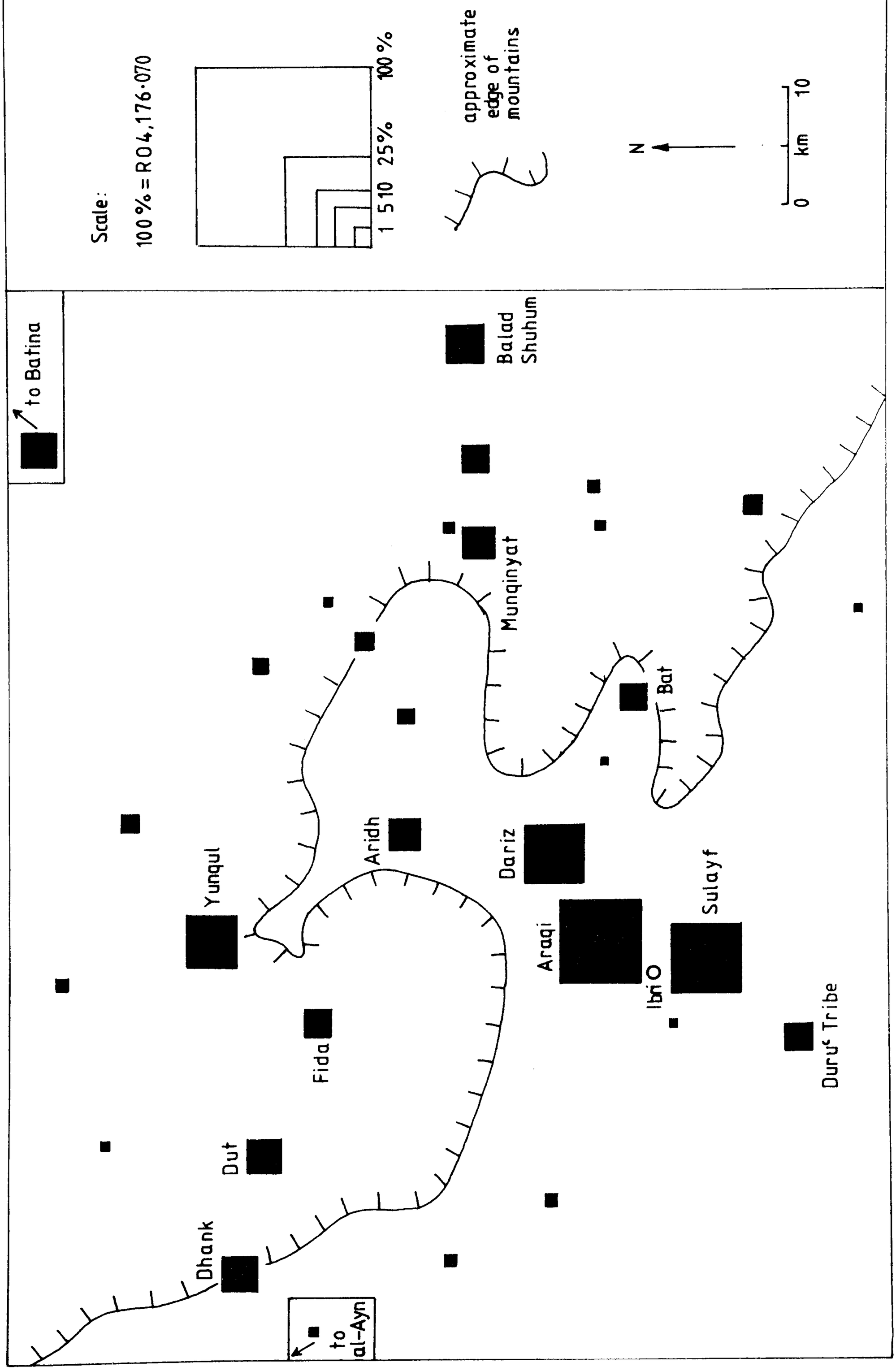
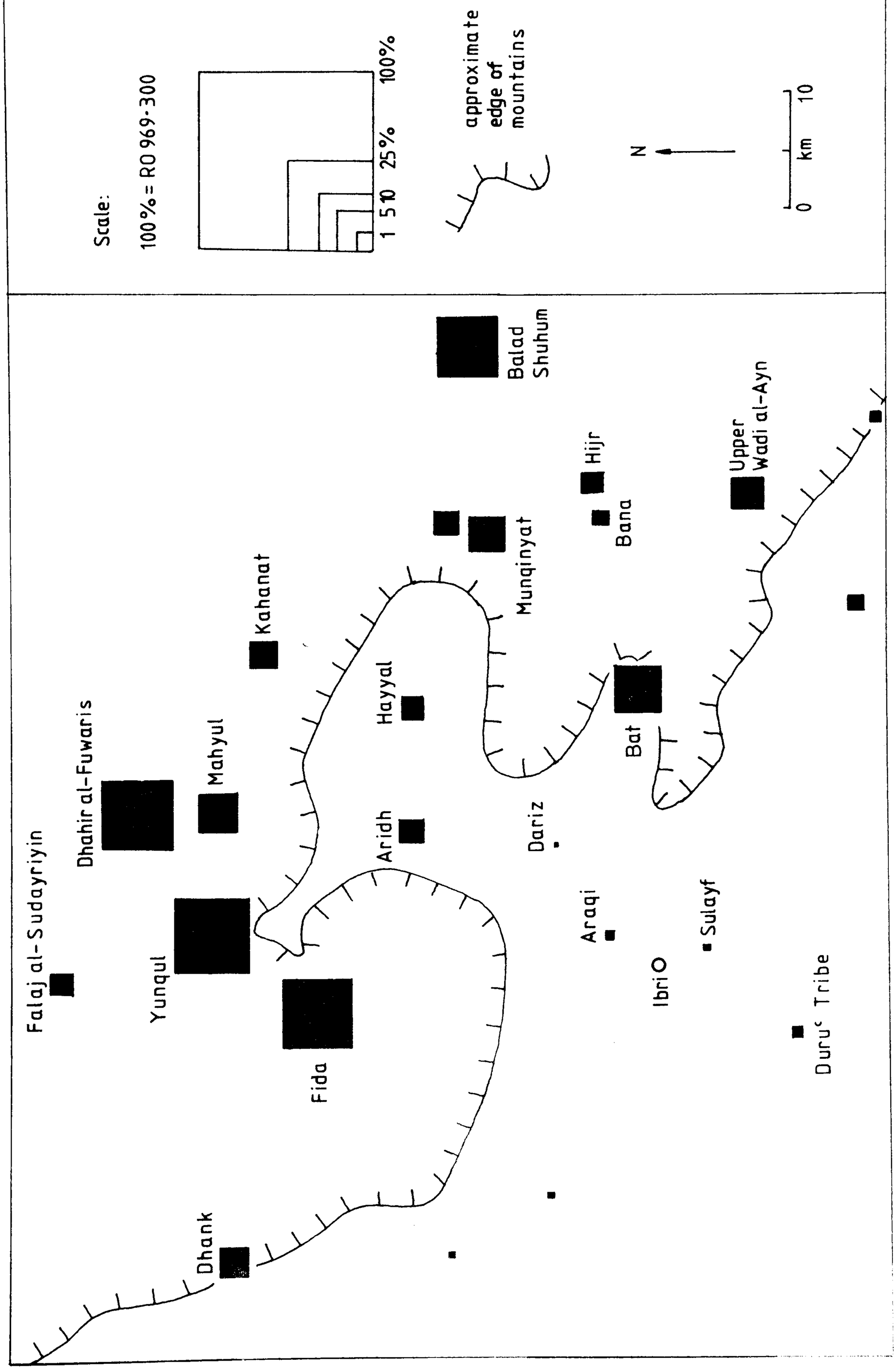


Figure 10-14 Distribution of fish from Ibri auctions to the hinterland during field survey : CURED FISH for fodder (uma jaffa)



Ibri. In particular, when the settlements are divided into two groups according to which side of the mountain edge they lie on, there is only a small difference between the fresh fish and the four varieties of cured fish in the proportions going to lowland and to highland populations (71% against 29% for the fresh, and 62% against 38% for qashi', uwal, kan'ad malih and mishwi). This is shown in Table 10.25.

The situation is very different with uma however. Both Figure 10.14 and Table 10.25 show that the buyers of uma from outside Ibri are predominantly from the mountain zone (85% of the ex-Ibri total value). The quantities going to buyers from the lowland markets of Sulayf, Araqi and Dariz are insignificant in comparison. Indeed, only one lowland settlement received more than two per cent of the ex-Ibri total - Bat with 7.17%. It is believed that most of Bat's total receipt was bought by a certain cured fish trader-transporter who though a resident of Bat habitually sold uma higher up the wadi in which Bat lies (the Wadi al-Hijr) at the settlements of Bana and Hijr. If this is so, the mountain populations therefore would in fact receive even more than the eighty-five per cent of the ex-Ibri uma noted above.

This situation leads one to suppose that uma are more important as a fodder source in the mountain zone than on the plains and in the foothills. It does not necessarily indicate however that animals are more important in the economy of the mountains, since other forms of animal feed could well be available on the lower ground which are not so abundant in the mountains. Indeed, evidence collected by the present writer from Ibri animal auctions in the first field season would tend to indicate that lowland sources of live animals

Table 10.25 : Distribution of fresh fish and cured varieties to lowland and mountain zones

	Lowland & foothill zone	mountains & mountain edge zone
FRESH FISH:		
no. of recorded recipient settlements	9	10
value recorded	RO 5,347.950	RO 2,212.350
percentage of total value	70.74%	29.26%
average value per recipient settlement	RO 594.220	RO 221.240
QASHI[c],UWAL, KAN[c]AD MALIH & MISHWI:		
no. of recorded recipient settlements	11	18
value recorded	RO 2,492.070	RO 1,501.300
percentage of total value	62.41%	37.59%
average value per recipient settlement	RO 226.550	RO 83.410
UMA:		
no. of recorded recipient settlements	9	15
value recorded	RO 149.650	RO 819.650
percentage of total value	15.44%	84.56%
average value per recipient settlement	RO 16.630	RO 84.560

are equally as important as the mountain zone. These data are presented in Table 10.26, from which it would seem that although the mountain areas are important providers of animals for sale, by far the majority of animals sold at Ibri come from the lowland settlements and the nomadic lowland Duruʿ tribe. Even when goats and sheep, the most numerous animals sold, are taken alone, less than forty per cent of those recorded were from the mountain zone.

The conclusions is therefore that the mountain populations rely relatively heavily on uma for feeding their animals, whereas the lowland populations including the nomadic Duruʿ do not. It can be inferred from this that other forms of animal feed are more available to the lowland populations than to those in the mountain zone. In the case of the settled populations in the lowland zone, the predominant alternative source of fodder is undoubtedly alfalfa and green barley. With the Duruʿ it is most likely natural pasture and scrub vegetation.

10.5 Trader-transporters

Trader-transporters who bring fish either cured or fresh from the various sources to sell in Ibri have been mentioned several times in this chapter. They are an essential link in the marketing chain in the Interior since without their private enterprise no fish would be available in Ibri or in the other Interior settlements. Further, those who have traded in fresh fish since the early 1970s are entrepreneurs in the Schumpeterian sense in that they are innovators as well as risk takers. Despite the risks, they have established from nothing a trade in a new and perishable commodity for which they recognised there was a potential demand. It is the purpose of this section to study these trader-transporters

Table 10.26 : Origins of live animals sold at Ibri auctions February - March 1975 for which origin of seller is known

Origin	Total animals	goats & sheep	camels	bulls & cows
Ibri	14	11	0	3
other settlements of lowland & foothill zone	17	7	0	10
Duru' tribe	20	14	6	0
mountain zone	22	19	0	3
Batina	6	0	0	6
Totals	79	51	6	22

in more detail and in particular to attempt to analyse their motivation and the economics of their operation.

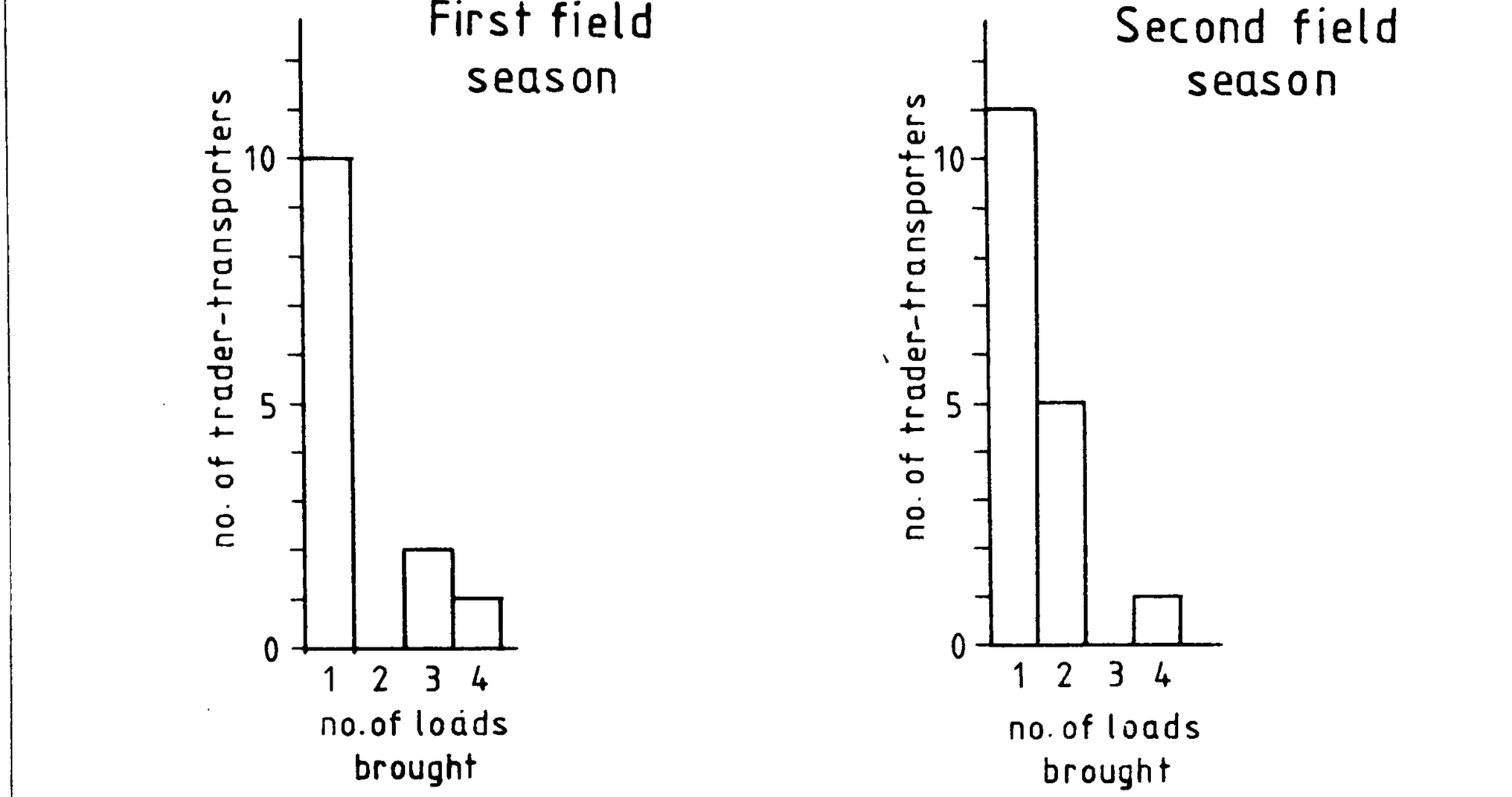
Fish trader-transporters in Ibri were found to work most commonly in pairs. Generally each partner was related to the other: a father and son, or two brothers or cousins. A total of sixty-nine of these pairs were identified during the two survey periods. Despite the large total, relatively few were noted on more than two separate occasions (Figure 10.15). Further, the number who appeared in both field seasons was very small (Table 10.27). This pattern is consistent with the fact that motor transport has revolutionised the marketing of fish in the Interior. Not only has an entirely new commodity been introduced to the Interior in the form of fresh fish, but the marketing of even the traditional cured product has been transformed. In such a novel situation it is to be expected that a relatively large number of entrepreneurs will be stimulated to try their hand in the new conditions, but that only a few will remain in the end as regular long term suppliers of fish.

Table 10.27 : Numbers of identified trader-transporters recorded in the two field seasons at Ibri

	total no. recorded (a)	no. recorded in First field season (b)	no. recorded in second field season (c)	no. recorded in both field seasons (d)
Cured fish trader-transporters	28	13	17	2
Fresh fish trader-transporters	41	15	28	2
totals	69	28	45	4

(b + c - d = a)

Figure 10-15 Frequencies with which identified trader-transporters were recorded in Ibri during field survey



10.5.1 Origins of the trader-transporters

The origins of the present trader-transporters are linked in the main with the type of fish sold. Most of trader-transporters of kanʿad malih and uwal from the southeast coasts to Ibri by motor had been traders in the same varieties until the early 1970s by camel. Nearly all were found to be natives of the settlements on the routes between the southeast coasts and the Northern Interior or were nomadic or semi-nomadic tribesmen of the same area. In most cases they use hired pickup vehicles, though some have more recently invested in a vehicle of their own with money saved from working in the oil company or in the Gulf states.

On the other hand, trader-transporters who brought cured uma and qashiʿ loads to Ibri were found to be more varied in their home settlements. About half originated in the area of the source of the fish - the Batina or the U.A.E. coasts, - and the remainder were natives of Ibri itself. They tended moreover to be general traders rather than specialists solely in fish. It is likely that this was the case also in the pre-1970 era. Further, their transport is generally rented by them rather than owned. This is probably because the vehicle tends to be a five-ton lorry rather than the much less expensive pickup, and therefore requires much more capital to be invested in it.

With fresh fish the pattern again differs with the origin of the fish. The trader-transporters who bought fresh fish in the first field season from the Batina without exception lived there and not in the Interior, and their transport was invariably a rented Landrover or similar vehicle. Those carrying fresh fish from the U.A.E. are nearly all U.A.E.

citizens: in fact only two such trader-transporters were recorded who were natives of the Sultanate - one from Dhank and one from Ibri itself. The U.A.E. trader-transporters were found nearly all to be traders who had for long retailed fresh fish in Dubai or Abu Dhabi markets, and had invested in their own vehicle and insulated ice box in order to sell further afield. The trader-transporters bringing fresh fish from the southeast coasts tend to be men who had originally traded in cured fish from that source, and who had more recently (after about 1975 in the case of those who now deliver to Ibri) invested in their own pickups and iceboxes.

Thus the majority of the trader-transporters noted in Ibri had connexions even before 1970 with fish whether cured or fresh. The innovation of motor transport in the Sultanate therefore produced not a new group of traders but rather a change in the operation of those who were already trading in fish. In the case of cured fish the range of the trader-transporters from the southeast coasts was extended northwards so that loads which had been previously sold at Adam and the intermediary markets of the Sharqiya could now be sold at the consuming markets of the Northern Interior. Fresh fish traders who had previously been confined to the coasts of the U.A.E. and the Batina were similarly enabled to extend their operation to the Northern Interior, while some of the cured fish traders from the southeast coasts chose to convert their trade to fresh fish.

10.5.2 Profitability and motivation

The innovation which permitted these changes in the patterns of marketing was, as has been said, the introduction

of motor transport. However, this did not in itself produce the changes. They were rather the result of decisions made by individual fish trader-transporters. In the case of those who originally traded in cured fish the chain of decisions would be approximately as follows:- whether initially to continue to transport by camel or to rent a motor vehicle; whether to continue to sell at or buy from an intermediary market, or to extend the range to cover the whole journey from the coast to the consuming market; whether, ultimately, to continue with cured fish or to invest in a vehicle and insulated icebox to enable a conversion to fresh fish. Similarly in the case of a trader who already traded in fish at the coast, the conscious decision would have to be made whether to remain a coastal fish trader or to chance an occasional load further afield. With U.A.E. traders who were originally retailers of fresh fish the same sort of decisions had to be made: the decision to sell at Ibri (or elsewhere in the Sultanate) depended first on investing in a motor vehicle fitted with an icebox.

The grounds on which the various trader-transporters have made their individual decisions which have collectively changed the patterns of fish marketing may be explained tentatively by assuming a maximising profit motive. That is to say, in deciding between alternative courses of action, the trader-transporter will choose that alternative which can be expected to gain him the greater profit. If this hypothesis is correct an analysis of the profits of the trader-transporters recorded during the present survey could be expected to some extent at least to support it.

The method of recording the profitability of trader-transporters was that described in Chapter Four (Section 3). The Ibri values could be recorded net directly at the time of the auction or afterwards from the auction recorders' lists. In some cases a small amount of a load was sold by direct bargain sale and this has been added to the net auction value. Buying prices of fish from the U.A.E. were quoted by the trader-transporters in U.A.E. Dirhams. These were converted to Riyals Omani at the rate of Dh 10 = RO 0.875, as elsewhere in this thesis, since this was the generally accepted rate in both field seasons. Unfortunately no independent source was available to check either the fish trader-transporters' buying prices or their expenses. Since however a friendly relationship was struck up with most of the trader-transporters and since the expenses quoted by them were roughly comparable for any particular source of fish, it is believed that the margin of error in the calculations is within tolerable limits.

Over the two field seasons enough data was collected to calculate the profits and losses for a total of forty-eight loads of cured fish and ninety-five loads of fresh fish. These are summarised in Table 10.28 according to the percentage profit or loss made on the total buying cost, or TBC (i.e., the cost of fish at source plus transport costs and other expenses, including ice in the case of fresh fish). The data are graphed in more detail in Figures 10.16 for cured fish, and 10.17 for fresh fish.

Concerning first the cured fish loads, it is apparent that the distribution of net profits and losses and their size (as expressed as a percentage of TBC) is very similar in both field seasons. Well over half the loads were sold at a profit in

Table 10.28 : Summary of loads recorded in Ibri sold at profit or loss

	nos. of loads sold at NET LOSS of...			nos. of loads sold at NET PROFIT of...			Total no.of loads at NET LOSS	Total no. of loads at NET PROFIT	Total no of loads recorded
	>50%	25-50%	1-25%	0-25%	25-50%	>50%			
CURED FISH									
First field season (row percentage)	0	0	6 (32%)	8 (42%)	4 (21%)	1	6 (31.58%)	13 (68.42%)	19 (100%)
Second field season (row percentage)	0	1	12 (42%)	14 (48%)	1	1	13 (44.83%)	16 (55.17%)	29 (100%)
FRESH FISH									
First field season (row percentage)	0	14 (39%)	11 (31%)	7 (19%)	4 (11%)	0	25 (69.44%)	11 (30.56%)	36 (100%)
Second field season (row percentage)	1	7 (12%)	16 (27%)	25 (42%)	7 (12%)	3 (5%)	24 (40.68%)	35 (59.32%)	59 (100%)

Figure 10-16 Graphs showing net profits and net losses on loads of CURED FISH at Ibri during field survey

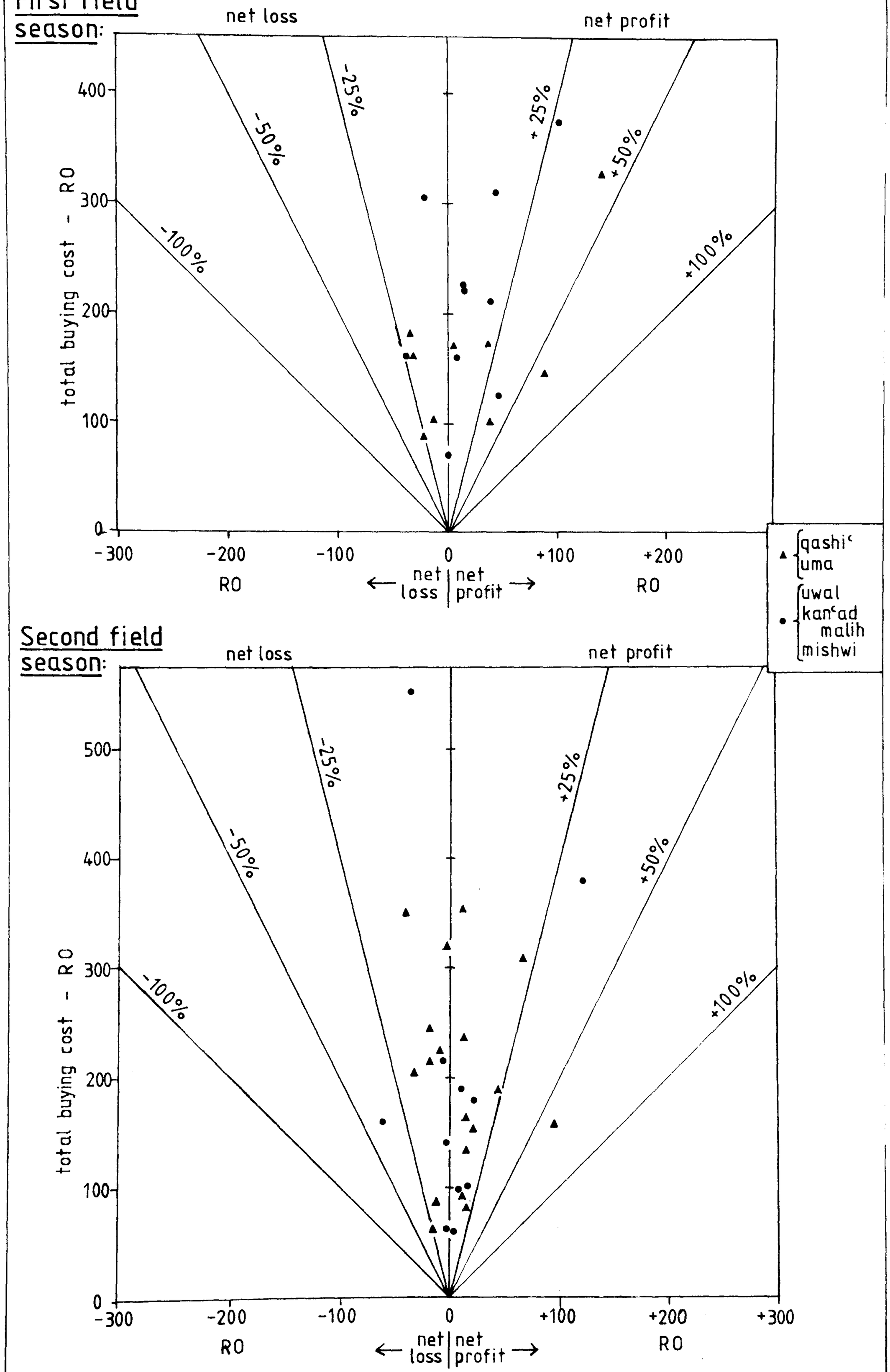


Figure 10-17 Graphs showing net profits and net losses on loads of FRESH FISH at Ibri during field survey :
(a) First field season.

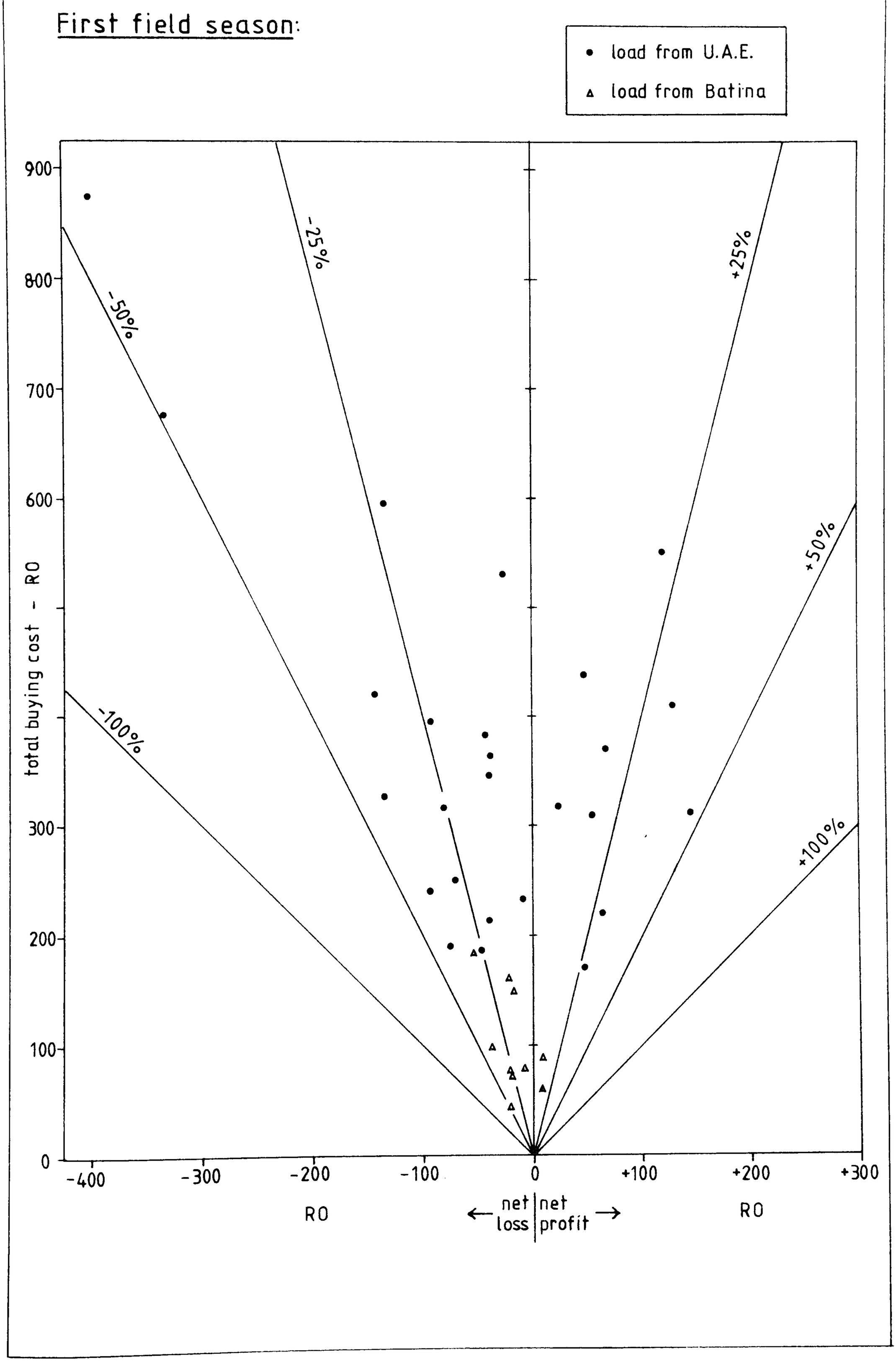
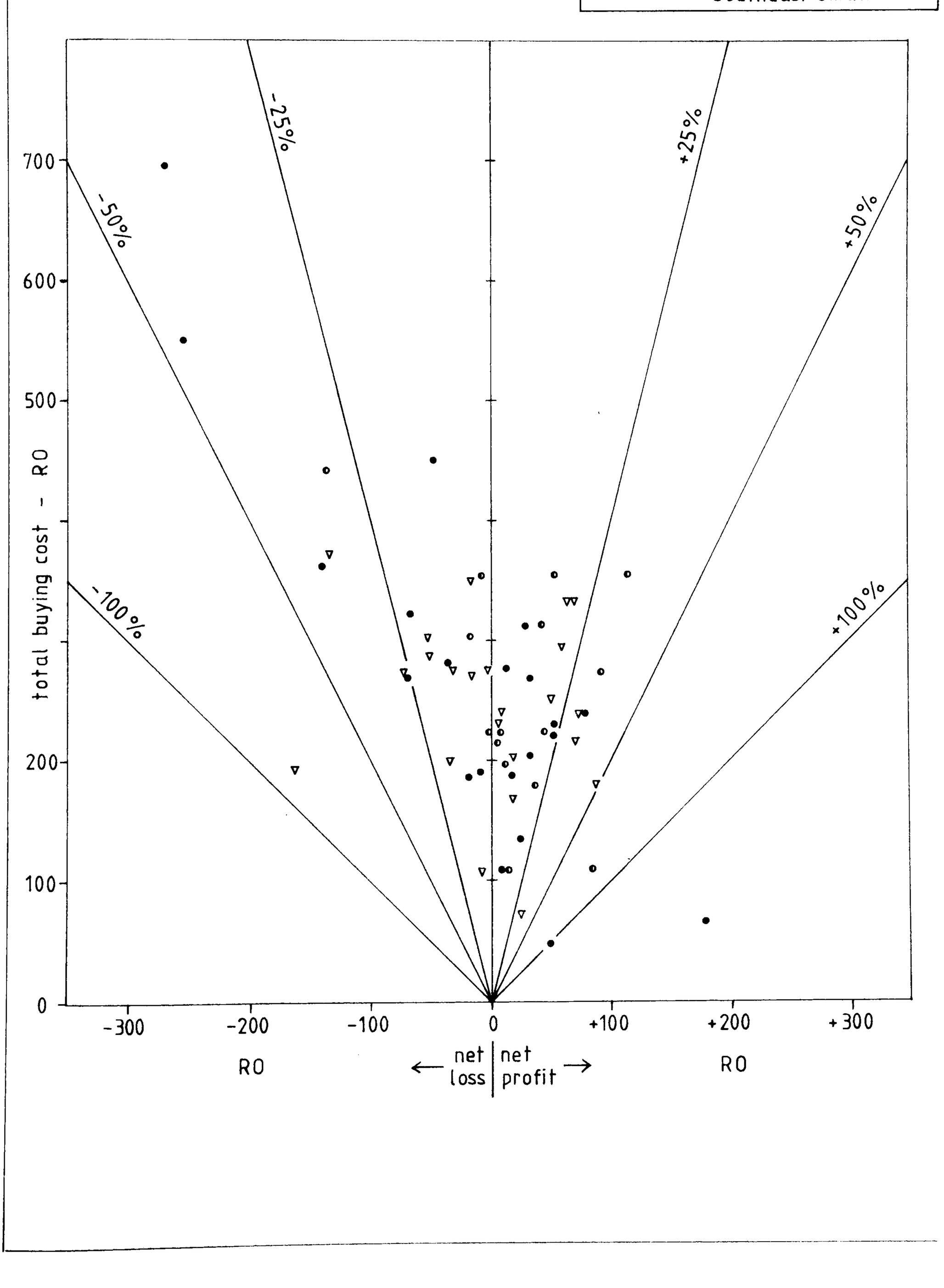


Figure 10-17 (continued) (b) Second field season

Second field season:



each year. The proportion of loads sold at a profit does however appear to decline somewhat from sixty-eight per cent of the first season loads to fifty-five per cent in the second field season. If real, this apparent decline in profitability may be interpreted as the result of increasing competition from fresh fish. Most of the losses in the second field season were however very small in relation to the TBC and many may well lie within the margin of error involved in their calculations. Moreover, a Mann-Whitney U-test applied to the percentage profits and losses of the loads of each field season indicates that it is extremely likely that such a difference could have occurred by chance sampling ($z = 0.47$, $p \simeq 0.65$ (two-tailed)). According to the present data therefore there was probably no significant change in the profitability of cured fish trader-transporters from the first to second field seasons, and therefore the present data do not show that the continued presence of fresh fish resulted in reduced profitability of cured fish marketing between the two field seasons.

With fresh fish on the other hand, there was an unmistakable change between the two field seasons. Whereas less than one-third of the loads were sold at a profit in the first field season, well over half made a profit a year later. Moreover, large net losses were much more frequent in the 1975 period than in the 1976 period, while large net profits were considerably more common in the second period than in the first. Whereas almost forty per cent of the first field season loads made a net loss of more than twenty-five per cent of the TBC, only fourteen per cent made such large losses in the second field season. On the other hand eleven per cent of the 1975 loads made profits greater than twenty-five per cent of the TBC,

while in 1976 this percentage rose to seventeen per cent.

In short therefore the sample field data point to an increasing profitability on the part of the fresh fish trader-transporters. This may perhaps be explained by the fact that the trade in fresh fish was relatively recent in 1975, but had by 1976 found a surer footing as the trader-transporters who were less adept or who brought fish from less suitable sources were forced to drop out. This is consisent with the finding noted at the start of this section that only two of the fresh fish traders noted in the first field season were seen again in the second field season.

An examination of the data on fresh fish loads by source of fish is revealing in this respect. Table 10.29 summarises the percentage profits and losses from this point of view. Two relevant points can be made. First, losses in the first field season were especially marked in the case of loads from the Batina. In fact only two out of ten from this source made a net profit (and then both were under twenty-five per cent of the TBC), while in the case of five loads the loss was more than twenty-five per cent of the TBC. This adequately explains why no fresh fish trader-transporters from the Batina subsequently chanced selling a load at Ibri. The reason for the high overall losses on these loads lies in the combination of relatively high prices on the Batina compared with rival sources and the high transport costs over the mountains. Further, the quality of the fresh fish from the Batina was undoubtedly lower than that from other sources. The journey from Khabura to Ibri across the Hawasina pass took about four and a half hours, and in order to catch the morning auctions in Ibri market which begin at about 8 am, a

Table 10.29 : Loads of fresh fish recorded in Ibri sold at profit or loss, by source of fish

	no. of loads sold at NET LOSS of			no. of loads sold at NET PROFIT of			
	> 50%	25-50%	1-25%	0-25%	25-50%	> 50%	
FIRST FIELD SEASON:							
UAE Gulf coast direct	0	9	8	5	4	0	26
Batina	0	5	3	2	0	0	10
SECOND FIELD SEASON:							
UAE Gulf coast direct	0	3	5	9	1	2	20
UAE Gulf coast via al-Ayn	0	1	3	8	2	1	15
UAE East coast	0	1	0	0	0	0	1
Eastern Hajar coast	0	2	2	3	1	0	8
Southeast coasts	1	0	6	5	3	0	15

very early start from the coast has obviously to be made. Consequently the fish so transported has to be bought on the coast the day before its sale at Ibri. That is to say, up to twenty-four hours elapsed between landing fish on the coast and its sale in Ibri. Although since 1974 a small flake ice plant was in operation as part of the F.M.C. project at Sohar, no Batina trader-transporter had an insulated icebox in which to carry iced fish, and in any case flake ice is less suitable for this purpose than the block ice available in the U.A.E. All in all therefore it is likely that fish from the Batina realised lower auction prices in Ibri than comparable fish brought iced from the U.A.E. on the grounds of lower quality.

The second point to be made from Table 10.29 is that in the 1976 field season losses were particularly low and profits high in the case of U.A.E. fish from the Gulf coast, and especially those loads which changed hands at al-Ayn. In comparison the loads from the coasts of the Eastern Hajar and the southeast were roughly evenly split between profit and loss. This situation suggests that the trader-transporters bringing fresh fish from the U.A.E. had by 1976 settled down to a workable trading pattern which on average produced a profit, whereas those bringing loads from the coasts of the Eastern Hajar and the southeast, the more recent sources, were still in the process of achieving an equilibrium.

When the data on profitability are viewed in this way, they support to some extent the hypothesis advanced above that the conscious decisions made by individual trader-transporters which produced the changing pattern were based on attempts

to maximise their profits. Those trader-transporters who constantly made losses on sales at Ibri either through ineptness or else through buying their fish at relatively expensive sources stopped selling at Ibri. They either gave up the trade altogether or else sold elsewhere where risks were presumably less, and left the supply to Ibri in the hands of those who either were more able or else who bought from cheaper sources, and who could therefore be expected to make profits more consistently.

There are however serious objections to applying this rational profit maximising model when individual decision making is considered. In the first place, communications in northern Oman are such that no trader-transporter can know all the variables on any given occasion on which to make the best decision. The Ibri auction system means that selling prices cannot be set by the trader-transporter, while the number of other loads that are present on any given day similarly cannot be controlled, or even known in advance, by the individual trader-transporter. This objection need not be too serious a criticism of the maximising model, however, if all that is required of it is that profits are maximised on average over a period and not necessarily on any given occasion. Further, those trader-transporters with iceboxes can and do hold over part or all of their load for a day without serious risk of deterioration of quality, if on the day of arrival at Ibri they find that several other loads are present.

A more serious objection to the model lies in the religious and social aspects of motivation. It was noted many times in Ibri and elsewhere during the survey that traders and retailers of fish and other commodities, when selling at

a net loss to themselves, would often remark that losses even if frequent did not matter since they carried out their work as a service to the community, that this was God's will, and that God's will was of more consequence than any losses they suffered. A case in point is that of two fish retailers in Ibri who about once a month shared the cost of buying an animal (usually a cow or a camel) in order to slaughter it and retail it as fresh meat. The Ibri auction value of cows averaged RO 123 in the 1975 field season and it is likely to have been somewhat higher a year later. The average cost of a camel was over half this at about RO 70 in 1975. The Ibri baladiya restricts the retail price of beef to RO 1.500 and of camel meat to RO 0.750 per kilogram. Since all the larger bones, head and viscera are not generally sold, all the meat retailed during the survey periods was sold at a considerable loss to the two retailers. Nevertheless, they continued regularly to carry out this work. They enjoyed it and were satisfied that they were serving the community, and were enabled to do so by the profits from their fish retailing activities. In the opinion of the present writer that this consideration colours much of the motivation of rural traders in Oman, including the fish trader-transporters.

A third objection to the maximiser model is that it would require that to those trader-transporters who changed from cured fish to fresh fish their new commodity should be more profitable than their old. Present data suggest however that this is probably not so: see again Table 10.28 and Figures 10.16 and 10.17. On the whole the percentage profits

of cured fish were overall as great as if not greater than those of fresh fish, even in the second field season. If a cured fish trader- transporter wished to maximise his profits therefore he would stand as good a chance if not a better one of doing so by continuing to trade in cured fish rather than by investing in a conversion to fresh fish. Yet as was noted in the previous subsection the trader-transporters buying fresh fish from the southeast coasts especially were nearly all trader-transporters of cured fish before changing to fresh fish.

Following on from this, a final objection to the maximiser model is that it would require individual fish trader-transporters to make conscious calculations of expected and actual returns against capital invested. The field survey tends strongly to suggest that no such calculations are consciously made. If calculated, the net return in fish trading is so low that it is more likely to deter a trader from taking up the trade, especially in fresh fish, than to motivate him to do so.

A parallel can be drawn here with the attitude of the fishermen of the Batina discussed in Chapter Seven (Section 5). It is extremely doubtful whether any fishermen consciously decides to invest savings earned abroad in a boat and motor because he calculates that this will bring him the largest returns on his capital. A much more reasonable explanation in the case of the fishermen would seem to lie in their preference to remain fishermen and to invest in the only job they know - that is, fishing. In the same way, all the evidence available to the present author indicates that fish trader-transporters who, it will be recalled, were nearly all traders or retailers in fish even before the advent of motors in the Sultanate, have

tended not to perceive opportunities for investing surplus capital other than in their own trade, and that considerations of maximum return on capital are not their motivation. Fish trader-transporters have invested in vehicles, it is believed, because they were already fish traders in the same way that fishermen invest in boats and motors because they are fishermen.

Even though profit maximisation is therefore not the most appropriate explanation of the trader-transporters' motivation, the profit accruing from their work must nevertheless be at least sufficient to enable them to continue with it and to support their dependents. Service to the community may indeed form an important element of their motivation, even though substantial losses may thereby be incurred. However, unless, like the two Ibri fish retailers who make consistent losses on their sale of meat, there is some subsidising source of income, net losses cannot be sustained indefinitely by any fish trader-transporter since he will not only have insufficient to live on but will eventually be forced out of business by inability to buy fresh loads of fish. This is known to have happened between the first and second field seasons in the cases of at least four of the thirteen fresh fish trader-transporters who were recorded at Ibri in early 1975 but who did not reappear in 1976.

For these reasons a satisficer model is considered to provide a more appropriate explanation of fish trader-transporter motivation in the northern Interior of Oman. Fish trader-transporters are willing to sustain net losses of sometimes considerable sums over longish periods, provided they make enough on average in the long run to keep them in business and provide for their dependents. Further, and as a corollary,

it can also be noted that, contrary to a commonly held popular opinion, fish trader-transporters, whether of fresh or cured varieties, do not make consistently high profits at the expense of the consuming public.

10.6 Conclusions on Fish Marketing in the Northern Interior

It has been seen in this chapter that in the mid-1970s fish both cured and fresh were an extremely important commodity in Ibri, the Dhahira and Northern Interior generally when compared with other non-imported goods. Although field data for a summer period in Ibri are unfortunately unavailable, it is known that the receipt of fish in summer, and especially that from the southeast coasts, is less than in winter, and the winter estimates cannot therefore simply be extrapolated to cover a whole year. Nevertheless, the great importance of fish is unqestionable. The monthly supply, in winter at least, appears to be of the order of twenty tonnes live weight in the case of fresh fish and some 100 to 160 tonnes live weight equivalent in the case of cured fish. In terms of value, fresh and cured fish taken together exceed in importance all other commodities auctioned in Ibri, at least during the winter months.

It has also been shown how Ibri acts as an intermediary centre for the supply of fish to the population of the Dhahira and how the flow varies with the type of fish. The distribution of fresh fish is mostly via fish retailers in Ibri and traders from the subsidiary market settlements of the hinterland, rather than directly from the auctions to the consumers. This pattern reflects the constraint on consumers to buy only as much fresh fish as they immediately require in the absence of local refrigeration or ice making facilities. The cured fish varieties

for human consumption are not generally so constrained, and the spatial distribution of this fish from Ibri not only relies less on retailers but probably reflects more closely than does that of fresh fish the ratio of population to distance from Ibri. In contrast, the distribution of dried sardines (uma jaffa) from Ibri is concentrated in the mountain zone of the Dhahira and shows the relative reliance of the animal keeping populations of that zone on this commodity as a fodder supplement.

In this way cured fish have continued to be an important commodity in the Northern Interior even since the advent of fresh fish and the realisation that the Interior population likes it enough to be willing to pay twice as much for it as do the coastal dwellers of the Batina.

Two related themes have been particularly apparent in this chapter: the transition and change in the fish marketing patterns; and entrepreneurial response to a new situation and its possibilities. The field survey happened to take place at a significant time, coinciding as it did with the developments permitted by the introduction of motor vehicles after 1970. Aspects of the transitional change as they have affected fish marketing have been discussed in this chapter, including the by-passing of the intermediary markets of Adam and the Sharqiya in the case of cured fish, and the introduction of fresh fish.

It is unlikely that these developments have yet finished. Improvements in the road network in and to the Dhahira are already underway which will doubtless have beneficial results on the speed and ease with which fish and ice may be transported. Since 1975 most Dhahira settlements have been linked with

Ibri by graded road, and in 1977 the previously difficult Hawasina pass to the Batina was also graded, reducing the time needed to travel between Khabura and Ibri by an hour to three and a half hours. The Ibri to al-Ayn tarred road was opened in late 1975, and, as has been seen, probably influenced the greater profitability of U.A.E. fresh fish trader-transporters in the second field season. At the time of writing, a tarred road connecting Ibri to Bahla and Nizwa is due to open which will doubtless make the Eastern Hajar and southeast coasts more attractive sources in the future in a similar way.

Another future development which will almost certainly affect fish marketing will be rural electrification. An electricity power station for Ibri is already built at the time of writing which when it finally opens may well make ice production and refrigeration an economic possibility in Ibri. It is not unlikely that this will stimulate and extend the distribution of fresh fish in the Dhahira generally. This and other aspects of the future course of developments will be taken up again in greater detail in Part III below.

As for the second theme of the present chapter, it has been shown how when new opportunities present themselves, private entrepreneurs can recognise and rise to meet a potential demand so created, and are prepared to do so even when the risk of financial loss to themselves is great. Explanation of their motivation, as has been shown, is probably best viewed in terms of a satisficer rather than a profit maximising model, coupled with a lack of preferred alternative investment opportunities.

The differences between the two field seasons are interesting in their own right in the context of the changing

pattern. The marked increase in the profitability of the fresh fish trader-transporters between early 1975 and a year later, as evidenced by the field samples, suggests that the trade in fresh fish was by early 1976 finding stability between supply and demand and that those trader-transporters who persevered with the trade even in the face of overall losses were the most able to continue, either because of their inherent trading ability or else because of the relative advantage they had in their source of fish. As was seen, between the two field seasons some sources of fresh fish rose in importance while others declined. This suggests that spatial differences are significant in fish supply. Why this is so, and why spatial location in northern Oman more generally cannot be ignored in the context of changing patterns of fishing and fish marketing is the subject of the next chapter.

CHAPTER ELEVEN

Spatial aspects of the northern Omani fishery.

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Spatial aspects of the northern Omani fishery

In Chapter two (Section 1) when the geography of Oman was introduced, it was suggested that a central concern of the development of the country was spatial in character. The last six chapters, which comprise Part II of this thesis, have concerned the analysis of the fishery of northern Oman as it appeared in the mid 1970s. In the discussion of both fishing and fishmarketing in these chapters, the spatial context of the field survey data has been referred to explicitly in several instances, while in other instances an implicit spatial context is often apparent.

What is required now to round off discussion of the present survey data, and to prepare for Part III, is for these spatial aspects to be drawn together and stated more categorically in terms of spatial differences and flows, and for the relevance of such an approach to fisheries development to be indicated. It is this task which the present chapter seeks to do.

A reconsideration of the fishing and fish marketing patterns of the fishery of northern Oman in spatial terms requires the question of scale to be taken into account. The most basic unit can be considered to be the individual fisherman, fish trader or consumer, and these accordingly formed the logical basis for the field survey of the northern Oman fishery. It has been seen that overall patterns and distributions can be interpreted only when it is realised that they result from decisions made by individuals. Motor

power and improved fishing equipment have been introduced by individual fishermen deciding to invest in them. Choice between different types of tackle or boats also lies largely with the individual. Similarly, the transition from camel transport to motor pickup and lorry (when it became possible) was accomplished very rapidly in the Interior by decision making on the part of individual trader-transporters. The amount of fish available for sale at Khabura or at Ibri on any day depends equally on the decisions of individual fishermen and trader-transporters respectively, while similarly the nature of the flow of fish from Ibri to its hinterland is the result of individual choice and needs. Profitability of trader-transporters varies with individuals, and on their choice of consequent action depends the changing pattern of fish supply to Ibri. Realisation of the importance of the individual unit is fundamental both to the interpretation of present patterns and to any attempt at influencing future patterns.

Grouping individuals into settlement units has also been shown to be helpful in understanding aspects of spatial distribution and spatial relationships. Boat builders on the Batina showed a considerable tendency to concentration in a small number of settlements: it will be remembered (Chapter Five, Section 3) that seventy-three per cent of the plank-built craft in the questionnaire survey (thirty-seven out of fifty-one) had been constructed by boat builders from only three otherwise unexceptional settlements. Again, certain individual settlements were shown to specialise in particular types of fishing equipment - for example, traps versus nets (Chapter Five, Section 2).

Grouping settlements also proved revealing in interpreting more general spatial distributions and relationships. In terms of fishing equipment and methods, the Batina has been shown to fall for historical reasons into two distinct and well-defined 'provinces', the Upper and Lower Batina (Chapter Five, Section 4), which have by inertia not only persisted until today but have been translated into modern terms. The relatively recent introduction of the larger diesel powered plank-built boats has been confined almost wholly to the Upper Batina which has traditionally been the stretch where large craft have been found, while the Lower Batina, traditionally devoid of larger craft, has adopted in recent years the much smaller dugout huri. Interpretation of the present distribution of craft therefore relies partly on an understanding of a previous spatial pattern in terms which group settlements by wilaya. There is here moreover an implication for development in that measures taken to assist and encourage fishermen on one stretch of coast may well be inappropriate for those on another stretch.

By drawing on the work of others discussed in Chapter Three as well as on the results of the present survey the whole coast of the Sultanate can be subdivided on the same basis. Bertram's (1948) distinction between 'rock' fishermen and 'sand' fishermen is a useful starting point and can be amplified. On the grounds of type of coast, fishing equipment and methods, and fishing regime, eight distinct fishing 'provinces' can be identified between Ra's Musandam and the border with the Hadhramaut. (One of these is formed by the east coast of the U.A.E.). These are mapped in Figure 11.1

Figure 11-1

Map showing fishing 'provinces' of Oman as defined by type of coast, type of equipment, fishing regime, and marketing patterns

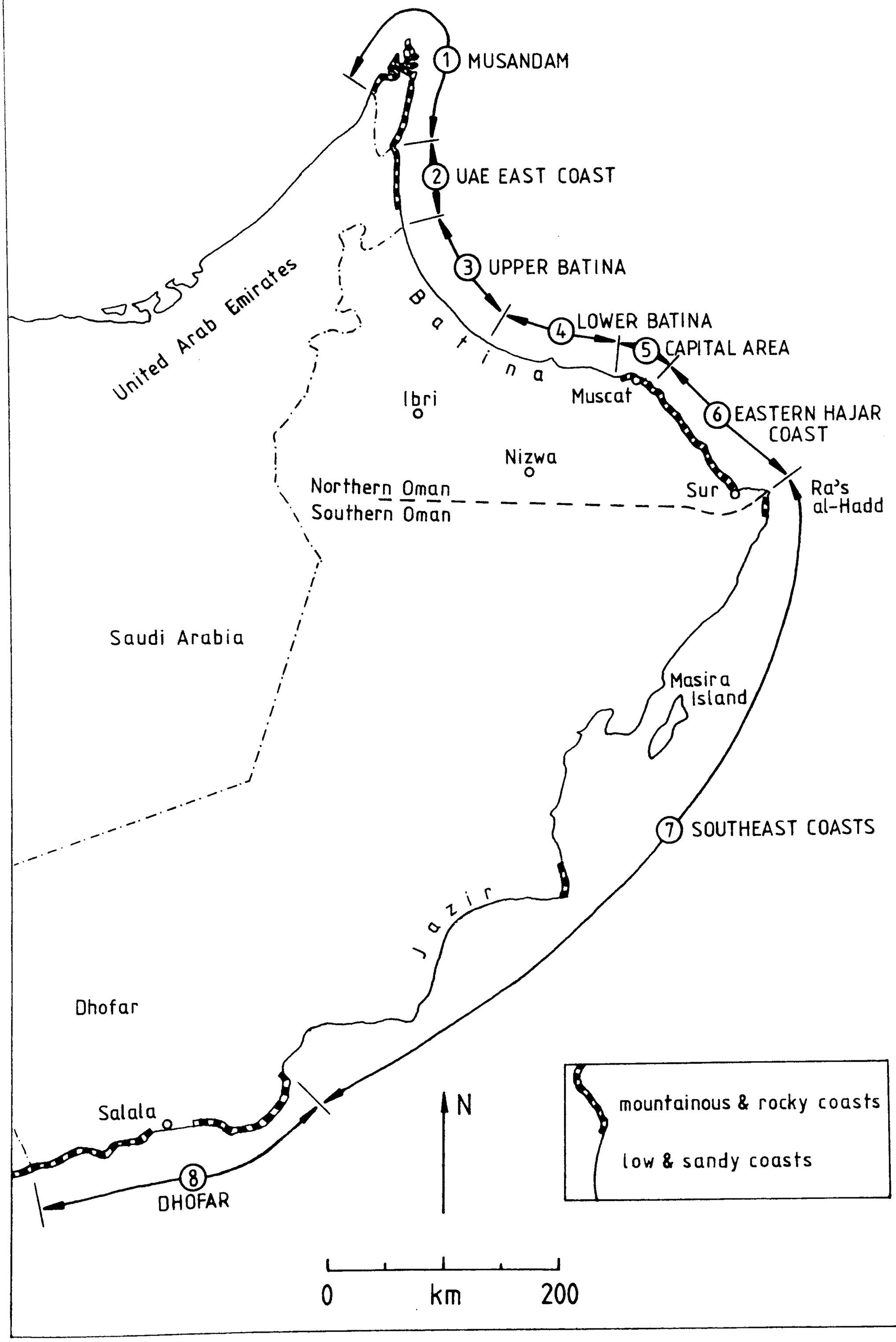


Table 11. 1 : Fishing provinces of Oman as defined by characteristics of fishing and marketing patterns

	Type of coast	Fishing settlements	Land communications to fishing settlements	Most important types of craft and tackle	Abundance of fish, marketing patterns, and other comments
1. Musandam	mountainous & rocky. Small bays and coves between massive headlands	small isolated communities	very poor	Both small and large craft, incl.large diesels up to 70 HP Traps & lines	Plentiful; large local surplus, marketed by sea to UAE Gulf coast towns and also to visiting Iranian boats
2. UAE East Coast	mountainous & rocky. Broad bays in places	discrete communities	good	Both small and large craft. Diesel and petrol. Typically 20 HP. Traps & nets.	Moderately plentiful; moderate local surplus marketed in UAE Gulf coast towns.
3. Upper Batina	low sandy shore	discrete and continuous settlement	good	Typically diesel up to 20 HP. Some small outboard craft. Shash important. Nets & traps.	No large surpluses recently; marketed locally.
4. Lower Batina	low sandy shore	discrete and continuous settlement	good	Mainly small outboard craft. Shash important Nets and traps	No large surpluses recently; marketed locally

/continued

Table 11.1 (Continued)

	Type of coast	Fishing settlements	Land communications to fishing settlements	Most important types of craft and tackle	Abundance of fish, marketing patterns, and other comments
5. Capital Area	mountainous & rocky with coves and bays	discrete communities	good	Mainly small outboard craft. No shash Nets and traps	High local demand absorbs all supply.
6. Eastern Hajar Coast	mountainous & rocky with small coves and bays	small isolated communities except at Sur and Quryat	poor	Both small and large craft, incl. large diesels up to 70 HP. Nets and traps	Moderately plentiful; local surpluses marketed in Interior settlements.
7. Southeast Coasts	low sandy shore	small isolated communities who depart inland during summer monsoon	very poor	Mainly small outboard craft. Some large diesel craft. Nets and lines	Very plentiful; very large local surpluses marketed in Interior settlements. Summer monsoon stops fishing for about three months each year.
8. Dhofar	mountainous & rocky with broad bay at Salala	discrete communities except at Salala	poor except at Salala	Mainly small outboard craft. Nets and lines.	Plentiful; local surpluses marketed inland and exported to Dubai. Summer monsoon stops fishing for about three months each year

and Table 11.1 summarises their important characteristics. This division, it is felt, would make the most appropriate basis for any development plan for Oman's artisanal fisheries.

Another important grouping of settlements was revealed when marketing on the Batina was considered. It was shown that only fishing settlement close to a market generally contributed to the supply of fish to the Batina markets, and an estimate of fifty-seven per cent of the Batina fishing settlements was suggested as being within convenient range of the markets for motorised craft under the conditions of the mid 1970s (Chapter Nine, Section 2). It was also seen however that although the total potential fishing manpower within the potential catchment area of a market was thus a large proportion of the total, the numbers of fishermen who actually delivered fish to a market on any given day was extremely small in comparison. This spatially deduced conclusion has clear implications for development in that it helps to identify at least one specific aspect of the underutilisation of manpower and capital equipment which must be taken into account when policy decisions are made regarding the artisanal fisheries.

A further spatial aspect of the fishery has also been referred to in passing and concerns the areas of sea fished by the Omani fishermen. It was noted in Chapter Two (Section 3) that one of the advantages an artisanal fishery potentially has over an industrial fishery is that it can utilise areas of the sea which are too shallow or too broken by rocks and coves for industrial methods. At the same time, one of the results of motoriation has been that the limit of fishing

could be extended outwards from the coast. During the survey the furthest out to sea that a non-motorised craft (a shasha under sail) was observed by the present writer was about ten kilometres and most of the fishing by non-motorised craft was carried out much closer to the shore than even this. It is likely that this was the general case before the introduction of motors. The larger motorised boats now commonly fish to the edge of the continental shelf, some twenty to twenty-five kilometres from the coast off the central Batina. This extension of the artisanal limit must be borne in mind when the government is considering industrial trawling ventures or concession agreements with foreign commercial fishing companies so that the interests of the artisanal fishermen are not harmed.

It has also been shown that the interpretation of the flows of different types of fish to settlements in the Northern Interior requires that recipient settlements are grouped spatially. It was seen that in the Dhahira the difference in the flow of fish for human consumption and that for animal fodder were directly related to the grouping of settlements according to which side of the mountain edge they lie (Chapter Ten, Section 4).

Viewing the fishery of the Sultanate as a whole from the point of view of supply and demand, it is helpful to broaden the scale further. Ignoring for the moment the detatched part of the country in the Musandam Peninsula and also the contiguous east coast of the U.A.E., the Omani fishery collapses into two unequal spatial units: Northern Oman on the one hand, comprising the relatively small but

most populous part of the country roughly north of the latitude of Ra's al-Hadd; and the South on the other hand which includes the southeast coasts and Dhofar Province.

Since probably more than three-quarters of the Omani population live in northern Oman, the demand for fish is naturally highest there. Despite the fact that most of the fishing effort (that is, a function of the fishing manpower and the capital investment in fishing equipment) is also concentrated in the north, the demand there is unsatisfied by local production. It has been shown (Chapter Ten, Sections 2 and 3) how most of the fish for the Northern Interior comes not from the Batina, the nearest coast, but from elsewhere. Indeed, in the case of most varieties of cured fish the Batina itself was found to be a net importer also: dried sardines sold in the Batina markets during the survey periods were invariably found to have come from Dhofar via Dubai; dried shark and wet-salted Scombridae on sale in the Batina markets were regularly recorded as having originated from the south-east coasts, or, in the case of the Scombridae, the U.A.E. also. In contrast to the north, the population in the south is very small, the coastline long, and the sea extremely prolific on account of the southeast Arabian upwelling currents. As a result the supply of fish during all but the monsoon months in the summer greatly exceeds local demand.

The essence of a major problem confronting the Omani fishery is thus spatial: the different spatial distributions of supply on the one hand and demand on the other. The solution to this problem must be a central concern of any effective government fisheries policy. It is significant to

note however that, left to itself, the artisanal fishery in both its fishing and marketing phases has already responded to the challenge as a result of individual initiative. The resultant flows of fish from the southeast coasts by land (wet-salted kingfish, dried shark and latterly iced fish) and from Dhofar by sea (dried sardines) have been explained in Chapter Ten.

The reasons why the demand in the north is unsatisfied by local supply have already been considered. Part of the answer lies in the fact that in recent years certain fish off the Batina coast seem not to have been as plentiful as formerly, and in any case the potential production off northern Oman is probably only a fraction of that from Ra s al-Hadd southwestwards. Again, the total potential fishing effort in the north is not used to its full capacity, principally through a sizeable part of the workforce spending part of the year fishing elsewhere.

There is however a further reason. It will be remembered that the marketing data showed that, in addition to the Omani coasts, the Gulf coast of the U.A.E. was a major source of the fish for the Northern Interior. Therefore the Sultanate does not constitute a discrete unit in terms of fish supply. Moreover, the two field seasons at Ibri provided evidence that the fish marketing situation was undergoing change and had been doing so since 1970. It was suggested that even by 1976 the situation was not yet stable. From this evidence it is clear that as well as the relative availability of fish on the different coasts, the location of ice plants and time-distance considerations are also major influences on the

competing sources of supply and the direction of flows. Based mainly on the Ibri data, Table 11.2 and Figure 11.2 summarise the spatial interpretation of the changing pattern of fish supply to the Northern Interior.

It can be seen from the table that the critical factor which has gone furthest to deciding the relative importance of each of the three main sources varies with the source. In the case of the U.A.E. Gulf coast the availability of ice (at Dubai, Abu Dhabi and other U.A.E. centres) was the deciding factor and allowed the U.A.E. Gulf coast to become the major source of fresh fish to Ibri by the mid 1970s. Its relative position was strengthened by the rapidly improving tarred road network which in 1975 reached Ibri. With the southeast coasts the critical factor has been the large quantities of fish available there, and these have been such that neither the lack of local ice nor the long and difficult journey to and from the Northern Interior was able to outweigh this advantage. The result was that the southeast coasts in 1976 continued to be a major source of cured fish and at the same time had become an increasingly important source of fresh fish using ice transported all the way from Dubai. The Batina on the other hand declined as a source of Ibri fish in the first half of the 1970s: relatively in cured fish, and completely in fresh fish. Absence both of local surpluses and of a local ice source to stimulate greater production, together with the difficulty of crossing the Hawasina pass, made impracticable the transport of fish either cured or fresh from the Batina to Ibri by 1976.

Since 1976 changes have occurred in both accessibility

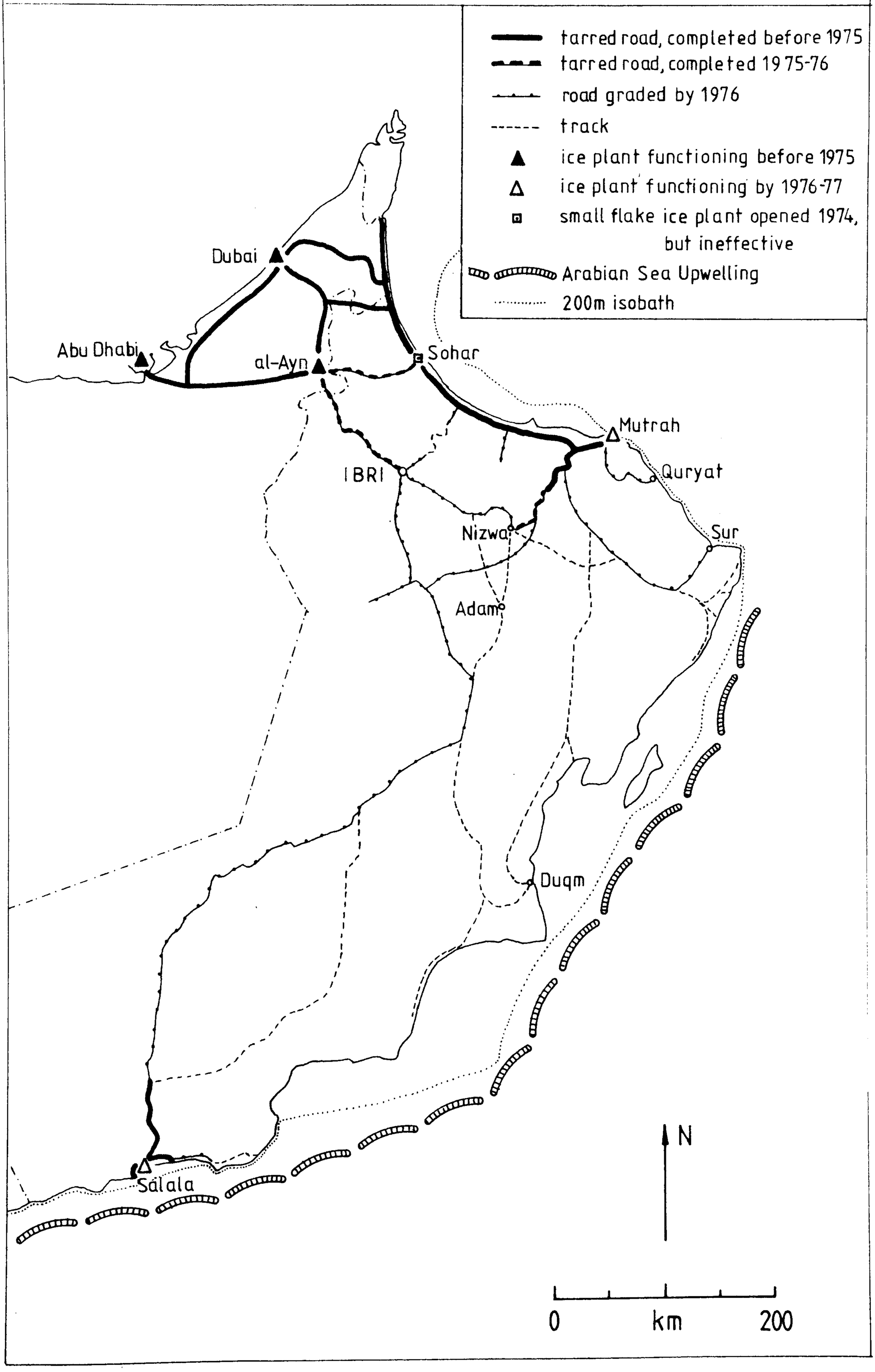
Table 11.2 : Summary of differential effects of factors influencing the relative importance of the sources of fish to Ibri as of 1975-76

Source of fish	relative availability of fish	availability of block ice	time-distance considerations (motor transport)	outcome at time of field survey
UAE Gulf coast	available, but relatively expensive and high local demand	available at Dubai, Abu Dhabi, al-Ayn and elsewhere	275 km, 6 hours. Ibri-UAE tarred road completed in 1975	Developed as main source of fresh fish by mid-1970s
Batina Coast	relatively expensive; little available in excess of local demand	none available locally *	130 km, 4½ hours Route over Hawasina Pass difficult	Declined as a source of both cured and fresh fish
Eastern Hajar and Southeast coasts	relatively very cheap; plentiful with little local demand	none available locally	350-400 km, 9 hours to Eastern Hajar coast; 400-600 km, up to 24 hours to southeast coasts. Routes difficult for most part	Continued as a major source of cured fish and developed as an increasingly important source of fresh fish (using Dubai ice).

* a small flake ice plant was set up at Sohar in 1974 as part of the FMC project, but was never known to be used by trader-transporters.

Figure 11-2

Map showing factors affecting fish supply to the Northern Interior at the time of the field survey : accessibility, ice plants, and the Arabian Sea Upwelling



and in the availability of ice. In 1977 ice became available at both Mutrah and Sur owing to the establishment of ice plants there. By early 1978 Sur was connected by tarred road with the Capital Area, and the route from Ibri to the Batina across the Hawasina pass was graded. At the end of 1978 a tarred road between Ibri and Nizwa, thus linking Ibri with the Capital Area, was almost complete. On his last visit to the Sultanate in December 1978 the present writer noted that these events were already changing the pattern of fish distribution in northern Oman, though these changes are beyond the scope of the present discussion. What remains clear however is that the spatial factors affecting fish catching and fish marketing are both important and interrelated. Any innovation, such as a new source of ice or an improved road, may well have repercussions throughout the whole system and through entrepreneurial response cause changes in the relative advantages of the different sources.

Viewed in this light, certain other spatial aspects of the fishery are also easier to interpret - those concerning the hinterlands of the markets of northern Oman, and in particular the contrast between the Batina markets and those of the Northern Interior. Except to a very limited extent, no Batina market acts as a centre for widespread fish distribution of either fresh or cured varieties, as has been shown. The only major variety of fish which was noted in Ibri during the survey as coming from the Batina (that is, dried anchovies), had been brought directly from the fishermen without having entered any of the markets. Distribution far afield from Batina markets in anything but small quantities

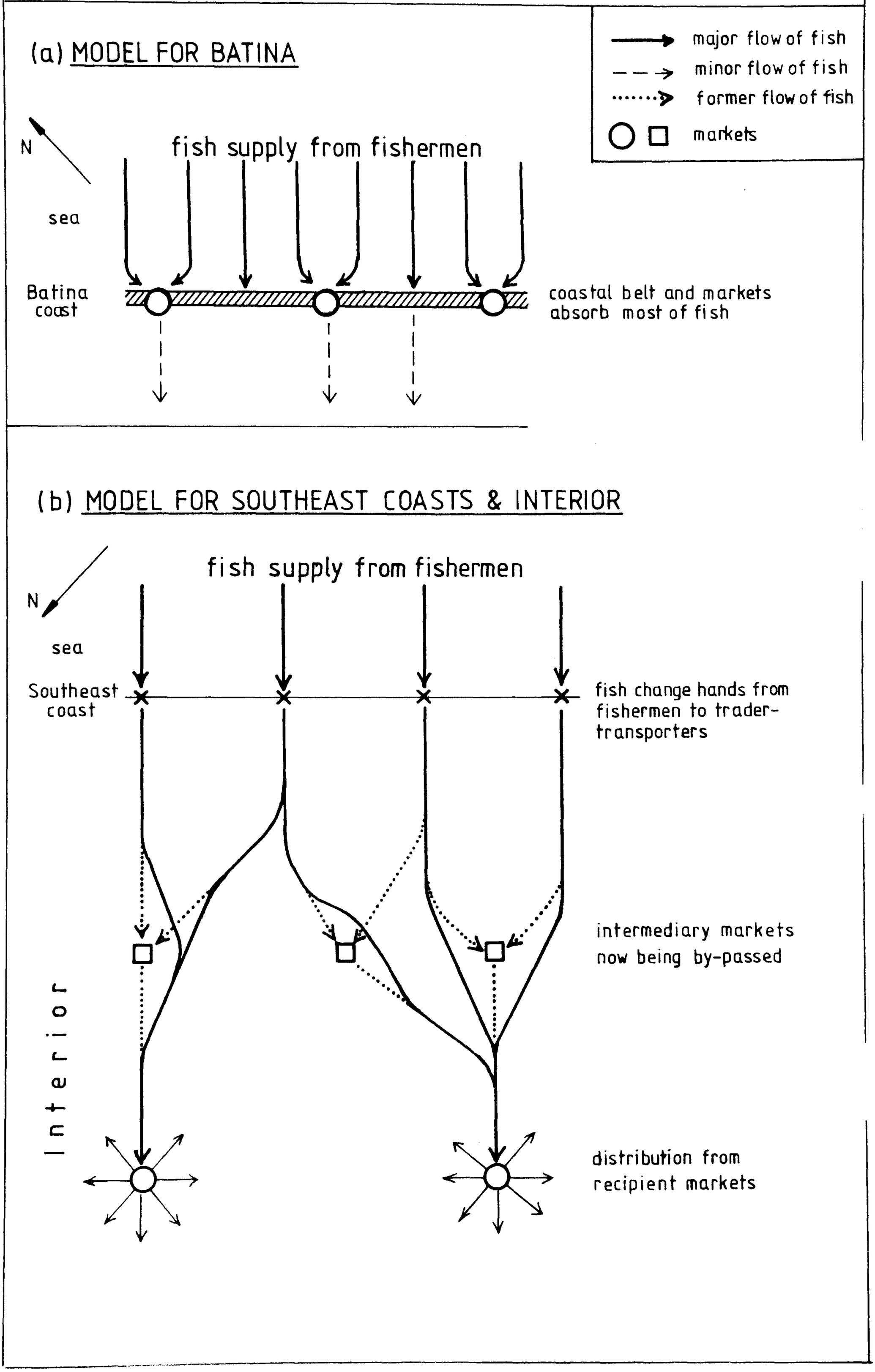
was never recorded during the survey. This accords with the pattern already established in which the Batina was at the time of the survey producing insufficient fish to provide surpluses for large scale distribution by fish traders based in the markets. In the Interior in contrast the pattern, as has been discussed in the case of Ibri, was entirely different. Whatever the source and whatever the variety of fish, Ibri was seen to act as a major regional centre for its distribution over a wide hinterland.

The Batina presents in spatial terms a more or less linear arrangement of settlements and markets, which can be envisaged as a narrow, highly absorbent barrier through which very little fish passes (Figure 11.3a). In contrast the spatial patterns of marketing in the Interior are two-dimensional rather than linear, and the southeastern coast provides very little resistance to the passage of fish (Figure 11.3b).

Since the fishery of northern Oman does not exist in isolation, it must be viewed in its wider spatial context. The conditions under which the Omani fishery operates are linked in several ways with those which obtain in the surrounding region, and particularly with those in the Gulf. Spatial proximity and consequent similarity of both physical and social conditions which affect fishing and fish marketing are important here.

It has been shown already how important the U.A.E. Gulf coast was in the mid 1970s in supplying fish for the Northern Interior of the Sultanate as a result of its differential advantages. In terms of the supply of inboard diesel engines

Figure 11-3 Diagrams to illustrate the different spatial patterns of fish distribution (a) on the Batina, and (b) in the Interior of Oman



and spare parts the Omani fishery was also dependent at the time of the survey on U.A.E. agents. Further, it has also been seen that as far as the Batina is concerned at least - and the Batina holds probably well over half the fishermen of the country - the Gulf as a whole and Bahrain in particular is of great significance to the Omani fishery in that it attracts away each year a substantial part of the effective fishing manpower and thus contributes in a major way to the underutilisation of the fishing effort. In compensation however the Omani fishery has benefitted by its fishermen working abroad since, as a result both of the higher income so achieved and of what has been called the demonstration effect (Chapter Six, Sections 5 and 6), innovations have been introduced to Oman which have improved the standard of fishing equipment.

The fisheries of the Gulf have had a head start on those of Oman in terms of development and in comparison Oman is a relative latecomer. In future development the Sultanate has the chance to benefit further from Gulf experience by avoiding the dangers and mistakes which have already taken place in the Gulf. What these dangers and mistakes are and how they might be avoided in Oman by appropriate government policy are the subject of Part III of this thesis.

PART III

Fisheries development and fisheries policy.

CHAPTER TWELVE

The pattern of fisheries development in the Arabian Peninsula.

CHAPTER TWELVE

The pattern of fisheries development in the Arabian Peninsula

12.1 Introduction

The late 1940s marked the start of a turning point in the development of fisheries in the Arabian Peninsula as a whole. Until then only artisanal fisheries existed in any part of the Peninsula, and these in a state which had changed very little for centuries. Since about 1950 not only have changes in both equipment and organisation made themselves felt in the traditional fisheries, but also there have appeared larger scale industrial or commercial fishing projects, distinct in every important respect from the artisanal sector except insofar as the sea is their common resource. Because of the differences between them it is necessary to treat artisanal fisheries and industrial fisheries as distinct and separate as far as a discussion of their development is concerned.

Among the first significant modern detailed data on Arabian fisheries are the reports Dr. G.C.L. Bertram made on his extensive visits between 1943 and 1949 in response to wartime and immediate post-war needs. (His reports during this period have been collected as Bertram 1953). His detailed report on the fisheries of Oman (1948) has already been discussed in Chapter Three above. Information is also available on the changing state of the fisheries of the Hadhramaut and Aden from the 1940s through the 1950s and 1960s from the reports of British agriculture and fisheries officers in Aden and the Protectorates now held in the India Office Library, London. Key among these are : Hartley (1941); Hickling (1947);

Anon. (Govt. of Aden) (1950) and (1960); and White (1967). Since the independence of Aden and the Protectorates in 1967 and the formation of the People's Democratic Republic of Yemen, the fisheries situation is however much less clear on that coast.

The first survey commissioned by the Saudi government on that country's fisheries was carried out by F.A.O. in the early 1950s (El Saby and Farina 1954), while more recent information on both the Hijaz and Gulf coasts of Saudi Arabia is available from the reports of the joint project of the White Fish Authority and the Saudi Ministry of Agriculture and Water Resources from 1973 (e.g., Peacock and Alam 1977, and Hull 1977; see also Wray 1976, and Anon. 1977). A personal view of the fisheries of the Bahrain area was provided by Erdman in 1950, while more recently F.A.O. and U.N.D.P. teams have visited and reported on most of the countries of the Peninsula. Of these particularly notable are the report of Boerema and Job (1968) on their visit to most of the Gulf states, and the 1970 F.A.O report on the fisheries of Kuwait (Anon. (F.A.O.) 1970). Concerning the U.A.E. (Trucial States), the reports of White and Barwani (1970; 1971) have already been mentioned in earlier chapters.

These then are the main documentary sources on which this chapter is based. Press reports, especially from Fishing News International and the Middle East Economic Digest, have also been useful in keeping track of recent developments. Other specific references will be given as they arise. These sources have been supplemented and amended where necessary by the present writer on the basis of information collected

during his tour of four countries of the Peninsula (Saudi Arabia, Kuwait, Bahrain and the U.A.E.) in December 1977 and January 1978.

12.2 The artisanal fisheries

12.2.1 The situation in the late 1940s

In the late 1940s the fisheries of the Arabian Peninsula were everywhere very similar in important respects to those of Oman as described by Bertram in 1948 (see Chapter Three above). Fishing units were small, usually family concerns. Ownership of boats and equipment appears to have lain mainly in the hands of the fishermen themselves in most areas. On the Hadhramaut coast (White 1967 p.12; Digby 1970 p.124), some fishermen at least were in perpetual debt to non-fishing merchants, though this seems to have been exceptional in the Peninsula as a whole.

Equipment varied in detail from coast to coast. Beach seines and castnets seem always to have been particularly used on the south and southeast coasts, reflecting the importance there of sardine and anchovy shoals close to the shore. In the Red Sea and Gulf on the other hand traps and lines were used more than nets, in response to rocky shores and coral reefs which are less common on the open Indian Ocean coasts. Nevertheless, a variety of nets, traps and lines could be found on all coasts to some extent, and all were hand-made and generally poorly protected. Imported cotton thread (for nets and lines) and local date and coconut products (for traps and ancillary equipment) were still in common use, though galvanised wire had already begun to make its appearance on the Gulf and Red Sea coasts.

With the exception of the ubiquitous huri, boats varied in detail from place to place. Plank-built sewn craft were common on the Hadhramaut and Dhofar coasts (where they are still in use), though nailing had for long been used elsewhere. Details of design and nomenclature varied from area to area (as it still does), but in general boat size was small. The largest were the transom sterned vessels fishing out of Jedda, Bahrain, Kuwait and Sur in Oman, of up to twenty metres in length. Crews from this last port habitually put to sea for several days at a time to fish the southeastern coasts of Oman and the Hadhramaut especially for shark, in which case the catch was salted on board and often sold at Aden, Mukalla and Salala rather than at the home port. On the whole however fishing trips were of only a few hours' duration. Most of the fishing done on any coast of the Peninsula was close inshore and catches were generally landed at or close to the home settlement. Fish not consumed fresh was as a rule cured on shore and not at sea.

Craft were powered by sail, oar or, in the case of the huri, paddle. No record seems to exist of motor power being used on fishing boats in the countries of the Peninsula before the 1950s, even though the larger trading vessels of the Gulf and Red Sea had begun to adopt diesel engines since before the Second World War, and even though several of the local fishing craft types have since proved suitable for motorisation.

The production of fish from the south and southeast coasts of the Peninsula was undoubtedly large at this time - and larger than that on the Red Sea and Gulf coasts. This reflected partly the greater inherent fisheries wealth of the south and southeast coasts, and also the fact that a larger

concentration of fishermen lived on those coasts than on the Red Sea and Gulf coasts. The sizeable exports of locally cured fish from Oman to India and East Africa, already described in Chapter Three above, were matched by similar exports from the Hadhramaut coast.

The size of these exports were however subject to considerable fluctuation. The Second World War reduced the trade considerably, especially with India, since return shipments of rice were prohibited from that country. Consequently production also fell. After the war the 1948-49 and 1949-50 seasons produced disastrous harvests, especially of sardines, and as a result exports fell again. Indeed, the variability of the catch on the southern coasts is an obstacle to its full exploitation since a constant supply cannot always be relied on. No long term statistical data for the 1940s are available, but White (1967) present statistics of approximate catches from the Qu'aiti State for the period 1957-66 which illustrate the problem (Table 12.1 and Figure 12.1). The higher catches from 1963 may in part be accounted for by the motorisation of the artisanal craft and possibly also by improved data collection; but nevertheless even the period 1963-66 shows considerable variation. More recently however, as was pointed out in the case of Oman (Chapter Three, Section 4), this export trade has declined, mainly because of the reduction in demand in India and East Africa.

12.2.2 Indigenous artisanal development since 1950

Even though the south and southeast coasts had the greatest potential for development in terms of both manpower and fish resource, it was in the Gulf and Red Sea that the

Table 12.1 : The catch of the Qu'aiti State, 1957-66, in tons

Year	Sardine & Anchovy	Other recorded fish	Estimated unrecorded	Total estimated catch
1957	1,291	1,444	270	3,005
1958	7,441	1,590	960	9,991
1959	4,302	1,778	610	6,690
1960	3,469	6,902	1,050	11,421
1961	10,627	2,096	1,270	13,993
1962	7,063	3,287	828	11,178
1963	14,156	3,792	0	17,948
1964	21,129	5,662	0	26,791
1965	8,510	9,580	0	18,090
1966	10,752	10,397	0	21,149
Average per year ($\bar{x}$)	8,874	4,653		14,026
Standard deviation (s)	5,752	3,341		7,087
$\frac{s}{\bar{x}}$ x 100%	64.82%	71.80%		50.53%

Source : White, 1967 pp.5-7.

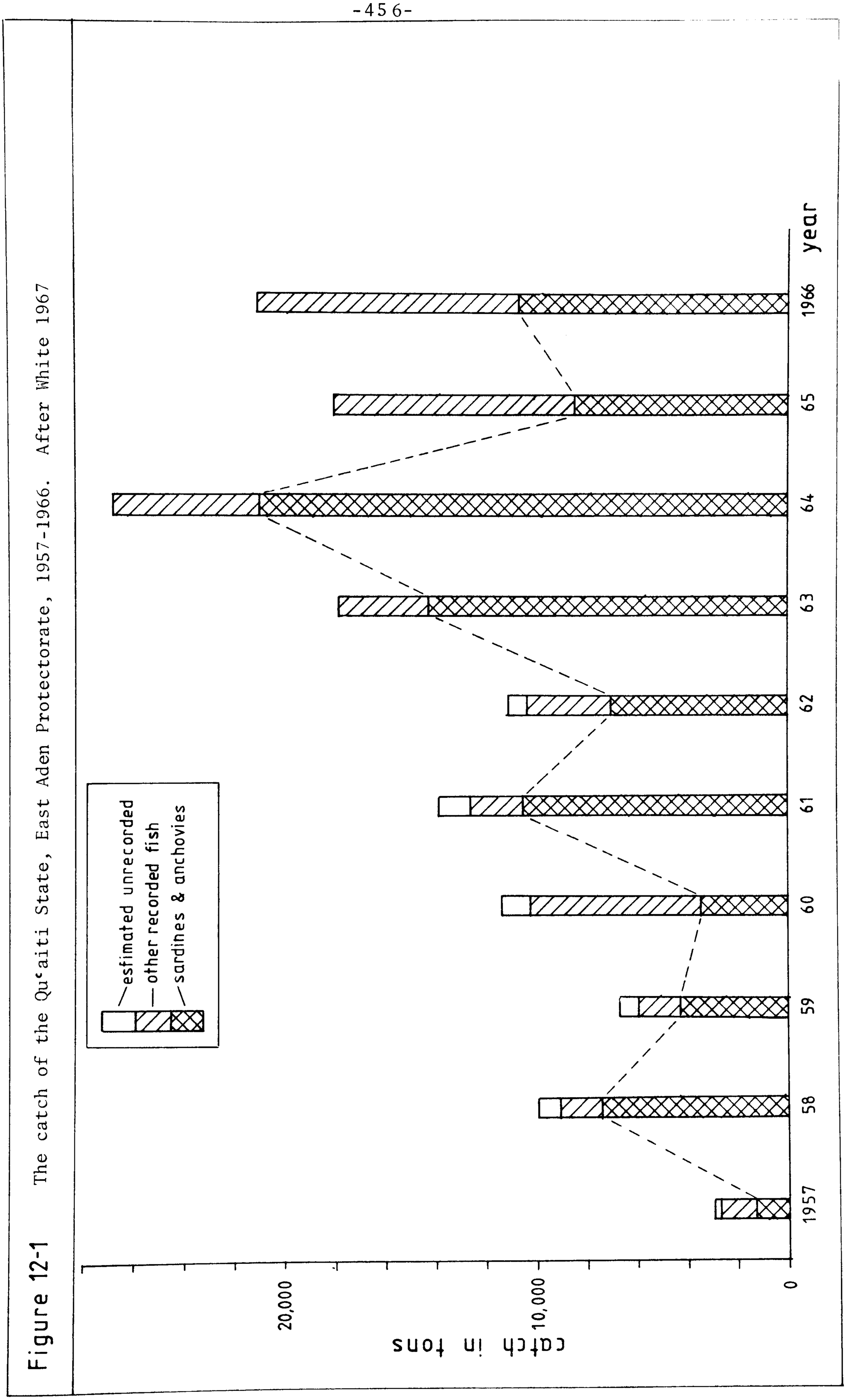


Figure 12-1 The catch of the Qu'aiti State, East Aden Protectorate, 1957-1966. After White 1967

impetus to indigenous fisheries development was first felt, as a result of the developments associated with the oil industry from the 1950s. The oil-based development had two major effects on the artisanal fisheries of the Hijaz and Gulf coasts. First, the increased wealth derived indirectly from the oil development allowed the introduction of improved fishing equipment, in particular motor power and nylon for nets, lines and ropes. Secondly, there began the move of local fishermen from active fishing to land jobs provided directly or indirectly by the developing oil industry.

In the Yemen, South Arabia and Oman in contrast the lack of oil wealth coupled with local restrictions on the introduction of fishing innovations not only delayed the advent of improved equipment to those coasts until the 1960s, but also helped to encourage a pendular movement of fishermen from their home coasts to the Gulf and the Hijaz. These fishermen, together with fishermen from the southern coasts of Iran, gradually took the place of local Saudi, Kuwaiti, Bahraini, Qatari, Abu Dhabi and Dubai fishermen from the 1950s onwards in providing for the increasing demand for fish in those centres. The extent of this replacement of local fishermen by non-nationals can be seen in the figures reproduced by Boerema & Job (1968 p.8) which summarise the situation in Kuwait in 1967. By that year no fisherman in Kuwait was recorded as being of Kuwaiti nationality. According to Boerema and Job's figures, of the total of 1,916 fishermen who were delivering fish in that year to Kuwait, sixty per cent were Iranians and forty per cent were Omanis (actually nationals of the northern Trucial States as well as of the Sultanate). Thus by the latter part of the 1960s very few if any of the Kuwaiti population relied on active fishing as a means of livelihood, though many still owned

fishing vessels.

This position was confirmed by the present author on his visit to Kuwait and neighbouring countries in December 1977 and January 1978. By then almost the whole fishing workforce in Kuwait was Iranian, even though some vessels remained in Kuwaiti ownership. In Bahrain, Qatar, Abu Dhabi and Dubai the active fishing force is almost wholly from the northern states of the U.A.E., from the Sultanate of Oman, and to a lesser extent from Iran, while in Jedda and other towns on the Red Sea coast of Saudi Arabia the active full-time fishermen are Yemenis almost to a man. Most nationals of these oil states who do still retain a link with fishing do so only as a part-time or leisure activity, or else as non-sea-going owners of fishing vessels with foreign crews.

Thus although the supply potential has always been greatest in the south and southeast of the Peninsula, and although the fishermen have been concentrated in greatest numbers there also, it has been the demand factor which has proved crucial in developing the present fishing patterns over the last twenty to thirty years. Whereas the demand for fresh fish has boomed in the Gulf and the Hijaz, the demand on the south and southeast coasts has declined since the former export outlets are no longer available. The fishermen from the south and southeast coasts have responded by following the demand.

The importance of the demand factor in stimulating artisanal fisheries development has been recognised by several authorities working on Arabian fisheries, for example Bertram (1944a p.47) in the Red Sea and Gulf of Aden area, and El Saby and Farina (1954 p.1) in the northern Red Sea. The relative retardation of artisanal development on the south and southeast

coasts of the Peninsula was only partly due to restrictions on fishing innovations for even since those restrictions were lifted in South Yemen and Oman from the 1960s the movement of fishermen to the Gulf and Hijaz coasts has continued. It is suggested therefore that in the further development of artisanal fisheries in Yemen and Oman a key stimulus will be the improvement of the marketing system and thereby the effective demand on those coasts.

Indigenous developments have also taken place in the traditional marketing patterns. The introduction of fresh iced fish to the Interior of Oman from the early 1970s was considered in detail in Chapter Ten. The Hijaz and the Gulf states saw similar development a decade or more earlier and there too private initiative and enterprise was the driving force. On the Hijaz coast indeed the demand for fresh fish has been so great that local entrepreneurs have been stimulated to invest in large refrigerated lorries.

With the expanded market for fresh fish and the introduction of improved means of handling it, the quantities of fish available for local curing on the Gulf and Hijaz coasts have declined. On the Hadhramaut and southeast coasts of Oman on the other hand, where coastal surpluses are still available for curing, traditional practices have remained virtually unaltered, despite the repeated recommendations for practical and relatively simple improvements suggested by Bertram and others since the 1940s. Modern commercial processing has been tried with varying degrees of success in several countries, but since this has been in the main divorced from the artisanal sector it will be considered when industrial fisheries

development is discussed below.

Increased retailing activity has been the other main result of the increased demand in the Gulf and Hijaz urban centres. This can be demonstrated in the case of Kuwait by observing the rise in the number of fresh fish wholesalers through whose hands passes all the fish entering Kuwait City fish market. In the early 1960s they numbered five according to Mr. Mohammad A. Sayf of the Kuwait Institute for Scientific Research. By 1970 they had grown to eleven (Anon. (F.A.O.) 1970 p.10), while in early 1978 there were fourteen. That their individual turnover and profits have not suffered in consequence is indicated by the fact that they now employ on average more assistants each than they did in the past (as many as eight assistants being employed at present by one of the wholesalers), and that they are able to continue to provide increasingly sizeable loans to the fishermen who deal with them for investment in fishing equipment. Also most of the wholesalers now have comfortable glazed booths in the city market in place of the open benches from which they used to work.

This evidence clearly indicates that the quantities of fresh fish being handled by Kuwait City fish market have expanded considerably over the past twenty years. Similar expansion has undoubtedly occurred in the other Gulf centres though no detailed data are available to show this.

Another indigenous development in fish retailing in Kuwait is more akin to what has happened in the fishing sector there. Since about the mid 1960s the original Kuwaiti retailers have been replaced entirely by Iranians. This has happened despite the fact that by law only Kuwaiti nationals are permitted

to rent fish stalls in both Kuwait City and Fuhayhil to the south. All stalls are however sublet by Kuwaitis to Iranians at considerably higher rents than the municipality charges for the stalls.

12.2.3 Government assistance in artisanal fisheries versus indigenous development

The earliest record of government attempts to assist the artisanal fishery to develop comes from Aden and the Protectorates. On Dr.G.C.L. Bertram's (1944a p.45, and 1944b p.135) recommendation a fisheries officer was appointed for Aden in 1944. Dr. C.F. Hickling (1947 pp.20ff) recommended government material help for local fishing three years later, including assistance in motorisation. However because of a succession of difficulties and mishaps, little substantive result emerged until the late 1950s, while of several government attempts to start fishermen's cooperatives none was entirely successful. Later, when A.W. White was Fisheries Officer at Mukalla, the Aden Fisheries Department set up a small workshop to repair local fishermen's engines in 1964. Engines had by that year become so numerous that the workshop had to be extended almost immediately after opening, and even then was never large enough to meet the demand (White 1967 pp.19-20).

Other attempts by governments to assist local fisheries have been more recent. Through the work of A.W. White, the government of the then Trucial States began to operate an aid scheme in 1971, giving grants of one-sixth the cost to fishermen buying engines, the remaining five-sixths being paid in monthly instalments over about two years. In 1974, largely prompted by what seemed to be a drop in the numbers of fishermen, the

U.A.E. government (as it had then become) increased the grant on engines to fifty per cent, subject to an upward price limit currently standing at Dh 50,000, while from 1977 certain items of gear have also been included in the scheme.

From about 1974 the Saudi government has also operated a scheme to assist Saudi fishermen to invest in larger boats and engines. In this case half the cost is paid immediately by the fisherman and a quarter is a government grant. The remaining quarter is a government interest free loan repayable over one to five years. Since however very few Saudi nationals now actively fish as a means of livelihood, the scheme is not reducing in any way the country's reliance on foreign fishermen. Rather it is subsidising former Saudi fishermen to build up fleets of two three or more large vessels which are then captained and crewed by foreigners.

A similar scheme has been operated by the government of the Sultanate of Oman in Dhofar and from 1974 several hundred small aluminium boats and engines have been distributed on a grant-loan basis to interested fishermen. From 1976 the Sultanate government has ordered further consignments of aluminium boats and engines and at the time of writing distribution to fishermen in northern Oman is underway. In this case one-quarter of the cost has been met by down payment by the fishermen, and a further quarter by a government grant; the remainder is a loan repayable over a maximum of three years.

In view of the findings of the present writer on the Batina detailed in Chapter Seven that the supply of tackle and the repair of engines are greater problems for the fishermen than the simple acquisition of boats, it may be questioned whether such schemes, at least in the case of Oman, should

take priority as they have done.

Government loan and grant-loan schemes of this type have indeed played only a relatively small and recent part in helping to introduce innovations to the artisanal fishermen of the Peninsula. Already by the mid 1960s improved fishing tackle and motor power had made their appearance in almost all parts of the region as a result of the initiative of the fishermen themselves. In Saudi Arabia local fishermen have financed the improvements both from their rising income made possible by the increased demand for fish, and, once they had left active fishing for less strenuous jobs on land, also from their non-fishing wage jobs. In the Gulf states the pattern has been very similar, though in Kuwait there has been an important additional source of finance for capital investment. This has come from the Kuwaiti fish wholesalers who began advancing loans to both Kuwaiti and Iranian fishing boat owners to allow them to motorise their craft and improve their gear. In the case of nothern Oman, as has already been seen (Chapter Six, Section 5), the financing of innovations has been mainly through money saved by fishermen working in the Gulf.

In the large majority of cases therefore innovations have been paid for from private sources and not from government loans and grants. Nevertheless, this has produced in a relatively short time an artisanal fishery which, taking the Peninsula as a whole, is relatively well equipped compared with those of many developing countries.

Of greater help to the fishermen have been government schemes to establish repair workshops. In the U.A.E. about one dozen marine engine repair workshops have been set up since 1973,

again at the instigation of A.W. White. The workshops are strategically placed around the coasts and the fishermen pay only the cost of spare parts, labour and expertise being provided free. In 1974 White set up a similar workshop on behalf of the government of the Sultanate of Oman at Salala in Dhofar, and more recently (1978) the Sultanate government has announced a plan to establish several similar workshops on the Batina coast, though at the time of writing this has not yet materialised. Since, as was found on the Batina (Chapter Five, Section 3), the greatest single difficulty facing fishermen with motors in Oman is that of servicing and repairing their engines, such workshops as these represent a very substantial benefit to the artisanal fishermen.

12.2.4 Government intervention in marketing

Certain governments have also intervened in the marketing side of the fishery in an attempt either to increase and improve the supply, or to reduce prices by artificial price controls. Beyond the construction at some centres of retailing facilities by governmental or municipal authorities, such attempts have however produced little good effect, and occasionally have been damaging.

In Bahrain the government attempts to supply fish at low prices from its industrial fishing enterprise. However the public still buys most of its fish from artisanal sources through the traditional outlets at prices three or four times the government prices. This is partly because the government fish comes deep frozen from commercial vessels, whereas the consumer strongly prefers fresh fish and is prepared to pay much higher prices for it. Even if this were not so however the government supply is not nearly enough to meet the demand.

The government of Oman too has attempted to increase the supply of fish for the local population from its own three trawlers and from the part of the catch supplied by the foreign companies holding concessions for fishing in Omani waters. Frozen fish from these sources are supplied to Mutrah fish market and an attempt was also made by the government to transport frozen fish by refrigerated lorry to sell at the markets of the Interior at heavily subsidised prices. Technical difficulties of preserving the quality of the fish under refrigeration have however been great, while the amounts involved have been small compared with the artisanal catch. As will be remembered from Table 8.6, the catch from the government vessels was only 503 tonnes in 1976. In any case, frozen fish are less liked by the Omani population than fresh, while the catch of these commercial vessels is mainly bottom dwelling fish from trawls rather than the pelagic species which are locally preferred.

In 1974 maximum retail prices per kilogram were laid down by the Kuwaiti authorities for the sale of fresh fish in the markets of Kuwait City and Fuhayhil. Although still nominally in force, they have never been adhered to. One reason is that the auction prices at which the retailers buy are neither quoted by weight nor are they subject to the price control. Further, demand so exceeds supply for most of the year that consumers with enough money are prepared to buy dearly. Consequently actual prices are several times higher than the official maxima.

In the U.A.E., Abu Dhabi alone has attempted to control retail fish prices by imposing official limits on the prices fishermen could receive when selling at Abu Dhabi. The policy soon had to be abandoned since the fishermen understandably

stopped selling at Abu Dhabi and delivered instead at Dubai and elsewhere where there were no price controls. This is very reminiscent of the event at Khabura described in Chapter Six when the wali attempted to impose price control. The result, as will be remembered, was the cessation of fish supplies to Khabura market until the wali had retracted.

In short therefore little success has so far been achieved in the region in terms of reducing or even regulating retail fish prices. There are grave practical as well as economic difficulties in the path of a government or municipal authority which seeks to intervene directly to adjust market forces. To impose on the fishermen maximum prices above which they may not sell is impractical without the cooperation of all the market authorities in the area and effective control of all other alternative outlets which the fishermen may choose. In any case, to determine what is a reasonable price which is fair to the fishermen is difficult in itself.

The task is made intractable by the fact that fish supply to the countries of the Gulf and Hijaz is almost wholly dependent on fishermen who are not nationals of those countries. The motive of those fishermen for selling where they do is the higher prices they can thus achieve for their catches. If price control is too efficient, the foreign fishermen will stop selling at those markets and the fish supply, already on the whole insufficient, will be reduced even further.

If on the other hand a governmental or municipal authority offers unrealistically high prices and then retails at subsidised rates, more fishermen will almost certainly be attracted to that market and the supply of fish will probably rise. However the cost of the subsidy to the authority will be

great. Further, the attraction of greater numbers of fishermen to one market in the area may well result in a diminution of fish supply to others.

12.3 Industrial fisheries development

12.3.1 Characteristics of industrial fisheries

Industrial fisheries enterprises are radically different from the artisanal sector in two significant respects. First, their technology is of a much more advanced order, their capital to labour ratio is high, and the basic unit tends to be a large public or private company rather than a family. Second, the primary object of all the large scale enterprises so far set up in the Peninsula has been, or has come to be, to produce a refined product for export (or at least for non-local consumption), and any supply of finfish for local consumption has been a by-product.

These characteristics impose four conditions on industrial projects. These can be viewed as follows:

(a) Large capital investment, whether in craft and tackle or in processing plant, demands, if it is to be profitable, a regular and dependable supply of fish not only from year to year, but also throughout the year.

(b) A sure market for the product must exist, and if such a market cannot be found locally, means must be assured of transporting the product to the market.

(c) The quality of the product must be such that it can meet the requirements of the market in terms of both taste and price, and be able to compete with other sources.

(d) The capital intensive equipment, both the craft and the shore facilities, demands expert handling and servicing, and a good supply of spare parts must be guaranteed.

If all four conditions are not met the result will be at best a partial failure of the project, and at worst its complete abandonment. The difficulties encountered by industrial enterprises in the Arabian Peninsula can be put down in every case to a failure to meet one or more of these conditions, as will be seen.

12.3.2 Early attempts at industrial fisheries development

In the wider region the first project which can be called an industrial enterprise seems to have been the sardine canning factory built at the outbreak of the Second World War at Bandar Abbas, Iran. Set up with Danish advice and assistance, the project was a government scheme. Although it benefitted at first from the abnormal wartime conditions which effectively eliminated competition, it was early hampered by difficulties in obtaining tinplate, in maintaining quality control, and also from the government's policy of charging high prices for its products (Bertram 1944c p.88). Some machinery was modernised in 1957-58 and again in 1966 (Anon. (F.A.O.) 1968), but more recent reports suggest that even after almost forty years of functioning the plant has never lived wholly up to the optimism of the original conception. However, that it has at least stayed in existence makes it one of the more successful industrial fishery projects in the region.

In the Arabian Peninsula proper, the first attempts at setting up commercial ventures took place in the late 1940s in

the East Aden Protectorate. Early attempts on the part of the British Government to set up at Shihr in the Qu'aiti State a pilot sardine canning plant and a fish meal plant unfortunately coincided with the very poor sardine harvests of 1948-49 and 1949-50, and largely as a result of this both projects collapsed. Norwegian interest was expressed at this time in establishing sardine packing plants on the same coast, but nothing seems to have resulted, probably again because of the bad harvests.

In 1950 however two local brothers, with considerable financial backing from the British and Qu'aiti governments, opened a small fish processing factory near Mukalla. The brothers' company employed nine Italians as skilled labour for the factory and for the fishing vessels owned by the company which together with the local fishermen were to provide the fish supply. Because of mismanagement, in particular lack of detailed costing and realistic planning, and also practical difficulties in keeping the company's vessels at sea and in obtaining large enough supplies of fish, the whole project made a considerable financial loss and was forced to close a few years later, owing large debts to both the Qu'aiti State and the British government. The total production from the operation during the few years of its existence was tiny compared with the money that had been invested in it, and in the words of the Assistant Fisheries Officer at Mukalla between 1957 and 1960, "All in all, it appears to have been a pretty appalling mess" (Anon. (Govt. of Aden) 1960 p.24).

12.3.3 Industrial shrimping in the Gulf

These then were the first attempts, so far as can be ascertained, at commercial or industrial fishery projects in the Arabian Peninsula, and they occurred as a result of governmental prompting. Industrial projects on a larger scale first made their appearance, and are now furthest developed, on the Arabian Gulf side of the Peninsula in the late 1950s, and were, at least initially, the result of private enterprise. Since 1959 both Bahrain and Kuwait have had large shrimp fishing companies which catch and pack shrimps by modern commercial means. As the 1960s progressed, Gulf shrimp fishing grew and companies were set up in the eastern province of Saudi Arabia and in Qatar. Iranian, Soviet and, from 1967, Iraqi commercial shrimping vessels also began fishing in Gulf waters. Kuwait however, with its four shrimping companies, retained the largest part of the total fleet with seventy of the total of about 130 vessels in 1967 (Boerema and Job 1968 p.9). The largest of the Kuwaiti companies was moreover by then sending its biggest vessels out into the Indian Ocean and even the Atlantic in search of shrimp.

From 1959 the commercial shrimp catch of the Gulf companies rose steadily to a peak in the 1968-69 season estimated by Ellis (1975 p.4) at 16,500 tonnes live weight. At the same time the total shrimping fleet of the companies had risen roughly proportionally. The 1969-70 season however saw a large drop in the catch to only 11,000 tonnes, and in the period from the 1970-71 season to that of 1973-74 the catch per season averaged only 10,000 tonnes. (Table 12.2 reproduces Ellis' figures). Since then no detailed statistics have been

Table 12.2 : Catches of shrimp by Gulf countries 1961-62 to 1973-74, as estimated by R.W. Ellis

Season (July to June)	Estimated total catch of Gulf in tonnes (live weight)
1961-62	1,300
1962-63	1,900
1963-64	4,000
1964-65	10,000
1965-66	12,000
1966-67	13,000
1967-68	16,200
1968-69	16,500
1969-70	11,000
1970-71	9,000
1971-72	9,500
1972-73	10,200
1973-74	11,500

Source : Ellis 1975, p.4.

found by the present writer, but his visit to the Gulf states in 1977-78 indicated that in Kuwaiti and Saudi waters at least the catch has continued to fall.

Despite the drop in the catch from the 1969-70 season, the fleet nevertheless continued to expand for several years. By 1972 however it was clear to the largest companies that they had overextended. The three largest Kuwaiti concerns amalgamated to form a single company, the United Fisheries Company (U.F.C.), which the Kuwaiti government assisted by buying a forty-seven per cent share, and reduced considerably the size of their fleet. Even so, in 1977 manpower difficulties meant that only one-third of the reduced U.F.C. fleet was active at any time, while the catch of the company in the 1976-77 season (according to the Kuwait Institute for Scientific Research) was only some 400 tonnes compared with several thousand in the boom period before 1969-70.

The precise reasons for the dramatic decline in shrimp catches after 1969 are not entirely clear. Harbour development and land reclamation in Kuwait, Bahrain and elsewhere may locally have been partly responsible by destroying spawning grounds. Ellis (1975 p.15) is firmly of the opinion however that overexploitation, at least in Kuwaiti and Saudi waters, was the main reason, and that a decrease in the fishing effort might well have produced a larger total catch. Whatever the causes, the Gulf commercial shrimping industry underwent spectacular growth in the 1960s, and has since 1970 suffered a considerable decline. Retrenchment and wastage of capital has been the result.

It is perhaps worthy of note however that the smallest

of the original four Kuwaiti shrimping companies, Mishari Khalid al-Zaid, saw no need to join with the other three when they formed U.F.C. and it still functions as an independent company. Being considerably smaller than the other three, it had presumably not overextended itself by 1972 and consequently was more in tune with the nature and size of the available shrimp resource. Moreover, probably the most successful shrimping company in the Gulf is the Bahrain Fishing Company, and according to Ellis (1975 p.13) the fishing effort in the Bahrain shrimping grounds, unlike that in Kuwaiti and Saudi waters, was most probably not too high in relation to the shrimp stocks. The Gulf shrimp industry therefore emphasises the lesson that a major requirement of an industrial fishery, if it is to be successful, is that it is geared appropriately to the size and nature of the resource which it is exploiting.

In addition to the shrimping companies, there have been other attempts by private enterprise to set up industrial fishery projects in the Arabian Peninsula, but none has been on the scale of the shrimping operations of the Gulf. In the late 1960s for example in the Red Sea a Saudi company was established in Jedda to catch finfish with trawls and lines in the area of the Farasan Banks, thought to be the most promising part of the Saudi Red Sea waters. Within a very short time however it was forced to close its operation, presumably because of insufficient catch rates.

12.3.4 Industrial fishing concessions

Several countries of the Peninsula have from the 1960s entered into concession agreements with foreign parties for the catching of finfish. Such agreements have become especially

important and wide ranging since the mid 1970s with the proposed extension of national economic zones to 200 miles. The foreign countries figuring particularly prominently in taking up concessionary agreements have been Japan, the Soviet Union and more recently Korea. In addition, Iraq, probably concerned at the reduction of its Gulf catch the 200 mile extensions would cause, signed an agreement with the People's Democratic Republic of Yemen in late 1977 to fish off the South Yemen coast, while in the late 1960s and early 1970s Kuwaiti shrimping vessels were fishing both Saudi and Iranian waters by mutual agreement.

Both Japanese and Korean commercial fishing operations on a concessionary basis are said to have been mooted in the late 1960s or early 1970s in the southern third of the Red Sea. No lasting operations emerged however, presumably because trial catch rates were too small, and it has been the South Yemeni and Omani coasts which have attracted the most intense interest in concessionary agreements by foreign companies. Oman's first concessionary agreement took effect from April 1976. A Japanese fishing company was granted sole right to fish most of the continental shelf off the southeast coasts with four trawlers. In late 1977 however the Japanese terminated the agreement. Although the exact reasons for this are not clear,it is likely that the company was not making large enough catches. In 1976 these amounted to only 6,301 tonnes and in 1977 to 6,868 tonnes, and forty per cent of this was the property of the Oman government under the terms of the contract. The Japanese company was replaced by a Korean concern which began operations early in 1978. Initial indications are that the Koreans are achieving larger catches than

the Japanese who had already identified the best grounds for them, though this may well prove only temporary.

Concessionary fishing agreements of this type have generally included the delivery of part of the finfish catch to the grantor country. In such cases capital intensive shore facilities for preservation and marketing have generally had to be installed in the grantor country to cope with the additional supply, and provision of these have frequently been written into the agreement. In the instance of Oman, the Japanese company provided forty per cent of its catch to Oman. In the agreement with the Koreans only thirty per cent of the catch is delivered to Oman, but Korean help in setting up a proposed fish meal project is also included. Nevertheless, the problem remains that the tastes of the local population in Oman as elsewhere in the Peninsula are strongly for fresh fish, or at least iced fish, in preference to the deep frozen product supplied by such concession agreements. In the case of Oman some of the frozen fish has reportedly been exported to Kuwait, Jordan and Egypt, though the quantities involved have been small compared with the artisanal catch.

12.3.5 Recent government fishery projects

In such concession agreements any financial risk there may be in the venture lies squarely on the shoulders of the grantee company. There have however been several instances in the Peninsula of industrial fisheries projects in which the government or the country concerned has been responsible for the major financial commitment. Early examples of such projects which failed were given earlier in this section (Subsection 3.2 above). Since the 1960s industrial projects

have tended however to become larger and more ambitious, and the capital which a government stands to lose in the event of failure is consequently greater.

The most ambitious government projects so far attempted concern fish meal production in the U.A.E. Because of rising world prices of that commodity, fish meal offers a potentially attractive proposition, and can be established without using fish traditionally important for human consumption. In June 1977 the Ra's al-Khayma government's fish meal project started operations as a joint venture with a Norwegian company. White with Barwani (1971 p.126) had suggested that a maximum sustainable yield of some 600,000 tons live weight of sardines per year was possible from the waters of the Lower Gulf, and on this basis had concluded that a fish meal industry in the U.A.E. was feasible. In this light the gearing of the Ra's al-Khayma venture to an annual catch of 125,000 tonnes live weight appears reasonable.

However, the basis of White and Barwani's estimates appears never to have been explained or tested in detail by the Norwegian company with whom the contract for the venture was concluded. By late 1977 it had become clear that the annual catch rate of the scheme in the first year of its operation would be only about one-third of the planned capacity and far below the catch rate necessary to produce a sufficient return on the capital invested. As a result the project was shut down in 1978, barely a year after it had opened.

Before the Ra's al-Khayma problems became evident, two other Emirates of the U.A.E. had already embarked on plans to set up even more ambitious joint fish meal projects.

Basing its estimates on an F.A.O. study of Gulf stocks a Peruvian fishery corporation assured the Ajman government that the quantities of fish in the lower Gulf were sufficient to support a fish meal factory served by a fleet of twelve craft with an annual capacity of an astounding 400,000 tonnes live weight. By the time the Ra's al-Khayma project started in mid 1977 the construction of the joint Ajman-Peruvian factory was already underway, while a similar project for Kalba on the Gulf of Oman coast was being worked out by the government of Sharja. On the experience of the Ra's al-Khayma venture it would now seem very unlikely that the Ajman and Kalba projects will ever be completed, still less fully productive.

Since 1972 the Omani government has been attempting to establish fish catching and handling facilities. The project at Sohar, work on which was begun in 1973 by F.M.C. with $3.1 million of government money, has already been reviewed briefly in Chapter Nine (Section 4). It failed initially in its attempt to use modern technological equipment because it had not foreseen the difficulties of keeping its eight vessels at sea under Batina conditions. Despite a training period in California, the eight Omani fishermen employed by the project proved incapable of handling and maintaining the boats efficiently, and finally left the project, being unwilling to remain as mere employees. Communication between the F.M.C. management and the employees was poor and mechanical failures in both craft and shore facilities were not remedied promptly. Latterly the project failed to attract enough fish from local artisanal fishermen because it did not take into account the freedom the fishermen have in disposing of their catches. By the time of the present author's

last visit to Sohar in December 1978, the physical fabric of the project was decaying, the ice plant was broken, and negligible quantities of fish were being handled.

In addition, since 1973 the Omani government has run an exploratory fisheries vessel, and from 1976 has owned three trawlers equipped with radar. Technical difficulties, especially in supplying spare parts, have reduced the efficiency of these vessels considerably however, and catches are poor as a result. In 1976 these government craft caught only 503 tonnes of fish and in 1977 their catch was 1,105 tonnes (over half of which was from the exploratory vessel alone). The record of direct government involvement in fishing operations has thus been disappointing in Oman as elsewhere in the Peninsula.

12.4 Fisheries research in the Arabian Peninsula

Bertram recommended in his 1948 report that Oman organise the collection of statistics on the quantities and types of fish caught by its fisheries, and indeed this is an essential recommendation for a fishery that is seeking to develop. He also rightly judged that at that stage Oman need not concern itself with the investigation of the biological aspects of the fishery which, although essential in the long run to development, would best be left to neighbouring countries which were better equipped to carry out such investigations (Chapter Three, Section 2).

In fact at that time the only effort in collecting any kind of fisheries data in the countries of the Peninsula seems to have been in Aden and the Protectorates to which,

as has been stated (Section 2 above) an expatriate fisheries officer had been appointed in 1944. A record of catch statistics was started there in 1948, though because of practical difficulties it was maintained only intermittently until 1957 when a more continuous record was kept.

By the mid 1970s however the position had advanced to the state where most of the countries of the Peninsula were carrying out some form of fisheries research and data collection, though in both quality and quantity the status varies from country to country. Most governments now own a fishery research vessel with which to carry out stock evaluation and species assessment and most are advised in this by expatriate experts.

Concerning statistics on the fishing workforce, estimates of numbers of fishermen have appeared from time to time from various sources, though not all are of equal reliability: the general tendency would seem to be to overestimate the numbers. Bahrain in 1965 and 1971 and the Trucial States (now the U.A.E.) in 1968 produced national censuses which give the numbers of fishermen in those countries. The U.A.E. took a second census in 1975, but this and the Kuwait census of 1975 have not officially been made public. None of these censuses however give a detailed socio-economic breakdown of the fishing population. In Saudi Arabia the White Fish Authority in conjunction with the Saudi Ministry of Agriculture and Water Resources have since 1973 been conducting a more detailed survey of the fishermen of that country of which details are becoming available, while Oman has plans for its own socio-economic survey of fishermen,

though only a pilot survey has been done so far at the time of writing. In view of the mobility of fishermen within the region already outlined, the collection of data of even an elementary kind on the fishing workforce is however a difficult task.

Some countries, including Saudi Arabia, Kuwait and from 1978 Oman, have also attempted to establish schemes to collect marketing and price data on the artisanal catch, though the coverage has tended to be patchy and confined only to major market centres.

As for the more biological aspects of the Peninsula fisheries, work is being done especially by the Kuwait Institute for Scientific Research. Other countries including Oman and the P.D.R.Y. are currently considering the establishment of national marine institutes, though the value of these is perhaps questionable in terms of priorities. Biological and hydrological data on the Gulf, Red Sea and Arabian Sea have also been produced by the efforts of international research projects in the area, notable the International Indian Ocean Expedition (see e.g. Zeitzschel 1973), while the joint U.N.D.P.-F.A.O. research project in the Arabian Gulf and Gulf of Oman, involving all the countries bordering the two gulfs and based in Qatar, has been underway since 1977.

12.5 Conclusions on Arabian fisheries development

All the countries of the Peninsula now have a government department or directorate responsible for fisheries policy, and in nearly all cases most available attention and resources have been so far directed to industrial fisheries

development in preference to the artisanal sector. However the performance of most of the industrial fisheries projects so far established in the region has on the whole disappointed their initiators.

This has been the case whether they have been set up by government agencies or by private enterprise. In the former cases, however, the results have been particularly worrying, since government ventures have tended to involve large amounts of public money without the same need for accountability or urgency which would be priorities in privately financed enterprises. Although by investing large sums in industrial fisheries several governments of the region have hoped for proportionately large returns, the ability to select, execute and administer schemes that are feasible and appropriate for the environment seems to have been lacking in most instances, though in many cases expatriate consultants, concerned foremost with their own interests, must be held largely responsible for some of the worst failures.

It is common for those concerned in such cases, whether government or consultant, to attribute difficulties and failures of industrial ventures to lack of sufficient data on which to base realistic assessments of potentialities and possibilities, and in particular of what are maximum sustainable yields. Indeed, scarcely has a report been written or a conference convened on Arabian fisheries over the last thirty years which has not ended by calling for more data on fish stocks, movements and spawning habits.

More information is certainly desirable, and such is the nature of fisheries that there will always remain yet more to be discovered, measured and assessed. Nevertheless, very

much more is known now of the fisheries of the Peninsula in terms of both the present situation and the potentialities than ever before, and yet costly mistakes continue to be made. In the opinion of the present writer the key to successful future development of the fisheries of the region lies not so much through amassing more data (important though this may be), but rather by appraising more critically the data which are already available, and above all by learning from past experience.

Viewed in this light, four major points can be made in conclusion. First, industrial fishery projects have proved more difficult to establish in the Peninsula than would appear from the desk studies on which many of them seem to be based. The reasons for this can be traced back to failure to meet one or other of the conditions of viability listed at the beginning of Section 3 above. The difficulties may even call into question the feasibility of attempting any industrial fisheries, at least of the type so far seen, and should certainly dispel any belief that an industrial fishery can be bought ready-made and self-generating 'over the counter', as long as enough money is paid for it.

It may well be that large-scale industrial ventures may prove eventually to be the only suitable way of exploiting to the full the undoubtedly large potential of the south and southeast coasts of the Peninsula. What is suggested here however is that in cases especially where government investment is concerned, tentative, smaller scale projects are first tried to establish feasibility before large amounts of capital are committed irrevocably. Otherwise the most appropriate

course would seem to be by concession agreements with foreign companies since it is the latter that would bear the risk.

The second point which stands out is the fact that even those industrial projects which have been successful have gone very little way to increasing the supply of fish to the population of the Peninsula. If this is to be a major aim of fisheries development in the region, then they have clearly failed in this respect, even though the export from successful ventures may have been beneficial in other ways to the countries concerned, especially those which have little or no oil to boost development.

Thirdly, this brief review of the region's fisheries shows clearly the continued importance and success of the artisanal sector, especially when contrasted with industrial attempts. Far from being 'inefficient' and 'relatively unproductive' (as for example the Middle East Economic Digest (23 March 1978) would have us believe), it is the artisanal fisheries which have adapted best to changing conditions. Their importance can be gauged by the fact that they continue to provide the vast bulk of the fish consumed by the population of the Peninsula, not only in the rural areas, but in all the urban centres also. Compared with most of the industrial fisheries enterprises they are relatively efficient in their use of capital and labour by virtue of their physical flexibility and their ability to adapt to new demand patterns.

The last point which emerges is that government assistance and intervention in the artisanal fishing and marketing patterns have been helpful in stimulating the

the artisanal fisheries to greater efficiency only where that intervention has been geared to meet real needs, as for example in providing motor repair workshops. When the intervention is not in tune with local conditions, as in the cases where governmental or municipal authorities have interfered with the pricing system, the result has been at best wasteful effort and at worst actually counterproductive.

The role of future government policy in fisheries, whether industrial or artisanal, should therefore be carefully considered in the light of these lessons from past experience. What this means specifically in the context of fisheries development in the Sultanate of Oman is examined in the next chapter.

CHAPTER THIRTEEN

Omani fisheries : review and prospects.

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Omani fisheries : review and prospects

It has been the overall purpose of this thesis to discuss the fisheries of Oman, and in particular of the northern part of the country, not in isolation and for their own sake, but rather in the context of their development and the development of the Sultanate. Consequently the purpose of this concluding chapter is to focus on what the findings of the author's survey of the northern Omani fisheries imply for fisheries development in Oman and what they contribute to a more general understanding of development processes.

13.1 Advantages of artisanal fisheries in Oman

It is convenient to begin by reconsidering in the light of the findings of the survey the five potential advantages of artisanal fisheries over industrial fisheries, advantages which were claimed *prima facie* in Chapter Two (Section 3).

13.1.1 The physical flexibility of the artisanal fisheries

In view of the evidence put forward in Chapter Eight (Section 2) that the number of edible species available for capture in Omani waters is large and that in many cases their abundance varies considerably both seasonally and from year to year, Oman requires a flexible fishery if it is to harvest thefull potential of its marine resource. In the past the artisanal fishery has coped both with the large variety of species and with their seasonality by having at its disposal different methods of capture and curing (Chapter Three, Section 3). The total catch has dropped in recent years not because of the difficulties of adjusting to heterogeneity

and seasonality but for other reasons discussed in Chapter Three (Section 4). The present ability of the artisanal fishermen to cope with the heterogeneity and seasonality of the catch is still reflected in the variety of different fishing methods in use and their variation in relative importance along the coast, as was seen in Chapter Five (Section 2 and 4), while the small scale of the handling and marketing units allows diverse catches, which may vary in size and composition from day to day, to be accommodated (Chapters Nine and Ten).

In contrast, the seasonality and unpredictability of the pelagic fish in particular has been a contributory cause of the lack of success of several industrial operations in the Arabian Peninsula (Chapter Twelve, Section 3).

Further, the ability of the artisanal fishermen to ultilise areas of sea close in to the shore, which are unsuitable for industrial fishing, is reflected in the fact that they employ several fishing methods specifically for such conditions, notably beach seines, castnets and the faruwa method (Chapter Five, Section 2). Similarly, the fish traders and trader-transporters can successfully operate with small quantities, can switch their operations from market to market, and can deliver to small and distant settlements (Chapter Ten) in a way that a large, centrally organised industrial organisation could not.

13.1.2 Responsiveness to local conditions and needs

It has been shown at several points in this thesis that where an idea is within the reach of the artisanal fishermen and fish traders it will be taken up if it meets local

requirements and fits appropriately into their lives. In Chapter Three (Section 4) it was indicated that when import restrictions in the Sultanate were relaxed, the fishermen willingly adopted motor power and appropriate modern equipment. In Chapter Six (Section 6) a specific example was given of this process in action, namely the adapting of shash to accommodate engines. This illustrates the flexibility of the fishermen's mental attitudes to experiment with new ideas which, when proved to be both appropriate and beneficial, are then adopted more widely. Further, once motorisation was adopted, many fishermen have been willing to alter their fishing schedules and increase the distance from the shore that they fish (Chapter Eleven). In Chapter Ten (Section 5) it was seen that fish trader-transporters in the Northern Interior have similarly been open to innovations and have adopted motor transport and the use of ice for fresh fish when these have become available. All these are examples of how the artisanal fishery has been able to respond to local circumstances and so meet local needs more fully.

In contrast, many governmental or other official attempts to introduce innovations into fisheries in Oman and elsewhere in the Arabian Peninsula have been less successful. As has been discussed in this thesis, their lack of success can in many cases be put down to failure to meet local conditions and requirements. Mardela's (1975) dismissive attitude to early attempts to motorise shash on the Batina (Chapter Six, Section 6) illustrates the lack of appreciation many outsiders show for local potentialities and needs. The F.M.C. project at Sohar failed mainly because

of technical difficulties and the problems of spare part supply; and in any case the demersal species caught by trawl are not those liked best by Omanis (Chapter Eight, Section 2; Chapter Nine, Section 3; and Chapter Twelve, Section 3).

Similarly, attempts by governmental, municipal, or local bodies in Oman, Abu Dhabi and Kuwait to interfere artificially with the market fish price mechanism have not worked because they have ignored local conditions (Chapter Six, Section 4; and Chapter Twelve, Section 2). Municipal attempts to improve the physical conditions of fish markets in Oman have not always been successful (the case of Salala especially was mentioned in Chapter Nine, Section 2) because the needs and methods of working of the fish retailers were not met.

In short, intervention which is inappropriate for local conditions has not succeeded, and failures have been particularly costly when the intervention has been of the industrial fishery type. Where outside intervention has met real needs of the artisanal fishery (as for example in the provision of marine motor repair workshops in Dhofar Province and in the U.A.E. (Chapter Twelve, Section 2), or in the building of better roads as in the Interior of Oman (Chapter Ten, Section 6)), it has been successful.

13.1.3 Utilisation of rural resources

Although most of the materials and all the machinery which serve to equip the Oman artisanal fishery have to be imported, it is otherwise wholly the product of local industry, skill, craftsmanship and enterprise. It has been seen (Chapter Five) that the skill of the fishermen in making up nets and in fishing, and of the boat builders in constructing

fishing craft are locally available abilities which exist now. If allowed to disappear in future such skills might be lost for ever. Similarly, it has been shown (Chapters Nine and Ten) that entrepreneurial skills and willingness to take risks in trading and transporting fish are by no means lacking in Oman.

In view of the present situation in the Gulf states and in western Saudi Arabia where the native skills in fishing are now no longer used (Chapter Twelve, Section 2), it is conceivable that the same danger could in future befall Oman. Yet if Lele (1975 and 1976), Schultz (1962) and others whose opinions were quoted in Chapter Two (Section 3) are correct, local skills such as exist in the Omani artisanal fishery must be fostered where they are seen to be viable and to show promise. In Oman, in the mid 1970s, it is these skills and abilities which succeed in exploiting the local resource of fish in inshore waters and provide the large bulk of the country's fish. In this they have been more successful so far than industrial ventures.

13.1.4 Rural employment

Many regard the drift of rural population to the towns in developing countries as an inevitable process (see for example R.A. Beard's (1974) conclusions). In Oman, the pull the Capital Area exerts on the rural population will doubtless increase in the future, bringing with it problems of providing urban housing, sanitation, water supply and other services on the one hand, and a depopulated hinterland on the other. Nevertheless, the urge in rural Omanis to stay in their home settlements still remains strong at present. The desire

among fishermen on the Batina to remain Batina fishermen and the strong community feeling which they share (Chapter Six, Sections 3, 4 and 5) are encouraging in this respect.

As was noted in Chapter Two (Section 3) however, if the desire to remain rural is to be met, employment in rural areas must be available. As has been seen (Chapter Six, Section 2), the Batina adult male fishing population is about 3,500. Fish traders and other engaged in the fishery on the Batina probably make up another 100 to 200. If each man has five dependents, perhaps ten per cent of the Batina population and its seaward wadis (estimated at some 200,000) are supported directly by work in the artisanal fishery. It is true that many of these are at present subsidised from work elsewhere, as was argued in Chapter Six (Section 5). Nevertheless, the artisanal fishery does provide at least a contribution to rural employment, being distributed throughout the country, in a way that a locationally concentrated, capital intensive, industrial fishery would not. Further, since Oman's oil industry must inevitably decline in the near future, speed is a crucial concern. In this respect, the artisanal fishery has the advantage in that it already exists, whereas time would be needed to establish an industrial fishery, or indeed any other industrial venture, which would provide even a fraction of the employment opportunities.

13.1.5 Financial burden on the government

It has been observed (Chapter Three, Section 4; Chapter Ten, Section 5; and Chapter Twelve, Section 2) that the artisanal fisheries in Oman and in the Arabian Peninsula have generally in recent decades improved their methods and

equipment mainly by their own initiative. Over RO 1,000,000 had been invested in the mid 1970s by the Batina fishermen in their boats and motors alone (Chapter Five, Section 5), to say nothing of the unquantifiable amounts of capital invested by private individuals in trading and marketing vehicles and facilities throughout Oman. Most of the material improvement of the Omani fishery had therefore by 1976 been effected at no direct expense to the government of the Sultanate. Further, the risks associated with new fishing methods and equipment (Chapter Five, Section 6) and new trading patterns (Chapter Ten, Section 5) had similarly been borne by those individuals who had introduced the innovations. In contrast, direct involvement in fisheries of the Omani government and other governments of the Arabian Peninsula (Chapter Twelve, Sections 2 and 3) has been expensive and to a large extent a waste of national resources. The proper role of government in fisheries will be examined in Section 3 below. Here the point to be made is that government assistance to artisanal fisheries in Oman need not be unduly expensive if local private initiative is relied on as far as possible, and will certainly be less than government investment in industrial fisheries.

13.2 Problems of the artisanal fisheries in Oman

Although the artisanal fishery in Oman thus has potential and actual advantages over industrial ventures, several specific problems which confront both the fishing and fish marketing aspects of the artisanal fishery in terms of its efficiency have been identified by the present study. For the Batina fishermen with motors, and especially those on

the Upper Batina with diesel inboards, the greatest single problem is the difficulty of servicing and repair (Chapter Five, Section 3). Beaching the heavy wooden craft is another problem (Chapter Five, Section 3), while for all fishermen the acquisition of tackle, which will be remembered constitutes the largest proportion of costs of annual capital replacement, is a further difficulty since it is not generally available in the Batina markets (Chapter Seven, Section 2). On the remote southeast coasts of Oman these difficulties are probably even greater than on the Batina. Combining with the effect of higher prices paid for fish in the Capital Area and in the Gulf states, these problems have encouraged a large proportion of the Batina fishermen to work elsewhere than on the Batina for much of the year and so not use their equipment to its potential efficiency (Chapter Six, Section5; and Chapter Seven, Section 6).

Yet in the view of the present writer, the main constraint on the fishery of northern Oman is not in the catching of fish so much as in the handling and marketing phases. When export outlets for Omani fishermen existed the catch seems to have been higher than at present, despite the recent improvements in catching equipment (Chapter Three, Section 4). The "moderately efficient collecting scheme" which Dr. G.C.L. Bertram (1948 p.6) observed on the Batina had broken down by the 1970s in the face of more lucrative commodities for Mutrah merchants to trade in. The lack of an ice source on the Batina and the unimproved methods of curing, together with the difficult communications through the Western Hajar Mountains at the time of the survey, have

combined to deter Batina fish trader-transporters from taking large quantities of fish from the Batina to the Interior and thus from making up for the reduced demand from the exporting merchants. The Batina has been at a disadvantage as a supplier of fish to the Interior compared with other sources which, though more distant, are better placed in other respects (Chapter Ten, Section 3; and Chapter Eleven). In other words, demand on the Batina for fish has become largely restricted to the coastal strip alone because of handling and marketing constraints, and to this reduced demand Batina fishermen have responded by catching less fish.

It is also true that between 1970 and the time of the survey the quantities of fish in the sea available for capture were probably genuinely less abundant than formerly (Chapter Three, Section 4). Nevertheless, given an increase in the local demand, as happens just before festivals, more boats put out to sea and more fish are brought to the Batina markets (Chapter Nine Section 2).

This conclusion, that demand is of crucial importance, is by no means novel. Bertram (1944c. p.88) observed that in the context of the southern Iranian fishery the problem of fishery development was "largely one of transport and organisation rather than catching". Even earlier G.L. Faber (1883 p.42) was well aware of the important effects the advent of the railway was having on the Austro-Hungarian Adriatic fisheries by opening up new markets and thus bringing greater demand. More generally, the present conclusion is in agreement with Schumpeter's (1934) model referred to in Chapter Two (Section 2) that demand is the driving force

in production. Even so, the importance of the demand factor in the context of Omani fisheries development needs to be stated. The present writer submits therefore that attempts at developing Omani fisheries will be less than fully effective if they are confined to removing only the constraints which directly hamper the actual process of fishing, important though these may be. A large amount of effort must at the same time be diverted to improving conditions of handling and marketing, including the improvement of communications throughout the country, so that fishermen are encouraged by greater demand to catch more and be assured of sale at prices which are acceptable to them.

13.3 Implications for government policy

It was noted in Chapter Three (Section 3) that there were four major reasons why fisheries were important to Oman before the changes of the 1960s and 1970s: in supplying a local nutritional need (both directly in human consumption and indirectly through the use of fish for fodder and fertiliser); in giving employment to fishermen, fish traders, boat builders and others involved in the industry; in supplying a valuable export of cured fish and fish products; and in providing a source of government taxation on fishing boats, fish auctions and fish exports. To what extent these should be aims of fisheries development in the future will influence the present policy decisions of the government.

Since 1970 the last of these, the fishery as a source of taxation, has disappeared in the face of the vastly larger income the government derives from oil exports. In the short term at least, the government has no real need to reintroduce

taxation of the artisanal fishery, and indeed if it is eager to assist the fishery it had better not do so.

Exports of fish, at least from the artisanal fishery in northern Oman, have also disappeared since the 1960s, for the reasons given in Chapter Three (Section 4). S.J. Holt (1975 p. 85) has rightly drawn attention to the danger in many developing countries that exports of fish and fish products can be at the expense of satisfying home demand. However in the case of Oman, given that the potential resource in Omani waters is large, that exports in the past were considerable (Chapter Three, Section 3), that the present capability of the artisanal fishery is not being used to its full potential (Chapter Six, Section 5), and that demersal fish are not as well liked in Oman as elsewhere (for example, in the Arabian Gulf: Chapter Five, Section 2; and Chapter Nine, Section 3), there would seem to be no reason in principle why the artisanal fishery should not contribute in the future to Oman's exports with no detriment to the home market. The major constraints would seem to lie rather in organisation, handling and marketing, as has already been indicated (Section 2 above).

As for the other two pre-1960 reasons why Omani fisheries were important, that is, local nutrition and local employment, both continue to be important, and will continue to be so for the foreseeable future, and government policies must take this into account. The potential of the fisheries in providing rural employment has already been considered in the previous section (Section 1 above). Although not now used for fertiliser (on the Batina at least), cured fish still has an important demand in the Interior both for human consumption and also, in the case of dried sardines (uma jaffa), as a

fodder supplement, especially in the mountain zone, as was seen in Chapter Ten (Section 4).

How Omani fisheries develop will depend on conditions both in Oman and in the region and the world generally, which cannot be precisely forecast. Among the influences acting on them government policy will no doubt be increasingly important. The government in Oman has three practical options open to it in how it approaches fisheries development. The first is to abstain from any intervention. In such a circumstance it is likely that in the short term at least Omani fisheries would continue to develop under their own initiative as they have done over the last decade. In the longer term however such a policy might well lead to a further diminution of the effective fishing manpower as fishermen continue to seek work in the Gulf states and perhaps also in expanding sectors of the Omani economy. In particular the sons of the present fishermen, who are the first generation of Omanis to enjoy widespread formal education, may well be attracted away from fishing as has been the case in the Gulf states. To some extent such a migration from fishing might well be in the interests of the fishery as a whole in that a reduction in the numbers of fishermen might well be necessary to allow an improvement in the well-being of those who remain. However, at the time of the survey at least, no such move from fishing was observed (Chapter Six, Section 3). In any case, in the present climate this particular option of abstention from involvement in the fishery is unlikely since the Omani government has already declared its commitment to intervene and has begun to do so.

The other extreme option open to the government is to

attempt to replace the artisanal fishery with a modern, high technology fishery, and this has undoubtedly coloured some government thinking in Oman, at least until 1975-76. The proposals provided by the Mardela-F.M.C.-Del Monte consortium (Mardela 1975; F.M.C. 1975) and specifically the F.M.C. Sohar fisheries project (Chapter Nine, Section 4; and Chapter Twelve, Section 3), and also the purchase by the Omani government of three trawlers (Chapter Twelve, Section 3), are indicative of this type of thinking : ignore the artisanal fishery and replace with a modern, high technology fishery.

As has been shown in this thesis such attempts as have been tried in Oman and in the Arabian Peninsula to introduce high technology fishery projects have not been notably successful (Chapter Nine, Section 4; and Chapter Twelve, Section 3) either in increasing the fish supply for home demand, or in providing employment opportunities in rural areas, or in assisting the development of the artisanal fishermen by transference of technology. By far the majority of the fish consumed in Oman and the Arabian Peninsula is still supplied by the artisanal fisheries, and the amount of employment offered by the industrial fisheries is very small compared with the number of artisanal fishermen, while the artisanal fishery has developed to its present state through its own initiative by building on traditional practices rather than by imitating and adopting innovations wholesale from the industrial ventures which are in any case irrelevant to solving artisanal problems. In view of the experience elsewhere in the world, this is likely to remain the pattern certainly in the short term and probably also in the longer term. There may well be a place for

industrial fisheries projects in Oman in the future, especially perhaps in harvesting the undoubtedly large potential of the southeastern coasts, as was suggested in Chapter Twelve (Section 5), but it is very unlikely that they will replace the artisanal fishery in the foreseeable future, especially where the supply of fish to meet home demand is concerned. In view of the difficulties and risks involved in establishing and operating industrial fisheries projects, they can be justified in the opinion of the present writer only for purposes for which the artisanal fishery is not at present well adapted (as for example in the export of high quality products) and only when the interests of the artisanal fishery are not prejudiced. Even in these cases direct government investment and intervention should be kept to a minimum and be confined to small initial trial projects (Chapter Twelve, Section 5).

The third option open to the government is to assist and stimulate, either directly or indirectly, the artisanal fishery to enable it better to support and develop itself. Directly, the government could be tempted to become involved in the supplying of fishing equipment and in the handling and marketing of fish and fish products. In some parts of the world such direct involvement has often been attempted under the guise of cooperatives (for example, George 1973 pp. 5 ff in India). In some cases direct government support or subsidy may be justifiable for social if not economic reasons and according to some reports has been successfully channelled by means of cooperatives to the fishery (for example Motion 1977 in Kerala, India; Anon. (Govt. of India) 1971 in South Kanara, India. Direct government involvement is however open

to abuse and is not always successful, as R. Lawson (1970, 1972, and 1977a, in southeast Asia and elsewhere) has shown. If the spirit of true cooperation is to be real it should arise from those involved in the fishery themselves in response to real needs rather than be merely a government creation as a convenient means of distributing subsidies. (See Digby 1961 for a statement of what fishermen's cooperatives should ideally be).

In any case in Oman one of the major ills which cooperatives seek to cure - that of indebtedness of fishermen to merchants - does not exist (Chapter Nine, Section 5). It is arguable indeed that in Oman the major problem regarding, for example, fishing equipment and services is not the fishermen's inability to pay for them, but rather the fact that they are largely unavailable at the fishermen's home settlements. Considering the fact that fishing equipment and the capital to renew it is not in short supply on the Batina at least, direct subsidies from the government for the supply of fishing equipment, whether through cooperatives or by other means, would seem to the present writer not to demand high priority in terms of government policy.

Direct government involvement in marketing, whether through cooperatives or by other means, would seem similarly to lack justification in the case of Oman. Fish traders and trader transporters show enterprise and ability, fulfil useful functions, and are willing to take risks (Chapter Nine, Section 2; and Chapter Ten, Section 5). Contrary to frequently expressed public opinion, they do not on the whole exploit either the fishermen or the customers in Oman (Chapter Ten,

Section 5). Given the already large difficulties with which the Omani civil service has to cope, the present writer is of the opinion that direct intervention by the government in marketing would not lead to greater efficiency. The costs of directly subsidising fish distribution on a national scale are likely to be great, and in view of experience elsewhere (for example, Bertram 1944d p.117 at Aqaba; Anon (F.A.O.) 1971 on Lake Nasser; Lawson 1972 in southeast Asia) there would most probably be grave practical difficulties, especially in ensuring reliability of collection arrangements from the fishermen, if a government organisation were to attempt to undertake this task directly.

The government of Oman can probably stimulate the artisanal fishery more successfully by indirect measures. This would involve the government identifying real needs as perceived by the fishermen, fish traders and consumers throughout the country, rather than supposed needs as viewed by officials in the Capital Area. The government would need to understand how the present patterns operate so as not to introduce innovations which are inappropriate and which may upset the system. This in turn means a closer contact between the Directorate-General of Fisheries and the rural populations than has been the case in the past. The present survey has identified several such needs which have been noted in the text as they have occurred, and has indicated also how such needs can vary along even short stretches of coast and within relatively small districts. Needs change also with time which means that the Directorate-General of Fisheries must keep in constant contact with the rural areas in order to monitor

events and note new priorities.

Such contact could be established in Oman by stationing fisheries extension officers at strategic points on the coast with roving briefs, as was done for example in many former British colonial territories, and which was indeed suggested for Oman by G.C.L. Bertram (1948 pp. 19-20), as was noted in Chapter Three (Section 2). However, the securing of educated, capable Omanis who are prepared to live isolated from the Capital Area or expatriates who can communicate with the rural population is acknowledgedly great.

At the time of the survey many of the major needs of the fishermen and fish traders as outlined in Section 2 above, could be met by suitable back-up action in specific fields where private enterprise was not providing for them. Marine motor repair workshops and possibly ice plants are among these. Trials could also be conducted at very little financial expense to the government in improved methods of beaching boats, of preserving nets and other equipment and of fish curing, and advice in these could be communicated to the fishermen and fish traders. Undoubtedly also the further selective provision by the government of basic infrastructural services such as roads and rural electricity supply throughout the country, services which benefit the population as a whole, will also enable both fishermen and fish traders to work more efficiently.

Whatever specific government measures may be decided on however, they must fulfil certain conditions if they are to have the desired result of fostering the artisanal fishery. They must first of all meet genuine needs as perceived by those engaged in or affected by the fishery; they must fill

gaps which private initiative is not at present filling or cannot fill; and they must be flexible enough to modify their application to take into account both spatial and temporal variations. In a word, they must be appropriate.

13.4 Future indigenous development : beyond the artisanal?

Describing the pattern of events which took place in the Ghanaian artisanal fishery in the late 1950s and early 1960s, R.M. Lawson (1970) noted a fundamental change in modes of working and in attitudes among certain enterprising operators. She observed that "the first break-through in methods of marketing came when a few larger-scale producers, owning two to four motor vessels each, were obliged to find new outlets for distribution" (ibid. p. 253). By developing a larger scale of production and of marketing, Lawson continues, some of the more enterprising men involved in the fishery were able to raise the reliability of the supply and the quality of the product. The traditional small-scale fishermen and fish traders continued to exist, but from the artisanal fishery had emerged entrepreneurs who were capable of conceiving the opportunities of the fishery resource in a fundamentally novel way, a way which involved a larger scale of production coupled with attitudes which treat fishing and fish marketing not merely as a way of life but as a commercial business. This is indeed analogous to what happened in much of Europe and other parts of the developed world a century and more before. The difference between this process as it has occurred recently in Ghana, and the implantation of industrial, commercial fisheries as has been attempted in Oman, is that in the former case the initiative has arisen from within the artisanal fishery itself,

rather than being an imposition from outside.

In the mid 1970s there was no such move to be observed taking place in the Omani artisanal fishery. Operators, both fishermen and fish traders, continued to act as small-scale units, motivated by their desire to remain fishermen or fish traders rather than by any notion of maximising return on capital or of the advantages of the economies of scale (Chapter Seven, Section 5; Chapter Ten, Section 5). Even though Batina fishermen by the mid 1970s had widely adopted motor power and had taken advantage of the extended range over which it enabled them to fish, nevertheless very few fishermen indeed owned more than one motorised vessel (Chapter Seven, Section 1), and their basic attitude to fishing had not significantly altered from that before motorisation arrived. Similarly, trader-transporters in the Interior, though taking advantage of the speed and flexibility which motor transport gave them in by-passing intermediary markets and in introducing fresh fish to the Interior, continued to hold the same basic attitudes to trading in the mid 1970s as they had held before the introduction of motorisation. In short, the Omani artisanal fishery had in a material sense improved the standard of its equipment, but had not yet thrown up individuals with a vision of the fishery which is broader than that of an artisanal fishery. There was as yet no suggestion of the 'break-through' that Lawson observed taking place in the Ghanaian example.

Such a revolution in the attitudes of those engaged in an artisanal fishery requires time to develop. In the case of Ghana, motorised vessels appeared in the private sector in 1953 (Lawson 1970 p.251), and it was not until about seven

years later that Lawson's 'break-through' began. In Oman the liberalisation of import policy made diesel engines and large boats available only five to six years before the present field survey. Further, many Batina fishermen, and among them doubtlessly those who are the most enterprising, continue to go to the Gulf states to work. It is probable therefore that in the case of the Batina, enterprising fishermen have seen their best opportunities as lying in periodic migration and have not yet felt the incentive to become larger and more efficient producers by altering their attitudes and reaping the advantages of increasing the scale of their operations at their home settlements.

Whether they ever will cannot be forecast definitely. The crucial condition would seem to be whether they perceive the desirability of doing so. If the desirability becomes apparent, the present writer believes that the more adventurous of the fishermen and fish traders will alter their attitudes and develop from the artisanal base an indigenous, larger scale commercial fishery which by its nature eventually ceases to be artisanal, in the same way as they have been ready to meet new challenges in the past. Whether or not this happens however, the artisanal fishery as such will continue to exist at least for the foreseeable future and will fulfil functions which industrial or commercial enterprises cannot at present meet.

13.5 Conclusions: the prospects of the Omani artisanal fishery

To conclude this study it is convenient to recall the three questions posed in the Introduction. These were :

1. Is the Omani small-scale fishery physically capable

of meeting local demand for fish, and of perhaps producing a surplus for export?

2. Can it contribute to fulfilling the social requirements of development?

3. Is it likely to be able to function viably and economically in view of the rapidly changing socio-economic situation in Oman and particularly in the face of potential competition from industrial fisheries? Or must it be recognised that it is likely to survive and to provide a socially valuable function only with economic subsidies?

In view of the evidence presented in this thesis the answer for the foreseeable future to the first two questions is affirmative. The Omani artisanal fishery holds within it the capability of meeting local demand for fish and can contribute to the need for local employment. Given appropriate conditions, it has the potential also of regaining its former function of providing an export commodity which need not be to the detriment of meeting home demand. In these ways it can help towards the economic and social development of the country.

Concerning the third question, how the artisanal fishery actually performs in the future and to what extent it lives up to its potential will depend largely on the quality of government support. Such support need not be, and in view of present circumstances would probably better not be, in the form of direct subsidy. If the support is sympathetic and appropriate, the present writer is of the opinion that, far from being threatened by the rapidly changing socio-economic

situation in Oman, the artisanal fishery has the potential of continuing to develop as it has done since 1970 as a result of the stimulus provided by those very socio-economic changes, and indeed shows more promise of success at present than does any of the industrial fishery ventures so far attempted in the country. The outlook for the artisanal fisheries in the development of Oman is thus hopeful.

As stated in Chapter One (Section 5), this study is a case study. In detail, the patterns, problems and conclusions which it has revealed are specific to Oman and to Omani fisheries. The findings have also a wider relevance however in terms of the postulates discussed in Chapter One about development in developing countries, particularly concerning the response of indigenous populations to development and the danger of researchers and policy makers coming to inappropriate conclusions. Specific policies which are appropriate for Oman, or for one part of Oman, might well be inappropriate elsewhere, but the principle of appropriateness is of crucial concern everywhere. To identify in any specific instance what is appropriate requires a detailed case study of the type attempted here in the case of the fisheries of northern Oman.

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APPENDIX A

Questionnaire used in the fishing survey

A. Details of craft and ownership:

Q.1 Number of boats and shash owned or part owned:
(For each wooden boat:-)
- type
- when bought (no. of years before survey)
- where bought
- price paid when bought
- whether bought new or second-hand
- origin of boat builder

(For each shasha :-)
- when bought (no. of years before survey)
- price paid when bought

Q.2 Ownership and crewing:
(For each wooden boat and shasha:-)
- number of owners
- number of households from which owners come
- usual number of adults in crew
- sharing system used to divide costs and takings

B. Details of income and interests other than fishing:

Q.3 Garden ownership:
- size: large - more important than fishing
medium - equal to fishing in importance
small - less important than fishing
none - no garden owned

Q4 Other work:
- location
- type
- frequency

C. Details of engine and fuel consumption:

Q.5 (For each motorised wooden boat and shasha:-)
- horse power
- fuel type (petrol or diesel)
- make and type
- when bought (no. of years before survey)
- where bought
- price paid when bought
- whether bought new or second-hand
- when first motor bought (no. of years before survey)

Q.6 Fuel - consumption per usual trip
- usual source(s) of supply

Engine oil - consumption per month
- usual source(s) of supply

D. Details of medium-term costs:

Q.7 Sall (shark liver oil)
- amount used per boat
- frequency of application
- usual source(s) of supply

Repairs to craft and engines
- estimates of amounts spent since bought

E. Details of tackle owned:

Q.8 Nets: usual source(s) of supply of netting
(For each net:-)
- type and size
- costs (both including and excluding ropes, anchors, &c.)
- length of life

Q.9 Traps: usual source(s) of supply of wire
- number owned
- cost of each
- length of life

Q.10 Lines: number owned, and types.

APPENDIX B

List of Batina fishing settlements from Khatmat Malaha to Qurm

المرير		1.	al-Murayr
ابو بقرة		2.	Abū Baqara
البليدة		3.	al-Bulayda
عقر		4.	ʿAqr
شناص	V	5.	Shināṣ
سور ابن غزيمة	V	6.	Sūr Ibn Ghuzayma
سور العبرى	S	7.	Sūr al-ʿAbrī
سور بنى درويش	V	8.	Sūr Banī Darwīsh
سور المزاريع	V	9.	Sūr al-Mazārīʿ
سور البلوش - حسفين	V	10.	Sūr al-Balūsh (Husayfīn)
ام العنّة	V	11.	Umm al-ʿInna
اسرار بنى عمر - الاسرار		12.	Asrār Banī ʿUmar (al-Asrār)
اسرار بنى سعد - الاسرار		13.	Asrār Banī Saʿd (al-Asrār)
الدوانج		14.	al-Duwānij
رميلة		15.	Rumayla
نبر		16.	Nabar
حرمول	S	17.	Ḥarmūl
الحارة الشمالية - لجيس	V	18.	al-Ḥārat al-Shamālīya (Majīs)
الحارة الجنوبية - لجيس	V	19.	al-Ḥārat al-Janūbīya (Majīs)
عمق	V	20.	ʿAmq
الصنقر	V	21.	al-Ṣanqar
الناصرية / الفاصقة	S	22.	al-Nāsirīya/al-Fāsiqa
الزعفران	V	23.	al-Zaʿfarān
صلان	V	24.	Ṣallān
كورو - صحار	V	25.	Kūrū (Sohar)
الحضيرة - صحار	V	26.	al-Ḥudhayra (Sohar)
سور صحار	V	27.	Sūq Ṣuḥār (Sohar)

حارة شيراو - صحار		28.	Ḥārat Shīzāw (Sohar)
حارة الصبارة		29.	Ḥārat al-Ṣubāra
حلّة الشيخ		30.	Ḥillat al-Shaykh
غيل شبول		31.	Ghayl Shabūl
السويحرة		32.	al-Suwayḥara
خورسيابى		33.	Khawr Siyābī
العوينات	V	34.	al-ʻUwaynāt
البديعة	V	35.	al-Buday'a
مجزّ الكبرى	S	36.	Majazz al-Kubrá
مجزّ الصغرى	V	37.	Majazz al-Ṣughrá
سورالشيادى	V	38.	Sūr al-Shiyādī
حارة السوق - صحم	V	39.	Ḥārat al-Sūq (Ṣaḥam)
الرويلة - صحم	B	40.	al-Ruwayla (Ṣaḥam)
خور حمام	B	41.	Khawr Hamām
مخيليف	B	42.	Mukhaylīf
ام الجعاريف	B	43.	Umm al-Jaʻārīf
الردّة / ردّة الديل	B	44.	al-Radda/Raddat al-Dīl
الديل	S	45.	al-Dīl
المقاعسة	B	46.	al-Maqāʻisa
حفيت	B	47.	Ḥafīt
منطيفة	B	48.	Munṭayfa
حلّة البرج	B	49.	Ḥillat al-Burj
حلّة القحاحيل	B	50.	Ḥillat al-Qaḥāḥīl
القرحة	B	51.	al-Qarḥa
خور الملح	S	52.	Khawr al-Milḥ
قصبية يال بريك	S	53.	Qaṣbīyat Yāl Burayk
قصبية آل بوسعيد	S	54.	Qaṣbīyat Āl Bū Saʻīd
قصبية الحواسنة	S	55.	Qaṣbīyat al-Hawāsina
قصبية الزعب	S	56.	Qaṣbīyat al-Zaʻab

خورالرسل - الخابورة	S	57.	Khawr al-Rasal (Khābūra)
الرديدة - الخابورة	S	58.	al-Rudayda (Khābūra)
محيضيب - الخابورة	S	59.	Muḥaydhīb (Khābūra)
خورالهند - الخابورة	S	60.	Khawr al-Hind (Khābūra)
عباسة	S	61.	ʿAbbāsa
الخويرات	S	62.	al-Khuwayrāt
الحجيرة	S	63.	al-Ḥujayra
الغليل	S	64.	al-Ghalīl
الخوير	S	65.	al-Khuwayr
النقذة	S	66.	al-Naqdha
المختارج	B	67.	al-Mukhtarij
العويدات	B	68.	al-ʿUwaydāt
ظيان	B	69.	Dhayān
البوارح	S	70.	al-Buwāriḥ
غرفة الشريف / الصريمة	B	71.	Ghurfat al-Sharīf / al-Ṣurayma
فريق الجنبة	B	72.	Farīq al-Janaba
الفاو	B	73.	al-Fāw
فريق آل بورشيد	B	74.	Farīq Āl Bū Rushayd
الرديدة	B	75.	al-Rudayda
حارة السولى	B	76.	Ḥārat al-Sawlī
الغليلة	B	77.	al-Ghulayla
حارة الجوع	B	78.	Ḥārat al-Jūʿ
برغوة / جزمى	B	79.	Birughwa / Jizmī
الردّة	B	80.	al-Radda
البطحة	B	81.	al-Baṭḥa
القرحة	B	82.	al-Qarḥa
الحارة القديمة - السويق	B	83.	al-Ḥārat al-Qadīma (Suwayq)
حارة السوق - السويق	B	84.	Ḥārat al-Sūq (Suwayq)
الشريسة	B	85.	al-Sharīsa
البدعة	B	86.	al-Badʿa

خبّة العاول	S	87.	Khabbat al-Ma‘āwil
خبّة يال خميس	B	88.	Khabbat Yāl Khamīs
بديعو	B	89.	Buday‘ū
ودام الساحل	B	90.	Wudām al-Sāḥil
العويد	S	91.	al-‘Uwayd
شرس	B	92.	Shurs
قريم	B	93.	Quraym
المصنعة	B	94.	al-Muṣan‘a
الردّة / ردّة المصنعة	V	95.	al-Radda / Raddat al-Muṣan‘a
ابوعبالى	V	96.	Abū ‘Abālī
خورالملح	V	97.	Khawr al-Milḥ
السوادى	S	98.	al-Suwādī
حفرى	V	99.	Ḥafrī
المريسى	V	100.	al-Muraysī
حارة البلوش	V	101.	Ḥārat al-Balūsh
بركا	V	102.	Barkā
المراغ	V	103.	al-Marāgh
الباسط	V	104.	al-Bāsiṭ
الحرادى	S	105.	al-Ḥarādī
بنى نخيل		106.	Banī Nukhayl
المنومة		107.	al-Manūma
سوراولاد حديد		108.	Sūr Awlād Hadīd
حلّة القلعة - السيب	V	109.	Ḥillat al-Qal‘a (Sīb)
الشريجى - السيب	V	110.	al-Shurayjī (Sīb)
الغبنى - السيب	V	111.	al-Ghabna (Sīb)
منطقة العاديات-السيب	V	112.	Minṭaqat al-‘Adiyāt (Sīb)
خورالفرض	V	113.	Khawr al-Fardh
البدعة	V	114.	al-Bad‘a
المضيفرة	V	115.	al-Mudhayfayra

المليحة	V	116.	al-Mulayḥa
البرشة	V	117.	al-Barsha
الخريّص	V	118.	al-Khurayyiṣ
حيل العوامر	V	119.	Ḥayl al-ʻAwāmir
العذيبة	V	120.	al-ʻUdhayba
الغبرة / غبرة وادى بوشر	V	121.	al-Ghubra / Ghubrat Wādī Bawshar
الخوير	V	122.	al-Khuwayr
صاروج	V	123.	Ṣārūj

S = settlement sampled for questionnaire survey.

B = settlement in which boat count taken.

V = other settlement visited by present author.

An oblique line (/) indicates alternative settlement name.

Names in parentheses ( ) indicate settlements that are subdivisible.

APPENDIX C Craft counted and interviews conducted in the twenty-five fishing settlements of the fishing survey

Settlement	Boat counts					No. of interviews conducted	Boats accounted for in interviews			
	shash	Class I	Class II	Class III	Total wooden boats		shash no.	shash % of total	wooden boats no.	wooden boats % of total
Northern Batina :										
Sur al-Abri	11	2	7	0	9	7	4	36%	6	67%
Harmul	20	7	10	4	21	10	4	20%	13	62%
Nasiriya	58	2	18	8	28	14	11	19%	13	46%
Majazz al-Kubra	36	3	1	2	6	11	18	50%	3	50%
Dil	37	1	17	1	19	18	15	41%	10	53%
Totals for Northern Batina	162	15	53	15	83	60	52	32%	45	54%
Khabura Stretch :										
Khawr al-Milh	27	0	1	3	4	10	20	74%	3	75%
Qasbiyat Yal Burayk	9	0	1	0	1	2	4	44%	1	100%
Qasbiyat Al Bu Sa'id	47	1	5	1	7	10	15	32%	7	100%
Qasbiyat al-Hawasina	63	1	13	4	18	10	27	43%	11	61%
Qasbiyat al-Za'ab	60	1	3	0	4	9	18	30%	4	100%
Khabura proper: Khawr al-Rasal	35	2	5	0	7	8	13	37%	3	43%
Khabura proper: Rudayda	80	1	2	0	3	11	28	35%	2	67%
Khabura proper: Muhaydhib	21	2	1	0	3	3	9	43%	1	33%
Khabura proper: Khawr al-Hind	19	0	2	0	2	3	11	58%	1	50%
Abbasa	45	6	3	3	12	11	28	62%	7	58%
Khuwayrat	40	4	5	0	9	17	20	50%	5	56%
Hujayra	51	11	7	0	18	13	19	37%	10	56%
Ghalil	74	14	0	0	14	16	36	49%	10	71%
Khuwayr	65	8	0	0	8	12	27	42%	4	50%
Naqtha	29	2	0	0	2	4	9	31%	2	100%
Totals for Khabura stretch	665	53	48	11	112	139	284	43%	71	63%
Southern Batina:										
Buwarih	19	5	0	0	5	8	16	84%	4	80%
Khabbat al-Ma'awil	45	10	0	0	10	12	12	27%	6	60%
Uwayd	2	52	3	0	55	22	0	0	23	42%
Suwadi	0	66	1	0	67	13	0	-	16	24%
Haradi	0	45	0	0	45	13	0	-	15	33%
Totals for Southern Batina	66	178	4	0	182	68	28	42%	64	35%
Whole Batina	893	246	105	26	377	267	364	41%	180	48%

APPENDIX D

Details and classification of fish found during the field survey

Classification of the fish found at Khabura market and elsewhere in Oman was based on field descriptions and measurements and, in the case of some seventy individuals, photographs. These data were used in conjunction with the following authorities: Munro (1955); Smith (1961); Blegvad and Löppenthin (1944); White and Barwani (1971); and Kuronuma and Abe (1972).

The present author gratefully acknowledges the help of Dr. P.J. Whitehead of the Department of Zoology, British Museum (Natural History), London, in identification of the photographs. Since however photographs are inadequate for certain taxonomic identification which requires real specimens, Dr. Whitehead is in no way responsible for any errors or inadequacies which may appear here.

As was recorded in Chapter Eight of this thesis, the fish found during the survey were classified into nine groups on the grounds of taxonomy and palatability. The nine groups, of which details follow, are:

I. SCOMBRIDAE

II. SPHYRAENIDAE

III. CLUPEIDAE,ENGRAULIDAE and MUGILIDAE

IV. CARANGIDAE

V. Breams, Snappers and similar fish

VI. Other well liked fish

VII. SERRANIDAE

VIII. Class CHONDRICHTHYES

IX. Other less liked fish

I. SCOMBRIDAE : the tuna, tuna-like and mackerel-like family. This group includes all the fish of the tuna type (yellowfin, skipjack, bonito) and the kingfish (Scomberomorus commersoni) and its relatives. Locally, the tuna and tuna-like species are distinguished as sahwa, jaydhar and sada, while the kingfish is kanʿad if mature, majdʿ if medium-sized and khubbat if small. The Scombridae form one of the most important groups in Oman as far as quality and palatability are concerned. Kingfish indeed is by common consent the most prized fish caught in Oman and this is reflected in its price. Sada is the least liked of the group because of the redness of its meat. All tend to be of medium to large size when seen in the market, with the exception of that called locally dhilʿ (probably Rastelliger kanagurta) which, especially in winter, frequently appears in large quantities when only half grown and the size of a large sardine.

In terms of quantities landed, the Scombridae are highly variable. As pelagic shoaling fish their movements are unpredictable from year to year. In general however in the Gulf of Oman they are most common in the autumn and winter and the largest catches on the Batina are usually during these seasons.

On the Batina, fixed gillnets, drift gillnets and to some extent handlines are the main methods of capture of this group.

II. SPHYRAENIDAE : the barracudas. Several species are present in Omani waters, including most probably Sphyraena jello and S. obtusata. Locally in Oman and in the Arab states of the middle and lower Arabian Gulf barracuda is called jadd or qadd. On the central Batina this has become qadad which is

the most usual name in Khabura. If large it is called qandwayh, while small immature specimens, or else members of a smaller species (e.g. S. flavicauda), are named ghalya.

As a group they are generally plentiful throughout the year. During the survey periods they were found, together with the Snapper-Bream group, to be the most consistently available of all the groups discussed here. They form a good and palatable source of food and are moderately well-liked by the local population. On the Batina they are caught mainly by gillnets, either fixed or drift.

III. CLUPEIDAE, ENGRAULIDAE and MUGILIDAE: The Clupeidae comprise the herrings and sardines. Several species are found in Omani waters, the smaller (the sardines) being collectively called uma in northern Oman. The larger (the herrings) include jawwaf and subur. The Engraulidae, the anchovies, are all grouped locally in Oman as barriya, though as with uma, a certain degree of differentiation between different species is reflected in local terminology. The Mugilidae, the mullets, are also included here for convenience, since, like the herrings, sardines and anchovies, they tend to occur in seasonal shoals close to the surface of the sea. Probably more than one species of mullet is found in Omani waters, though fishermen tend to call all simply duʿ. Less frequently the name bayah is heard, though this is more common elsewhere in the Peninsula.

As pelagic shoaling species they are notoriously unpredictable in their movements, and this is especially the case with the sardines and anchovies. The Batina, as has been seen in Chapter Three, was once a major producer and

exporter of sardines and anchovies. Since about 1970 however the region has been a net importer of sardines (from Dhofar via Dubai), while shoals of anchovies were very scarce for several years until about January 1976, and even then were confined to the Upper Batina around Sohar and Shinas (see Chapter Nine, Section 2; and Chapter Ten, section 2).

When present on the Batina sardines and anchovies are caught by castnet, by beach seine, or by the encircling method called faruwa (see Chapter Five, Section 2). The vast majority enter the markets in dried form (see Chapters Nine and Ten). Dried anchovies (called qashiʿ) are mainly for human consumption, while dried sardines (uma jaffa) are used mainly as fodder. This distinction is important: see Chapter Ten (especially Section 4) which discusses the marketing of fish in the Interior.

The Mugilidae are grouped for convenience with the larger Clupeidae, since both are similar in several respects. Both are pelagic shoaling families of similar ranges of size and both tend to be caught near the shore by similar methods, notably the beach seine and the faruwa. Both are moderately well liked by the local population and command similar prices.

IV. CARANGIDAE: the jacks, trevallies, queenfish and their relatives. A large number of species of this family are commonly caught, and although no individual species is brought in consistently in large quantities, together they form an important food group. All are well like locally and tend to command good prices, especially that locally called sal. Other species are locally called dibsi, qufdar, layliya, tulah, hibs, qasm, qushran, diyayu and khayyat. All tend to be of medium to large size when seen in the market.

The Carangidae are caught by a variety of means, including surface gillnets and handlines. Occasionally several may appear in a beach seine catch.

V. Bream-Snapper Group: In this category are included the various breams and scavengers (Nemipteridae, Lethrinidae and Sparidae), the snappers (Lutjanidae), the grunts (Pomadasyidae and Plectorhynchidae), and a number of other families similar from several points of view for present purposes (including Sciaenidae, Mullidae and Siganidae). All tend to be medium sized fish (0.75 to 2 kg) when caught; all dwell at or near the seabed especially around rocky outcrops and coral reefs; all are caught in the main by traps and bottom lines (rather than by nets); and all command similar moderately high prices when sold. In local terminology most of the species are distinguished. The most frequently occurring are kawfar, andaq arabi, andaq abu rishi, andaq sittin and shaʿri.

VI. Other relatively well liked fish: The most common of these are the cobia (Rachycentron canadus, locally called sikl), the jack-pomfret (Formio niger, locally halwayu), the dorado or dolphin-fish (Coryphaena hippurus, locally anfalus), and various marlins and sailfish (the Istiophoridae, locally salsul).

VII. SERRANIDAE: the rock-cods or groupers. Several species are found in Omani waters. A number of distinguishing local names were recorded, but there was doubt or difference of opinion among informants about the exact application of the majority of them. Individuals of the group as a whole tend to be called hamur or siman.

Most fish of this family seen in the markets were of medium to large size (1 kg to 10 kg or more). Like the Bream-Snapper Group, the Serranidae tend to dwell among rocky outcrops and corals, and the main methods of capture, traps and bottom lines, reflect this. The flesh is generally good to eat and is highly regarded by many in the Arabian Gulf, though the Omani coastal population and especially the Shi'a community hold it in low esteem as they do shark, and it consequently commands a low price on the Batina. Because of this it is commonly taken to the Interior settlements where it is readily eaten.

VIII. Class CHONDRCHTHYES : the cartilaginous fishes (the sharks, rays, sand-sharks and sawfish). Jarjur is the local generic name for shark, though different species are often locally differentiated. (e.g., abu al-qurun for hammerhead shark). Tabaq is the local generic name for ray, different species being similarly differentiated, while the Rhynchobatidae (sand-sharks or guitar-fish) and the Pristidae (sawfish) are locally called barbar and sayyafa respectively.

Immature (or otherwise small) sharks (of up to about 2 kg) and cured shark are also distinguished, but nomenclature varies with district. There are three terms in common use and the pattern of usage is as follows:

عوال uwal : cured shark both on the Batina and in the Interior;

قصقوص qasqus (pl. qasaqis): in the Interior - cured small shark; on the Batina - fresh small shark;

عـلص ils (pl. ulus) : In the Interior - fresh small shark; on the Batina - occasionally used for fresh small shark.

Considering Oman as a whole, the sharks probably form the largest single part of the total catch in terms of weight of any of the groups discussed here, with the possible exception of the Clupeidae and Engraulidae. However, the small but important section of the coastal population belonging to the Shiᶜa sect of Islam is forbidden to eat sharks and rays, and even the settled coastal population who are Ibadhi or Sunni hold shark and ray meat somewhat in contempt. As a result, it is consistently cheaper than every other major type of fish, and most finds its way either fresh or dried to the inland and mountain populations, both settled and nomadic.

Shark liver oil (sall) is still an important local by-product, and is used for caulking and painting local wooden craft (see Chapter Seven). However, in recent years the trade in dried shark fins has atrophied and they now no longer form the major export to the Far East that they once were. The combination of decreasing supply from the fishermen and waning interest on the part of the intermediary Omani merchants are the main reasons for the decline. The traditional uses of shark skin have similarly declined, mainly through substitution by imported manufactures such as nylon ropes.

On the Batina the main methods of capture are handlines and longlines for the large sharks, fixed and drift gillnets for the small sharks, and fixed tangle nets for the guitar-fish and sawfish.

IX. Other less liked fish : As well as the Serranidae and the Chondrichthyes, a number of other fish which are not well liked on the coast frequently find their way to the market. The most common of these are various flatfish (including the flounder Psettodes erumei, locally kabsh), the wolf-herring (Chirocentrus dorab, locally faras), lizardfish (Synodontidae, locally shanjuh), garfish (Tylosuridae or Belonidae, locally kharkhur), and catfish (Tachysuridae or Ariidae, locally khann). None of these are liked greatly by the local population, and all consequently command similarly low prices.

List of names of fish in use in northern Oman

Taxonomic identification has been attempted in accordance with the authorities given at the beginning of this appendix. However, because specimens of fish could not be collected and preserved in the field, the identifications must be regarded as provisional.

Generally speaking, the Omani names are given in their collective form. The transliteration is fuller than in the text of the thesis. Names which are marked with an asterisk (*) are used in the Arabian Gulf and are understood by northern Omani fishermen, but more common Omani alternatives exist for them. The group numbers I to IX refer to the groups used in this thesis and explained in the first part of this appendix. 'S' indicates a species invariably found during the survey as a small fish (of less than 300 gm weight) and not classified in the nine groups. 'O' indicates a species that is not generally eaten. A dash (-) indicates that the Omani name, though recorded in the survey, could not be identified further, in most cases because of infrequent occurrence. 'n.f.i.' = 'not further identified'.

	Omani name	Group	Family	Genus & Species
ابوعمير	abū ʿamīr	O	Ballistidae	n.f.i.
ابوكراز	abū kirāz	VIII	Sphyrnidae	Sphyrna zygaena
ابوالقرون	abū al-qurūn			
عندق	ʿandaq	V	Nemipteridae	Nemipterus spp.
عندق ابوريشى	ʿandaq abū rīshī	V	Nemipteridae	Nemipterus japonicus
عندق سٓتّين	ʿandaq sittīn	V	Nemipteridae	Nemipterus sp.
عندق ام رويشى	ʿandaq umm ruwayshī	V	Nemipteridae	Nemipterus sp.
انفلوس	anfalūs	VI	Coryphaenidae	Coryphaena hippurus
عنفوف	ʿanfūf	IX	Chaetodontidae	Heniochus acuminatus
عنز	ʿanz	-	?Tetradontidae	n.f.i.
عروس	ʿarūs	VII	Serranidae	n.f.i.
بلاص	balāṣ	IX	Cynoglossidae	n.f.i.
بعيل	baʿīl	IV	Carangidae	n.f.i.
برعم	barʿam	IV	Carangidae	n.f.i.
بربر	barbar	VIII	Rhynchobatidae	incl.Rhychobatus djiddensis
بربرخورى	barbar khawrī	VIII	Rhynchobatidae	n.f.i.
برّيّة	barrīya	III	Engraulidae	Stolephorus spp.

بياح	bayāḥ*	III	Mugilidae	n.f.i. : alternative for dūʿ
بدح	bidaḥ	S	Gerridae	Gerres filamentosus
بكّة	bikka	IV	Carangidae	n.f.i.
برطام	burṭām	-	?	n.f.i.
بقم	buqum	O	Balistidae	n.f.i.
داس	dās	O	Echidnidae	n.f.i.
ذئب	dhīb (dhi'b)	VIII		type of shark
ضلع	dhilʿ	I	Scombridae	Rastrelliger kanagurta
دبسى	dibsī	IV	Carangidae	Caranx sp., possibly C.ignobilis
ديك	dīk	V	Sparidae	Argyrops spinifer
دياپو (دجاجو)	diyāyū (dijājū)	IV	Carangidae	possibly Megalaspis cordyla
دوع	dūʿ	III	Mugilidae	n.f.i.
فرانكى	farānkī	V	Sparidae	Argyrops sp.
فَرَس	faras	IX	Chirocentridae	Chirocentrus dorab
فَيرس	fayrs	VIII	Mobulidae	Mobula diabolus & Manta birostris
فُرْس	furs			
فُرْش	fursh	V	Pomadasyidae	n.f.i.

غلية	ghalya	II	Sphyraenidae	Sphyraena sp. (young) & possibly S. flavicauda
غزوان	ghazwān	-	?	n.f.i.
غرارة	ghurāra	S	Hemirhamphidae	Hemirhamphus sp.
غريبية	ghuraybīya	IV	Carangidae	n.f.i.
غربى	ghurbī	IV	Carangidae	n.f.i.
حاكول	ḥākūl*	IX	Belonidae (Tylosuridae)	n.f.i.; alternative for kharkhūr
حلوايو	ḥalwāyū	VI	Formionidae	Formio niger
حمام	ḥamām	IV	Carangidae	n.f.i.
حمراء حمّر	ḥamrā' ḥammar	V	Lutjanidae	Lutjanus sp., possibly L.coccineus
هامور	hāmūr	VII	Serranidae	Epinephelus spp.
حقيبة	ḥaqība	O	?	n.f.i.
حاروس	ḥārūsh*	V	Lethrinidae	Lethrinus sp.; alternative for shaʿrī
هياس	hayyās	VIII	Orectolobidae	Chiloscyllium griseum
حبص	ḥibṣ	IV	Carangidae	Chorinemus lysan
حدى	hidī	V	Mullidae	possibly Mulloidichthys auriflamma
علص	ʿilṣ	VIII		small shark
عماد	ʿimād	VI	Platacidae	Platax pinnatus

اسفيرة	isfayruwa	-	?	n.f.i.
جفاع	jafāʿ	VIII		type of ray
جمل	jamal	O	Tricanthidae	Tricanthus spp.
جرنشوع	jaranshūʿ	S	?	n.f.i.
جرجور	jarjūr	VIII		generic name for shark
جواف	jawwāf	III	Clupeidae	Hilsa ilisha
جيدر	jaydhar	I	Scombridae	large tuna
جمجام	jimjām	S	?Theraponidae	possibly Helotes sexlineatus
جولان	jūlān	IV	Carangidae	n.f.i.
جوران	jūrān	S	Lutjanidae	possibly Lutjanus lineolatus
كعب	kaʿb	-	?	n.f.i.
كبش	kabsh	IX	Psettodidae	Psettodes erumei
كاحل	kāḫil	IV	Carangidae	Elagatis bipinnulatus
كنعد	kanʿad	I	Scombridae	Scomberomorus spp., incl. S. commersoni
كانتى	kāntī	-	?	n.f.i.
كاردوس	kārdūs	V	Lethrinidae	Lethrinus sp.
كاسر ملة	kāsir milla	S	?	n.f.i.
كوفر	kawfar	V	Sparidae	Argyrops spp.

خنّ	khann	IX	Ariidae (Tachysuridae)	Arius (Tachysurus) spp.
خنّای	khannāy	V	Pomadasyidae	n.f.i.
خرخور	kharkhūr	IX	Belonidae (Tylosuridae)	n.f.i.
خیاط	khayyāṭ	IV	Carangidae	Atropus atropus
خود	khawd	VIII		type of ray
خبّاط	khubbāṭ	I	Scombridae	Scomberomorus spp. (young)
خمار	khumār	-	?	n.f.i.
کرّ	kurr	V	Plectorhynchidae	Gaterin sp., possibly G. gaterinus
لاصف	lāṣif	O	Trichiuridae	n.f.i.
لیلیّة	laylīya	IV	Carangidae	Caranx fulvoguttatus
لزاق	lizzāq	IX	Echeneidae	Echeneis naucrates
لصف	luṣuf	V	Sparidae	Acanthopagrus sp.
معیزو	maʿayzū	V	Lethrinidae	Lethrinus sp.
مجدع	majdʿ (maydʿ)	I	Scombridae	Scomberomorus spp. (medium sized)
ملزم	malzam	V	Siganidae	Siganus sp.
مرن	marn	VIII		type of ray

مشب	mishib	O	Chaetodontidae	n.f.i.
مشط	mishaṭ	O	Chaetodontidae	Chaetodon obscurus
مران	murān	S	Hemirhamphidae	Hemirhamphus sp.
نمّوه	nammūh	S	?	n.f.i.
نيسر	naysir	V	Lutjanidae	Lutjanus sp., possibly L.fulviflamma
قابط	qābiṭ	V	Sparidae	Acanthopagrus sp.
قداد (جداد)	qadād (jadād)	II	Sphyraenidae	Sphyraena spp.
قدّ (جدّ)	qadd (jadd)			
قلمبيص	qalambīṣ	-	?	n.f.i.
قنديح	qandwayḥ	II	Sphyraenidae	Sphyraena spp. (large)
قنديح مكراني	qandwayḥ makrānī	II	Sphyraenidae	Sphyraena sp. (large)
قصم	qaṣm	IV	Carangidae	Caranx sp.
قصقوص	qaṣqūṣ	VIII		small shark
قباب (جباب)	qubāb (jubāb)*	I	Scombridae	types of tuna
قفدار	qufdār	IV	Carangidae	Caranx sp., possibly C.speciosus
قروش مناورة	qurūsh munāwara	III	Engraulidae	n.f.i.
قشران	qushrān	IV	Carangidae	Caranx sp., possibly C. kalla
رابض	rābidh	VIII		type of ray

صداء	ṣadā'	I	Scombridae	Euthynnus affinis
صافي	ṣāfī	V	Siganidae	Siganus sp.
صفصوف	ṣafṣūf	V	Lutjanidae	Lutjanus sp.
سهوة	sahwa	I	Scombridae	medium sized tuna
ساحوك	sāḥūk	VIII	Rhynchobatidae	n.f.i.
صال	ṣāl	IV	Carangidae	Caranx malabaricus & similar
سلسول	salsūl	VI	Istiophoridae	incl.Istiophorus gladius
سنور	sannūr	VIII	Orectolobidae	Stegostoma fasciatum
سيافة	sayyāfa	VIII	Pristidae	Pristis spp.
شعم	shaʿm	V	Sparidae	Acanthopagrus berda
شنجوح	shanjūḥ	IX	Synodontidae	Sauridae spp. & Trachynocephalus spp.
شعري	shaʿrī	V	Lethrinidae	Lethrinus sp.
شاص	shāṣ	IX	Platycephalidae	Platycephalus sp.
شوبري	shawbarī	VIII		type of ray
شيمبوه	shaymbūwa	IX	Bothida	n.f.i.
شماهي	shimāhī	V	Sciaenidae	possibly Johnius sp.
شجار	shujār	V	Lutjanidae	n.f.i.

شويجى	shuwayjī	S	Lutjanidae	n.f.i.
سجندان	sijindān	-	?	n.f.i.
سكل	sikl	VI	Rachycentridae	Rachycentron canadus
صيم	ṣīm	S	Carangidae	possible Decapterus russellii
سمان	simān	VII	Serranidae	Cephalopholis spp. & Epinephelus spp.
سين	sīn	IV	Carangidae	Chorinemus sp.
صبور	ṣubūr	III	Clupeidae	Hilsa ilisha
سليس (سلس)	sulays (sils)	S	Hemirhamphidae	Hemirhamphus sp.
سولى	sūlī	V	Lethrinidae	Lethrinus sp., possibly L.fletus
سوام	suwām	-	?	n.f.i.
طباق	ṭabāq	VIII		generic name for ray
طزج	ṭazaj	-	?	n.f.i.
طلاح	ṭulāḥ	IV	Carangidae	Trachinotus blochii
طريجو	ṭurayjū	-	?	n.f.i.
عوم	ʿūm	III	Clupeidae	Sardinella spp.
ام القرون	umm al-qurūn	VIII	Mobulidae	Mobula spp. & Manta spp.

ام الخويط	umm al-khuwayṭ	VIII	Mobulidae	Mobula spp. & Manta spp.
عقوم	ʿuqūm	-	?	n.f.i.
زريدى	zuraydī	IV	Carangidae	n.f.i.

Other sea creatures :

دوك	dūk	cockle
غيلم	ghaylam	turtle
ربيان	rubyān	shrimp
سافع	sāfiʿ	crayfish
عوج (عوق)	ʿūj (ʿūq)	cuttlefish

APPENDIX E

Details of fishing tackle used on the Batina

The main items of fishing tackle used on the Batina have been summarised briefly and illustrated in Chapter Five (Section 2; Table 5.1; and Figures 5.1 to 5.9). Fuller details are given here.

1. Nets

Nets are used in a variety of ways on the Batina. Identification and classification of the various methods from oral accounts alone are made somewhat difficult by the fact that local nomenclature varies with location. This results often in a single name being applied to two different methods on different parts of the coast, while a single method is called by different names at different places. Because of this it was found to be essential that in each settlement in which interviews were conducted the local usage of terms was established before the formal questioning was begun.

(i) Castnets are thrown by hand either by a wader or from a boat, and are used close into the shore. Their main catch is sardines and anchovies. The size of mesh of the anchovy castnet is of necessity extremely fine (usually 0.3 cm knot to knot), and frequently has internal drawstrings. The sardine castnet has a slightly larger mesh, though still fine

(about 0.5 cm. knot to knot), and is generally without internal drawstrings. Castnets are circular in shape, and the circumference commonly measures 20 m or more. Like nearly all other nets, they are nowadays made up locally from imported nylon netting. The circumference weights are of lead.

(ii) Encircling nets are broadly speaking seine nets (see Bloomfield 1923). The beach or shore seine is the largest type of net used in Oman and is employed principally for catching shoals of sardines and anchovies. It is frequently several hundreds of metres long, excluding the haul ropes, one at each end, which themselves may be another several hundred metres. The construction and principle of operation of the beach seine is well known, and the method found widely in many countries. For further information on the general principle, see Davis (1958) and Von Brandt (1972). In Oman it may be with or without a bunt (the central bag), and in general the wealthier the owner the larger will be the fine-meshed middle section. Traditionally in Oman the beach seine has been worked by the plank-built craft called the badan or else its slightly small relative, the shahuf or baqqara, and the total number of men required to work one of the larger beach seines might well be as many as fifty. Nowadays it is much more usual to see beach seines worked using smaller boats - huris, or even shash - which require much smaller crews. Nevertheless, the total manpower needed to work a beach seine is generally no less than about fifteen men (or men and youths).

Partly because it is unique among Batina fishing methods in requiring such a large number of men to work it, and partly because of the different degrees of effort required of different members of a team (those who row and later haul as well, as opposed to those who remain on shore and merely haul), the method of sharing the proceeds from the catch generally differs from the sharing methods of other fishing techniques. This is discussed in Chapter Seven (Section 3).

Seines are also used on the Batina offshore without contact with the beach. These may be termed offshore seines. One, two or four boats may be used, depending on the size of the net, and are generally dugout huris or shash rather than larger plank-built vessels. The largest single-boat offshore seine that was seen during the survey measured approximately 320 m in length by about 5 m in depth.

A further encircling method can also for convenience be included here. Both the method and the net used for it are called faruwa along the length of the Batina. The faruwa net can be up to about 15 m in length and is usually around 2 to 3 m in depth. The mesh is fine or very fine (i.e., from about 1.5 cm down to 0.3 cm knot to knot), and is suitable for catching anchovies, sardines and other small shoaling fish, that is to say, the same fish as are caught with both castnets and beach seines. The system is worked by between five and ten men (or men and boys) in up to a metre and a half of water. No boat is used. Once a shoal of fish is spotted close to the shore the men with the net

(usually four or five men) wade out carefully around the shoal. The remaining men then create a disturbance in the water shorewards of the shoal, forcing the fish seawards and into the net. The net is then closed around the fish from each end and from the bottom.

(iii) Fixed nets are nets which are anchored to the sea bottom. They are gill or tangle nets in that they trap fish by enmeshing the fish by their gills or other protruberances of their bodies. Fixed nets on the Batina are found both in the form of rectangular boxes or pens, and as linear nets. The pen-type nets have an entrance at one side and an extra length of netting to guide fish to the entrance. They vary considerably in size. The smallest measure typically 40 m in length by up to 20 m in width by five to ten metres in depth. The largest reach 100 m or more in length. The linear fixed nets have a similar large variation in size, from about 20 m in length up to 200 m or more. Since the pen-type nets must reach from the surface of the sea to the bottom, they are confined to the sea close to the shore and are not used in water deeper than about 20 m. The linear types are however not similarly restricted and are used from close inshore to the edge of the continental shelf. The mesh of fixed nets is usually of medium to large size - from about 2 cm knot to knot upwards. The small fixed nets used for trapping the Rhynchobatidae and Pristidae (sand-sharks, sawfish, etc.) have the largest mesh size of all (commonly 25 cm knot to knot) and are hand knotted from coir cord.

(iv) Drift nets are, like fixed nets, of the gillnet type. As their name implies, they are not secured to the sea bottom, but are instead fixed to a boat and allowed to drift, and are usually used at night. In other respects, including the range of dimensions and mesh size, they are similar to the linear type of fixed net.

2. Traps

The type of fish trap currently used on the Batina coast is locally made up from imported galvanised wire which over the last ten years or so has completely ousted the former date branch trap. The latter were heavy and cumbersome to handle, especially if they had been in the sea for some time (since they absorbed water), and their size was limited by this and by the length of the date fronds. Wire fish traps have the advantage of being lighter to use even when larger.

The shape of the wire fish trap on the Batina is roughly hemispherical with an intrusive entrance at the side. The base is flat, strengthened with date palm sticks, and is generally around six to seven metres in circumference. The overall height is usually between 1.25 m and 1.5 m.

The hadhra fish trap, made of fences set in the shore between high and low tide in the shape of an arrow or horse-shoe pointing seawards, which is common in Bahrain and elsewhere in the Arabian Gulf, has never been noted on the Batina coast, possibly because of unsuitable shores or tides, or more likely because of the frequency of high seas.

3. Lines

Both handlines and longlines are used by Batina fishermen. Longlines are set and marked very much in the same way as are traps and fixed nets, and are then visited periodically for inspection. The most common type at present consists of several large hooks (sometimes twenty or more) attached by short lengths of chain to a rope of up to 100 m long, anchored at both ends. An earlier version which would seem now to have gone out of use consisted simply of a pair of large hooks fastened to the end of a line. Longlines are always baited.

Handlines on the other hand are merely cast and recovered immediately a fish bites. They generally have one or two hooks, seldom more, and may be baited with small fish or else have artifical lures made of palm fibre and wood attached to them.

Local Batina terminology for tackle

The local terminology for the different tackle, and in particular the various types of nets and net systems, is complicated. The name of a net or net system as given by a fisherman can be of several kinds. Many of the local names describe the way the net is used: thus, mansab (from nasaba, to fix or place) is a type of fixed net; and dawwārī (from dāra, to turn or revolve) is a type of revolving net. Other terms reflect the type of fish they are designed to catch: thus, qasqūsī (from qasqūs, small shark); barbarī (from barbar,

sand-shark). Others describe the characteristics of the netting (especially the mesh size) which makes up the net. Thus, for example, diqqa (literally, minute or delicate) is a net of 'small' mesh size (usually 2 to 2.5 cm knot to knot). The foreign companies manufacturing netting have their own gauges and numbering systems and these are sometimes used by the fishermen to define mesh size and cord thickness. More usually however mesh size, and thus the net also, is described by the fishermen in terms of how many meshes to the dhirāʿ or forearm (about 40 to 45 cm). The most commonly found terms of this type are as follows:

name of net mesh size	no. of meshes to the dhirāʿ	approximate equivalent mesh size in cm. (knot to knot)
sadāsī	6	7.5
sabāʿī	7	6.5
thamānī	8	5.5
ihdaʿ asharī	11	4.0
ithnaʿ asharī	12	3.75
thalatʿ asharī	13	3.5
thamantʿ asharī	18	2.5

Mesh sizes smaller than 2.5 cm are generally referred to by counting the number of meshes to the shibr, the span of the hand (about 22 cm). Thus thamantʿ asharī (2.5 cm mesh size) can alternatively be called "nine meshes to the shibr". A mesh size of about 1 cm would be called "twenty to the shibr".

The following is a list of other common terms for fishing tackle as used on the Batina coast.

Batina term			Observations
	لَيخ	laykh	general Batina name for net; applied to all nets except castnets.
CASTNETS	شَبكَة	shabka	Arabic for net generally, but used on Batina solely for castnet, usually without internal drawstrings.
	غَلّ	ghall	c a stnet, usually with internal drawstrings.
	سالية	sālya	castnet.
SEINES			
	جاروف	jārūf	beach seine
	ضغو	dhaghw	beach seine net and/or offshore seine net
	ضاغية	dhāghya	offshore seine; see also below
	تحويط	taḥwīṭ	offshore seine
	فاروة	fāruwa	encircling net used in shallow water without boat.
GILLNETS			
	منصب	manṣab	fixed: on Upper Batina refers to large fixed pen-type net; on Lower Batina is any fixed net.
	منصب رفع	manṣab raf‘	fixed : used on Lower Batina to mean fixed pen-type net.
	طوّالى	ṭawwālī	long net, either fixed or drift.
	هيّالى / هيّال	hayyālī or hayyāl	long net, either fixed or more usually drift.
	دوّارى	dawwārī	fixed by anchor at one end, but able to revolve with current.
	دقّة / دقّى	diqqa, diqqī	fixed or drift; mesh size 2 to 2.5 cm knot to knot.
	سينى	sīnī	fixed
	قصقوصى	qaṣqūṣī	fixed or drift, to catch small sharks.
	بربرى وليخ طباق	barbarī and laykh ṭabāq	fixed shallow water tangle nets with very large mesh size to catch sand-sharks, sawfish & rays.
	طريقى	ṭurayqī	small fixed net of small mesh size used close inshore.

Batina term		Observations
TRAPS		
دوبايه	dūbāya	large wire trap
جرجور	jarjūr	large wire trap. This is the usual name in the Arabian Gulf but is not common on Batina.
بيمة	bīma	small wire trap
LINES		
خيط	khayṭ	handline
حدق	ḥadaq	handline
حلقة	ḥalqa	longline with two hooks
شكّة	shakka	longline with many hooks
OTHER TERMS		
بوه	būh	(polystyrene) float
باورة	bāwara	anchor
انجر	anjar	anchor
مدّ	madd	rope through top (and bottom) of net (i.e. reeving rope)
شطان	shiṭān	rope attaching net to anchor
شدّ / مشدّ	shadd or mishadd	old nets, tree branches, &c. sunk with traps to attract fish
هالى / هابى	hālī or hābī	
ضاغية	dhāghya	length of large mesh netting set at right angles to the entrance to pen-type net. Term also used meaning beach seine net.

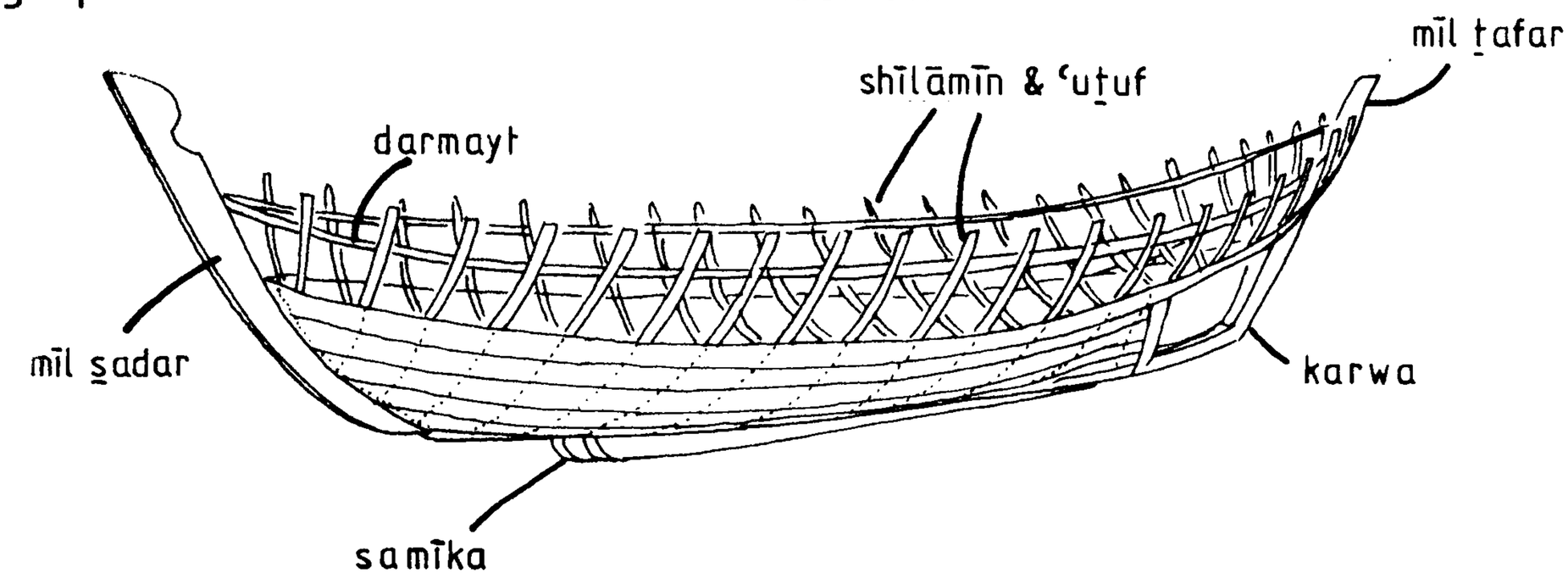
APPENDIX F

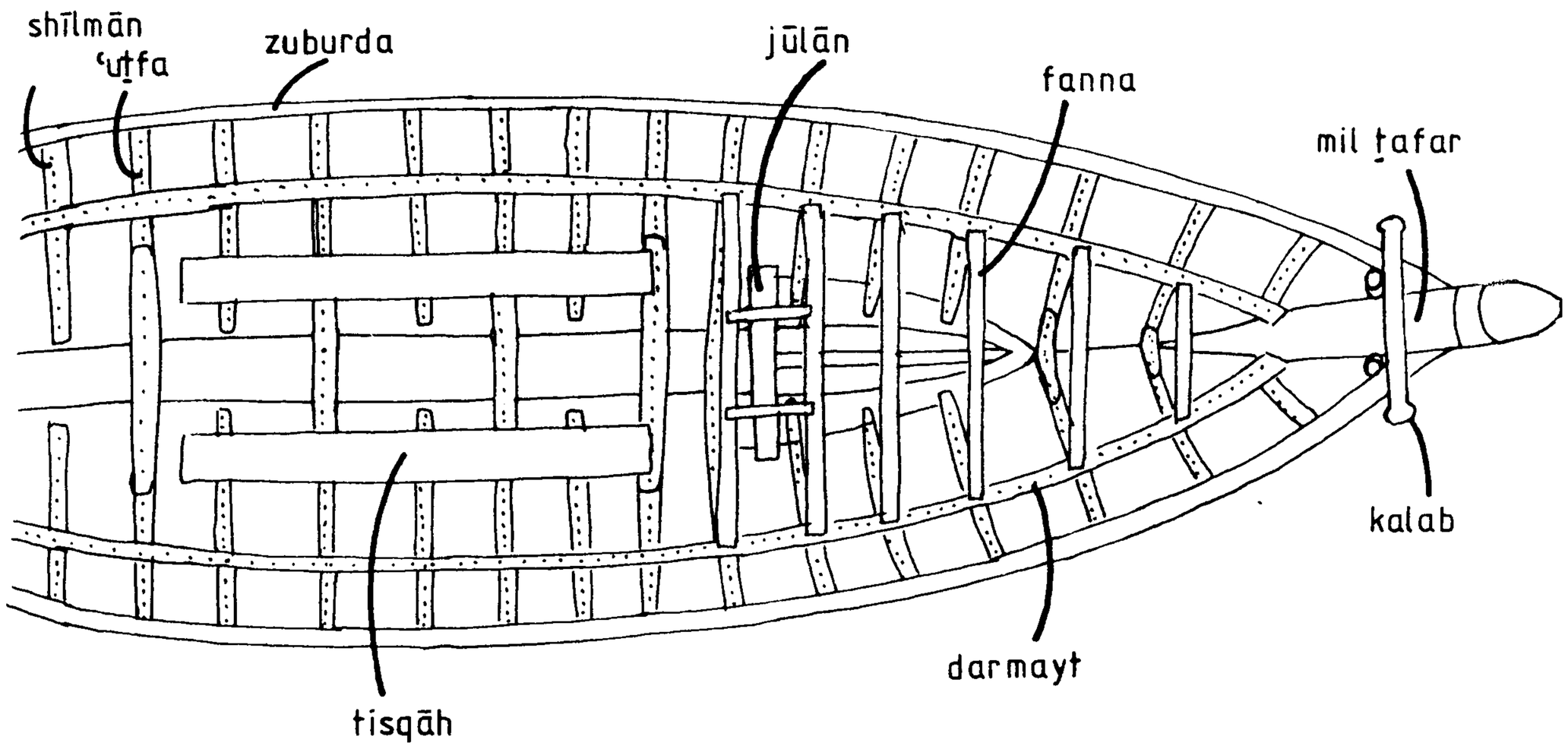
List of local terms used on the Batina for parts of wooden craft

term		observations - see also Figure F.1 ('A' indicates standard Arabic word)
درميت	darmayt	internal bar connecting shīlāmīn and ʿuṯuf (q.v.) below gunwale
فنّة	fanna	internal horizontal spar below decking
غادوف	ghādūf	paddle (used with dugout hūrī)
غصّ	ghaṣṣ	vertical posts above gunwales, used as rowlocks
جولان	jūlān	internal bridge over inside of keel under which passes drive to propellor
كَلَب	kalab	posts and bar at prow for hauling nets and anchor
كروة	karwa	lower part of stern frame below afterpeak in which is located propellor
مجيسى	majīsī	tall false stern post of badan
مخياك	miḫyāk	pivots for rudder fastening
مجداف	mijdāf	oar (pronounced maydāf on Batina)(A)
ميل صدر	mīl ṣadar	stem post and prow
ميل طفر	mīl ṭafar	stern post
صدر	ṣadar	fore part (A)
سميكة	samīka	keel runner(s) (called bīṣ in Arabian Gulf)
سطح	saṭaḥ	deck (A)
شلمان/شيلمان shīlmān (pl.	shilmān & shīlāmīn)	internal rib, discontinuous across keel
سكّان	sukkān	rudder (A)
طفر	ṭafar	stern
تشنيعة	tashnīʿa	false stern post of badan and shāhūf
تسقاه	tisqāh	planks resting on shīlāmīn and ʿuṯuf (q.v.) on which inboard engine lies
عطفة	ʿuṯfa (pl. ʿuṯuf)	internal ribs, continuous across keel
زبردة	zuburda	gunwale rail

Figure F-1 Batina wooden craft : local terms

large plank-built 'huri' under construction





view of stern of plank-built 'huri' from top, with decking and inboard engine removed.

APPENDIX G

The diffusion of outboard and inboard marine engines on the Batina

How innovations diffuse in a spatial context has exercised the attention of many geographers and others in recent years, and attempts at tackling the problems involved may be traced back to even before the seminal work of T. Hägerstrand (see Hägerstrand 1952 and 1967). As D. Harvey pointed out, the literature in the field of spatial diffusion was already large over a decade ago (Harvey 1967 p. 589), and it is well beyond the present writer's intention to attempt a review of it here.

One controversial aspect of the problem is the importance of what has been called the neighbourhood effect. Hägerstrand saw the pattern of adoption of an innovation as being due basically to transmission of knowledge about the innovation from one individual to another, and that this personal transmission is constrained by distance. That is to say, early adopters tend to cluster spatially around an original source, and subsequent adoption spreads outwards with time through personal communication. More recent studies have cast doubt on the general applicability of the assumptions that information transmission is the key to understanding the diffusion of innovations and that distance is the main constraint (see for example Cliff 1968; Maclennan 1973;

Blaut 1977; and Findlay and Maclennan 1978). Some light is thrown on this question by data deriving from the present questionnaire survey.

It was proposed in Chapter Five (Section 4) that a major influence on the present distributions of motorised dugout huris (Class I) and motorised large plank-built craft (Class II) on the Batina has been the nearness to the original areas where these two types of craft were common - that is, Class I with outboard engines have invaded the Lower Batina from the Capital Area of Muscat-Mutrah because dugout huris were for long found in the Muscat area and outboard motors have become available in Mutrah; while the Class II designs which originated in the Arabian Gulf, and diesel engines which are available in Dubai but not Mutrah, have been gradually introduced on to the Upper Batina, the stretch in closest contact with Dubai.

The Batina coast can be imagined as a linear one-dimensional arrangement of settlements with Mutrah at one end and Dubai at the other (Figure G.1). If it is assumed that an innovation emanating from either Mutrah or Dubai will spread along the Batina so that settlements near the source will adopt earlier and at a more rapid rate than settlements further away, Figure G.2 shows a model of adoption that might be expected.

The year of adoption by eighty-one outboard petrol engine owners and by thirty-nine diesel engine owners is known from the fishing questionnaire survey, within the limits imposed by the accuracy of recall on the part of the respondents.

Figure G-1 The Batina coast viewed as line between Dubai and Mutrah

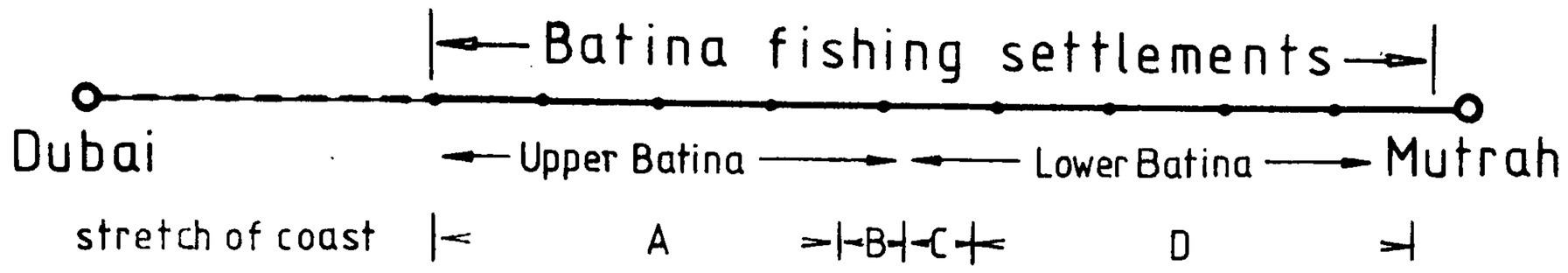
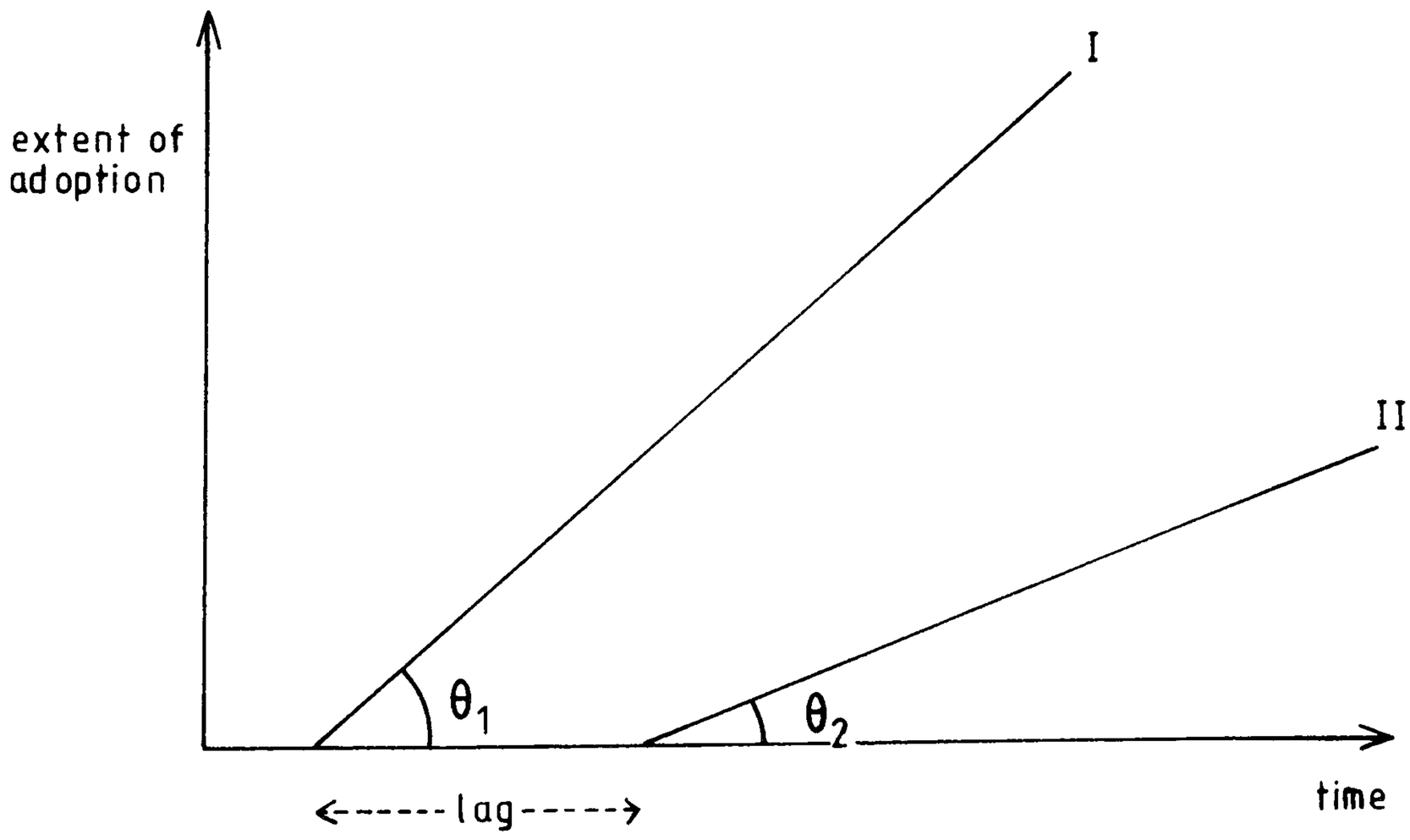


Figure G-2 Model of innovation diffusion assuming diffusion constrained by distance from source



I settlement near source

II settlement distant from source

$\theta_1 > \theta_2$

When arranged by settlement the numbers involved in several of the settlements are too small to allow definite conclusions to be made about spatial patterns of adoption. For present purposes therefore the twenty-five sample settlements have been grouped into four sets:

(A) Sur al-Abri to Dil (five settlements) - Northern Batina;

(B) Khawr al-Milh to Hujayra (twelve settlements) - North Khabura;

(C) Ghalil to Naqdha (three settlements) - South Khabura;

and (D) Buwarih to Haradi (five settlements) - Southern Batina.

Stretches (A) and (B) cover the Upper Batina, and stretches (C) and (D) the Lower Batina. Because of the unequal numbers of settlements in the different stretches, the cumulative average numbers of motors per settlement appearing per year in the years before the survey have been calculated for each of the four stretches (Table G.1). When these are graphed, Figures G.3 (outboard engines) and G.4 (inboard engines) show the patterns found.

Outboard petrol engines:

Stretch D (nearest Mutrah) began to innovate earlier than stretches C, B, and A (by three to four years), and adoption has proceeded on stretch D twice as fast as on stretch C and about five times as fast as on stretches B and A, the stretches furthest from Mutrah.

Table G.1 Diffusion of outboard and inboard engines in the Batina survey by stretch of coast

1. OUTBOARD PETROL ENGINES:

Stretch of coast	No. of settle-ments	year of adoption (no. of years before field survey)															
		8 yrs		7 yrs		6 yrs		5 yrs		4 yrs		3 yrs		2 yrs		1 yr		<1 yr	
		a.	b.	a.	b.	a.	b.	a.	b.	a.	b.	a.	b.	a.	b.	a.	b.	a.	b.
A	5									0	0.00	4	0.80	4	0.80	5	1.00	5	1.00
B	12							0	0.00	1	0.08	7	0.58	8	0.67	13	1.08	16	1.33
C	3							0	0.00	3	1.00	5	1.67	6	2.00	9	3.00	9	3.00
D	5	0	0.00	1	0.20	3	0.60	9	1.80	13	2.60	21	4.20	35	7.00	46	9.20	51	10.20
2. INBOARD DIESEL ENGINES:																			
A	5			0	0.00	2	0.40	3	0.60	5	1.00	7	1.40	10	2.00	15	3.00	18	3.60
B	12			0	0.00	2	0.17	4	0.33	8	0.67	12	1.00	16	1.33	19	1.58	21	1.75
C	3																	0	0.00
D	5																	0	0.00

a. - cumulative numbers of engines in survey

b. - average cumulative numbers of engines in survey per settlement.

Figure G-3 Diffusion of outboard petrol engines on the Batina (field survey data)

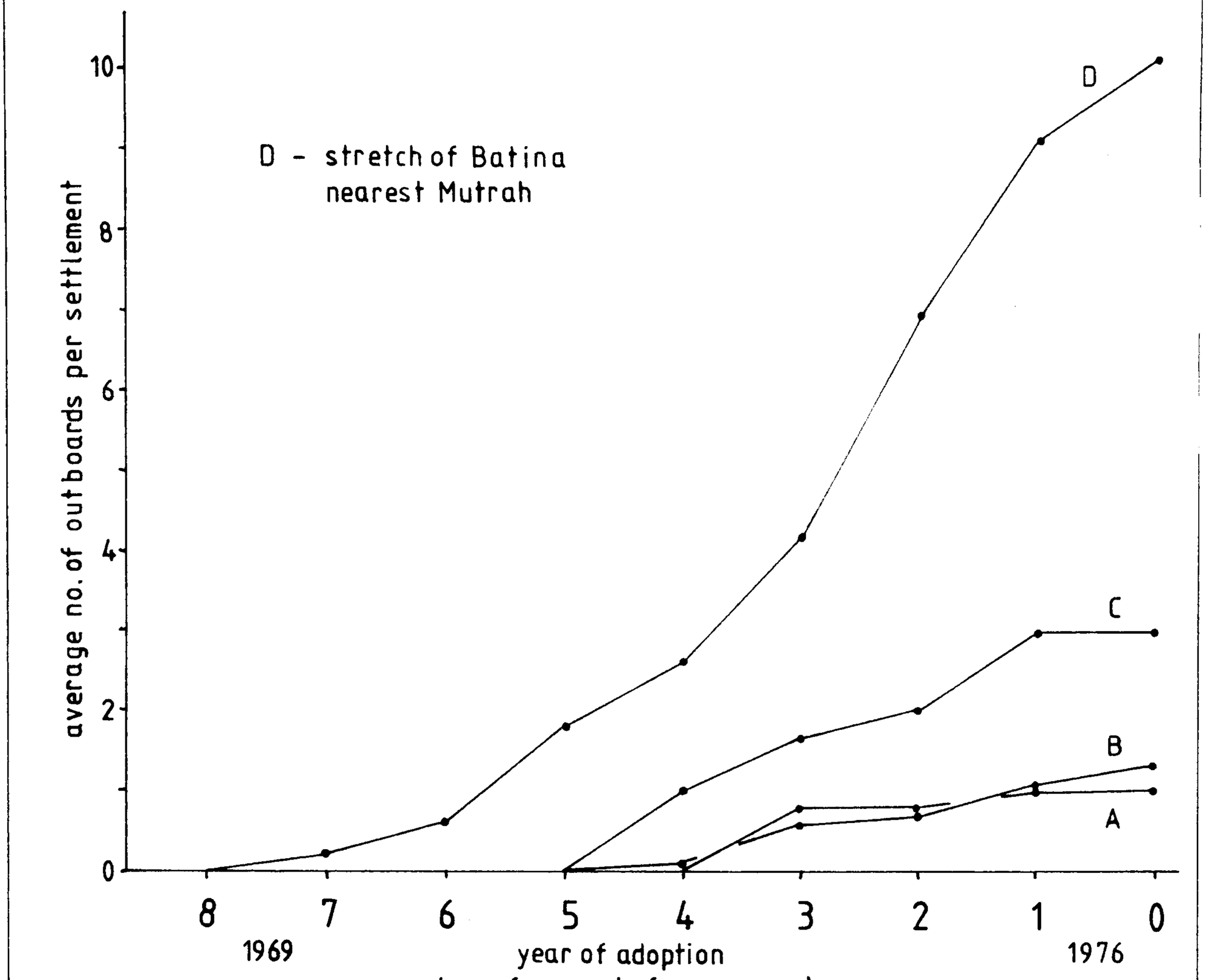
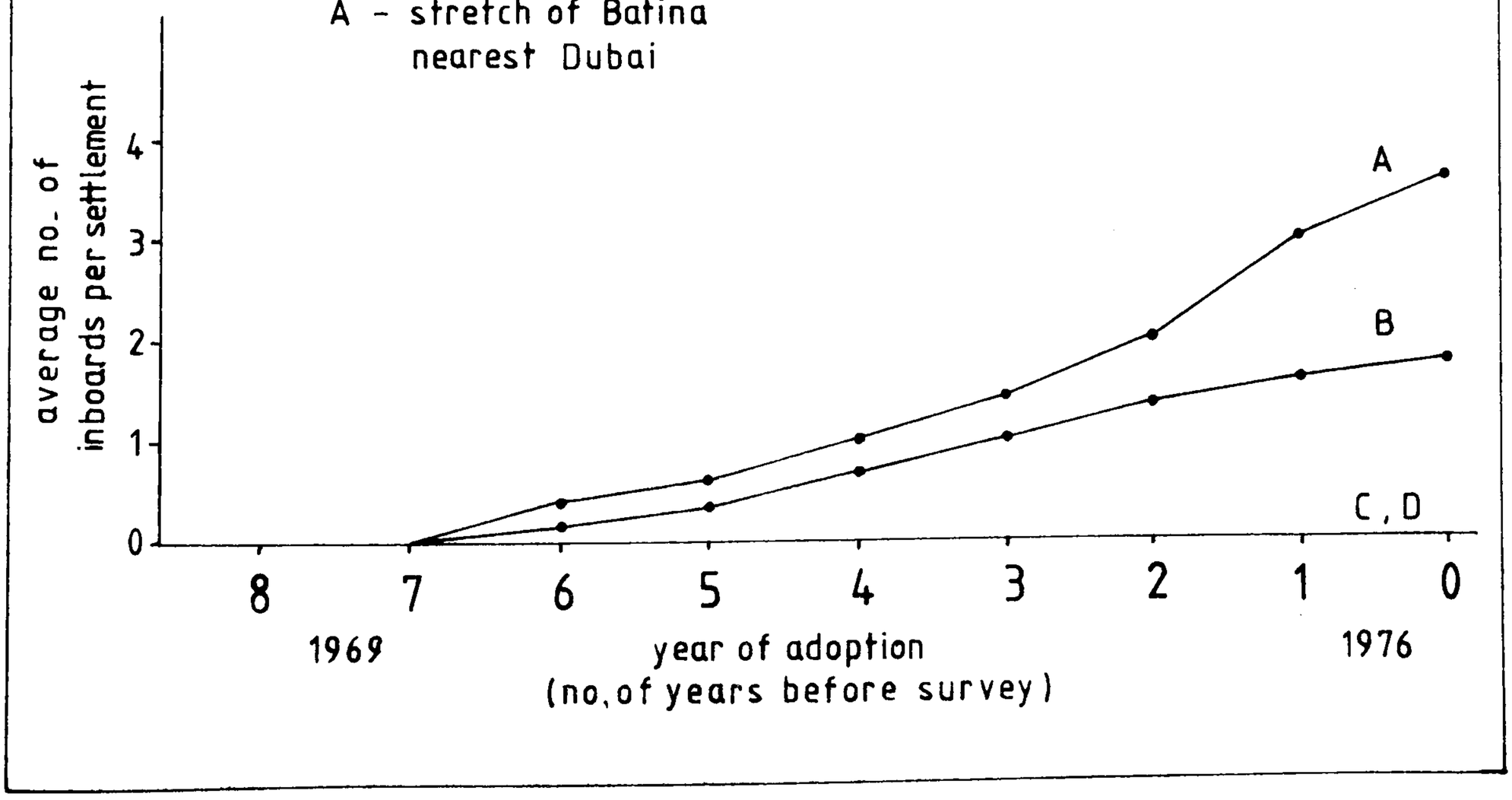


Figure G-4 Diffusion of inboard diesel engines on the Batina (field survey data)



Inboard diesel engines:

Stretches A and B (nearest Dubai) both started to innovate at about the same time (ca. 1970, i.e., six years before the survey), but adoption has been twice as fast on stretch A as on stretch B. On stretches C and D (the Lower Batina, further from Dubai) diesel engines were present, but were so few in number that none occurred in the questionnaire survey.

These findings are generally in accord with the model (Figure G.2) and support the hypothesis that distance from source is of significance in the spread of innovations in terms of both the time of first uptake and the subsequent rate of adoption. What cannot be shown from the results however is whether the constraints imposed by distance are related to the spread of information about the innovation, or whether distance is important because of costs and convenience in terms of fishermen's time absorbed in visiting the point of innovation supply. In view of the fact that Batina fishermen on different parts of the coast have good knowledge of each other and of each other's fishing methods, as has been discussed in Chapter Six (Section 3), it would seem improbable that on the Batina the personal communication of knowledge about the innovation of motor power has been constrained by distance in the way Hägerstrand envisaged. While therefore the pattern found here conforms to that to be expected from Hägerstrand's model, the present findings do not necessarily support Hägerstrand's mechanism for the pattern, that distance constrains personal transmission of knowledge about an innovation.

The present conclusions must be only tentative since the data are representative of only a special case and are moreover imperfect in their accuracy and detail. The case is special in that diffusions on the Batina coast can be viewed spatially as one dimensional. The more usual case, with which previous studies have tended to concern themselves, would be two-dimensional diffusions in which complexities and alternatives are consequently much greater. Detail and accuracy are lacking in that verbal recall on the part of the fishermen of the year in which they adopted motor power is likely in some cases to have been imperfect, that the present data were collected for only a relatively small sample, and that the grouping of settlements which these small numbers made necessary allows only a coarse degree of definition. A further complication is that although only outboard petrol engines (not inboard diesels) are available at Mutrah, both inboard and outboard engines can be bought at Dubai.

Despite the difficulties of the data, however, the results as explained here do show a recognisable pattern which, given more intensive fieldwork, might be fruitful of further testing.

APPENDIX H

Further details of boat building on the Batina

1. Breakdown of costs of three Class II vessels

During the periods of the fishing survey three large plank-built 'huris' (Class II) were observed under construction in different Batina fishing settlements. A partial breakdown of the building costs was obtained for these. In each case the boat builder in question was asked to detail as far as he could each item of costs. Details are set out below together with the price which the fisherman for whom the boat was being constructed gave independently of the boat builder.

Case 1: at Qasbiyat al-Za'ab (Khabura)

	RO
Local timber: 3 sidra trees @ RO 10 ea. 5 qarat trees @ RO 10 ea. plus RO 25 for felling, cutting, & transporting	105
Imported timber: ready machined planks from Bahrain on dhow - Dh 4,000 incl. transport	350
Nails: large - 10 mannMuscat (ca. 40 kg) @ Dh 25 per mann = Dh 250	25
Total materials on site	480
Labour & expertise (3 men @ RO 3 per day for 2½ months)	810
Total cost, as estimated by builder	1,290
Total cost, as estimated by buyer	1,200

Case 2: at Raddat al-Dil (between Saham and Khabura)

	RO
Local timber, imported timber & nails, on site	1,110
Labour & expertise (3 men @ RO 5 per day for ca. 50 days)	750
Total cost, as estimated by builder	1,860
Total cost, as estimated by buyer	"about 2,000"

Case 3: at Dil (between Saham and Khabura)

	RO
Local timber, imported timber, on site	400
Nails	100
Total materials on site	500
Labour & expertise (2 men @ RO 5 per day for 70 days)	700
Total cost, as estimated by builder	1,200
Total cost, as estimated by buyer	1,500

In all three cases the boat builder's estimate tallies fairly closely with that of the buyer. Such discrepancies as do occur may be largely accounted for by the fact that the work in each case was still in progress and the final price had not been paid over. Since the boat builders' access to capital funds is generally limited, it is usual for the fisherman either to buy much of the materials himself directly, or else to provide the boat builder with sufficient cash to cover each purchase as and when necessary. No written account was ever noted in such dealings either in the above three cases or in any other.

It is usual for a fisherman who has ordered a boat to provide food for the boat builder and his assistants while the boat is being constructed. The real cost of this is impossible to estimate precisely and has been omitted from the estimates.

2. Note on shāsh making

Previous references to the shāsha have been given in Chapter Three (Section 1) and it is illustrated in Figure 3.1.

A shāsha generally takes one man and a helper two days to make. A breakdown of costs is given in Chapter Seven (Table 7.2). An average sized shāsha needs between 100 and 150 zūr (date palm fronds). The zūr are stripped of their leaves and tied securely in bundles of about twenty-five. The bundles are then buried in the mud between high and low tide for ten days to soften and straighten them After being so treated, the bottom of the shāsha is first laid. To this are then fixed the vertical ghass (pl. ghusūs) or ribs, the tops of which will protrude in the finished shasha above the sides and serve as rowlocks. There are usually five to seven ghass. Eight is said to be the maximum number and four the minimum. Fishermen and shāsh builders refer to the size of a shāsha by the number of its ghass. Thus, abū khamsa (literally 'father of five') is a five-ghass shāsha; abū sitta is a six-ghass shāsha, and so on. The sides are built up by tying zūr to the ghass, the tapering effect at each end of the shāsha being produced by overlapping different lengths of zūr to different degrees. Once the sides are complete and the ends tied securely, the

body is filled with karab (date frond butts), or more usually nowadays pieces of expanded polystyrene, and over this is fixed the 'deck' of zūr interwoven with cord and strengthened with horizontal cross pieces. There is generally a 'gunwale' of some 15 to 20 cm above the 'deck'.

APPENDIX I

Investigation into the influence of auctioning and of seller on fish prices in Khabura market

It has been noted in Chapter Nine (Section 3) that calculated prices per kilogram for fresh whole fish in Khabura market (in the sample of fish sales taken over the three field seasons) range considerably even within single groups of fish. Two major influences acting on sale prices have been noted: the method of sale (direct bargaining and auctioning); and the seller (fishermen and fish traders). This appendix investigates statistically these influences on the sample data. Truly random samples of fish sales were impossible to achieve because of the way in which Khabura market operates. However, for present purposes the samples will be assumed to approximate to random. It will also be assumed that other factors affecting fish price (for example, the degree of freshness of fish sampled, the size of catch on the morning on which samples were taken, and the time of morning at which the samples were recorded) do not bias unequally the factors under consideration.

1. Influence of method of sale : direct bargain versus auction

The method of sale is known for a total of 1,076 of the 1,435 price-weight records taken during the market survey. Of these, 730 were direct bargain sales and 346 were auction sales. The expectation, on the basis of popular contention, is that, on average, auctions produce lower prices (weight for weight) than direct bargain sales.

Table I.1 summarises the sample data in terms of the average direct bargain prices and the average auction prices calculated in baisas per kilogram for each of the nine species

Table I.1 : Average prices of fish by direct bargain (DB) and auction (A) in sales sampled (in baisas per kilogram)

Species Group	Method of Sale	First Field Season		Second Field Season		Third Field Season		All Field Seasons	
		Average price per kg.	no. of records	Average price per kg.	no. of records	Average price per kg.	no. of records	Average price per kg.	no. of records
I	DB	617	(21)	564	(61)	400	(9)	560	(91)
	A	-	(0)	-	(0)	644	(6)	664	(6)
II	DB	447	(36)	450	(86)	401	(79)	430	(201)
	A	309	(7)	407	(5)	339	(90)	340	(102)
III	DB	356	(11)	265	(2)	-	(0)	342	(13)
	A	-	(0)	-	(0)	-	(0)	-	(0)
IV	DB	586	(26)	491	(51)	737	(24)	574	(101)
	A	368	(11)	816	(6)	493	(42)	502	(59)
V	DB	383	(31)	415	(54)	429	(37)	411	(122)
	A	457	(5)	521	(37)	438	(61)	469	(103)
VI	DB	483	(13)	331	(14)	324	(7)	388	(34)
	A	270	(3)	-	(0)	414	(11)	384	(14)
I to VI	DB	481	(138)	469	(268)	456	(156)	468	(562)
	A	358	(26)	546	(48)	411	(210)	429	(284)

/Continued

Table I.1 (Cont.)

Species Group	Method of	First Field Season Average price per kg.	First Field Season no. of records	Second Field Season Average price per kg.	Second Field Season no. of records	Third Field Season Average price per kg.	Third Field Season no. of records	All Field Seasons Average price per kg.	All Field Seasons no. of records
VII	DB	225	(7)	208	(11)	238	(2)	217	(20)
	A	152	(4)	251	(7)	265	(12)	241	(23)
VIII	DB	182	(19)	229	(24)	238	(55)	225	(98)
	A	148	(1)	146	(5)	194	(31)	186	(37)
IX	DB	125	(22)	125	(20)	116	(8)	123	(50)
	A	-	(0)	-	(0)	107	(2)	107	(2)
VII to IX	DB	162	(48)	187	(55)	223	(65)	194	(168)
	A	151	(5)	207	(12)	209	(45)	204	(62)
All Groups I to IX	DB	399	(186)	421	(323)	387	(221)	405	(730)
	A	325	(31)	478	(60)	375	(255)	389	(346)

groups by field season. The number of records on which each average is based is also given. The small fish (those individually less than 300 gm) are omitted here since all but five of the recorded sales for such fish were made by direct bargaining.

The average overall auction price (389 baisas per kilogram) is lower than the average overall direct bargain price (405 baisas per kilogram) as would be expected, but the margin of difference is small - only four percent. In the second field season indeed it would appear that auction prices were on the average higher than direct bargain prices, not lower, on the basis of the sample data.

Overall differences in price are however of little meaning in themselves because of the uneven number of records over the species groups and over the field seasons. This was to a large extent unavoidable: if very few fish of a particular group were available for sale in a field season then obviously very few prices could be recorded for that group. Further, auctioning has tended in Khabura to be less frequent than direct bargaining.

The number of records in each category to a large extent mirrors the availability of the different fish and the number of direct bargain and auctions sales. Attention must therefore be confined to the individual groups within field seasons, and, of these, to the 'best recorded' groups. Of the well liked fish (Groups I to VI) only those categories which have at least seven records for both direct bargain and auction will be considered. Of the less liked fish (where records are sparser) cells with at least four records for both direct bargain and auction will be taken. This gives a total of eleven 'best

recorded' categories. These eleven are retabulated in Table I.2 together with the percentage the average auction price forms of the average direct bargain price, and the distributions are summarised in Figure I.1.

As can be seen from the table, in the majority of cases the direct bargain average is higher than the auction average, but in four cases the reverse is true. That is to say, in four categories out of the eleven best recorded cells the observed difference in the average direct bargain and auction prices is contrary to what was expected. In three of these four cases indeed the auction average is twenty percent or more above the direct bargain average, a seemingly substantial difference.

Before any conclusions can be drawn about this situation the possibility must be tested that the differences in the pairs of averages are due to chance sampling and do not reflect real differences in the Khabura market sales as a whole. This possibility is real since in many cases the averages are based on small samples and consequently even large differences in the sample averages could well be due to chance. For this reason the distributions in each of the above eleven categories have been tested against the statistical probability of their having occurred by chance. The tests chosen are the parametric t-test and the non-parametric Mann-Whitney U-test.

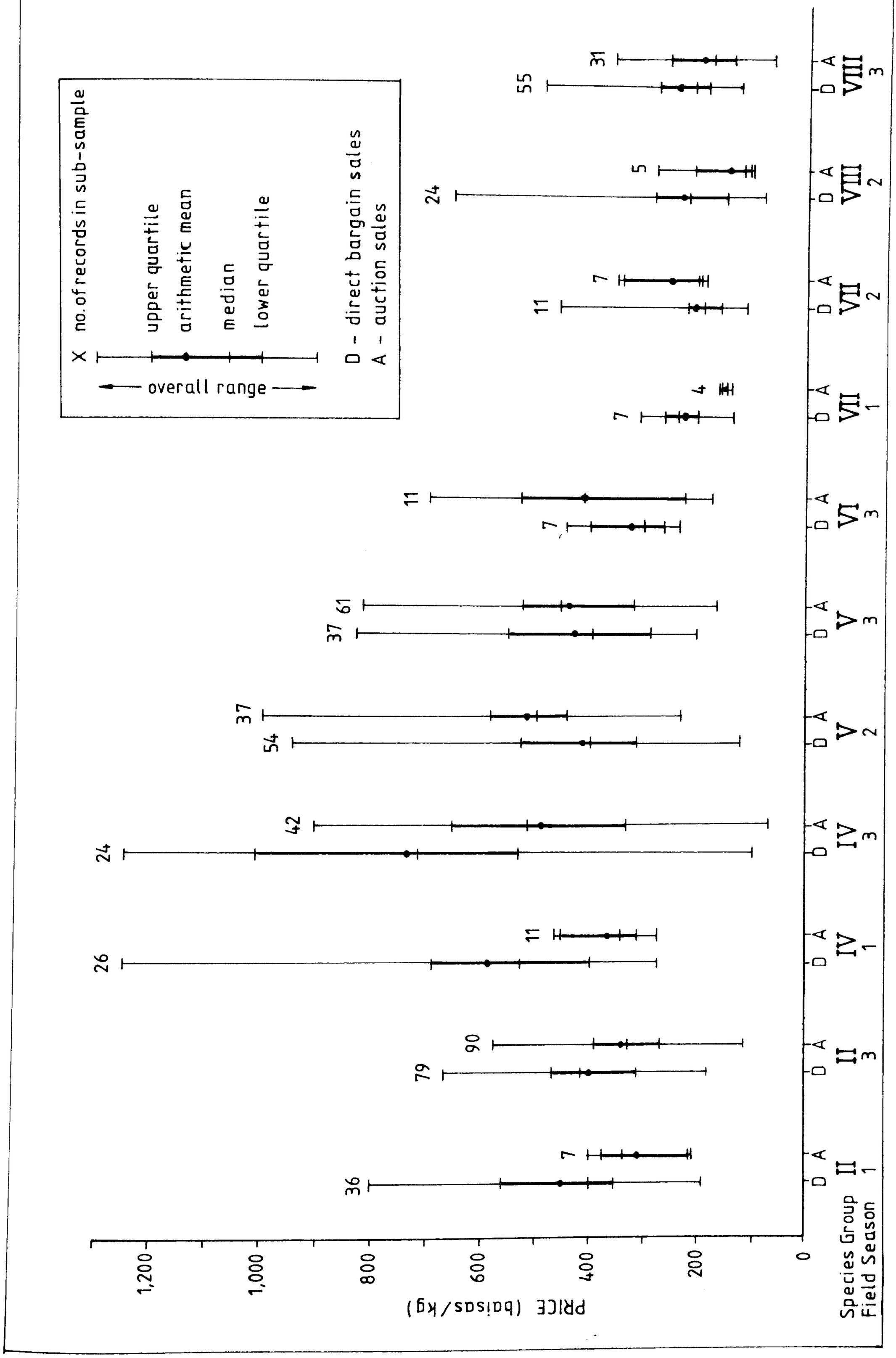
The t-test assumes that the populations underlying the two samples to be tested are normally distributed, and also that they have the same (or closely similar) variances. As Figure I.1 shows, most of the pairs of samples have distributions which tend to positive skewness. Indeed it is consid-

Table I.2 : Average prices of the best recorded categories sold by direct bargain and auction (in baisas per kilogram)

Species Group	Field Season	Direct Bargain Sales		Auction Sales		Average auction price as percentage of average direct bargain price
		average price per kg.	no.of rec-ords	average price per kg.	no.of rec-ords	
II	1	447	(36)	309	(7)	69.13%
II	3	401	(79)	339	(90)	84.54%
IV	1	586	(26)	368	(11)	62.80%
IV	3	737	(24)	493	(42)	66.89%
V	2	415	(54)	521	(37)	125.54%
V	3	429	(37)	438	(61)	102.10%
VI	3	324	(7)	414	(11)	127.78%
VII	1	225	(7)	152	(4)	64.56%
VII	2	208	(11)	251	(7)	120.67%
VIII	2	229	(24)	146	(5)	63.76%
VIII	3	238	(55)	194	(31)	81.51%

Figure I-1

Prices of whole fish at Khabura market during field survey : direct bargain sales versus auction sales for best recorded categories



ered likely that taking all prices as a whole the overall tendency is towards positive skewness in that extreme high prices are less likely to occur than extreme low prices. It will be assumed however that they do not depart so far from normality that the t-test is inapplicable.

Concerning the second requirement, that the variances are closely similar, the ratio of the variances of each of the eleven pairs of samples was tested against the F-distribution (Hammond and McCullagh 1974; Lindley and Miller 1966) at the 95% probability level (i.e., p = 0.05). In four of the eleven cases the pairs of sample variances showed differences too great to be compatible with the application of the t-test. In the other seven cases, the variances were similar enough for the t-test to be applicable.

To take the place of the t-test where the latter was inapplicable, and as a back-up in the other cases, the Mann-Whitney U-test was used (Siegel 1956). This test was chosen since, as a nonparametric test, it makes no assumptions about normality of distribution of underlying populations nor about similarity of variance, and is yet highly discriminatory with both large and small samples. According to Siegel (1956), its power of efficiency in discrimination is about 95% of that of the t-test.

With both tests the probability level of 0.05 (two-tailed) was taken as the level at which the null hypothesis (i.e., that there is no significant difference between the pairs of samples) can be rejected. Although it was expected that distributional differences were directional (i.e., that direct bargain prices on the whole were higher than auction

prices and not vice versa), in some cases the averages went against the expectation, as has been seen. Consequently the more stringent two-tailed testing was applied throughout.

The results of the tests, summarised in Table I.3, are clear. In all cases the result of the t-test (where applicable) is closely similar to that of the U-test. Of the seven cases which support the expectation that direct bargain prices tend to be higher than auction prices, six show differences between their two sample distributions which are significant statistically at least at the 0.05 level of probability. That is to say, it is at least 95% certain that the higher average direct bargain sales and lower average auction sales in these six pairs of samples have not been produced by chance. In most indeed the significance of the difference holds at an even more stringent level. On the other hand, of the four cases in which the auction prices average more than direct bargain prices, only one shows a significant difference. In the other three cases a similar difference could have been produced by chance sampling in more than five cases out of one hundred.

The conclusion to be drawn is therefore that according to the sample data it appears with more than 95% certainty that auction prices of fish in Khabura are indeed on the whole less than those produced by direct bargaining. This conclusion confirms the opinion of the general public. Further, the differences in price produced by the two methods of sale appear to be similar in the case of both well liked and less liked fish. That is, auction prices can on average be between 65 percent and 85 percent of direct bargain prices on the

Table I.3 : Statistical significance of between sample differences in the best recorded categories: direct bargain and auction prices

Species Group	Field Season	Average auction price as percentage of average direct bargain price	Significance of Difference	
			t-test	Mann-Whitney U-test
I	1	69.13%	signif.at p = 0.01	signif.at p = 0.016
II	3	84.54%	(not applicable)	signif.at p = 0.001
IV	1	62.80%	(not applicable)	signif.at p = 0.004
IV	3	66.89%	signif. at p = 0.0005	signif.at p = 0.003
V	2	125.54%	signif.at p = 0.001	signif.at p = 0.001
V	3	102.10%	N.S.($p \simeq 0.8$)	N.S.($p \simeq 0.48$)
VI	3	127.78%	(not applicable)	N.S.($p > 0.10$)
VII	1	67.56%	(not applicable)	signif.at p = 0.036
VII	2	120.67%	N.S.($p > 0.25$)	N.S.($p > 0.10$)
VIII	2	63.76%	N.S.($p > 0.025$)	N.S.($p = 0.072$)
VIII	3	81.51%	signif.at p = 0.013	signif.at p = 0.015

Notes: not applicable : Variance ratio test against the F-distribution at p = 0.05 indicates that difference between sample variances is too great for t-test to be applied.

p = level of significance at which null hypothesis (that there is no significant difference between the samples) can be rejected.

N.S. = difference between samples is not statistically significant at the p = 0.05 (i.e. 95%) level (two-tailed).

whole if the sample data are representative.

The above discussion and calculations have assumed that all other market factors affect both direct bargain and auction sales equally. This can safely be assumed in the case of some factors. There is no reason to suppose for example that auctioning was more common on days of plentiful fish when prices could in any case be expected to be lower.

On the other hand, one influence in particular is known without doubt to affect auctioning more than direct bargaining, namely the nature of the seller, fisherman or fish trader. This is considered fully in the next section of this appendix. Whereas a fisherman sells either by auction or by direct bargaining, a fish trader (at Khabura) sells only by direct bargaining. Since the fish traders buy in the first place from the fishermen, the selling prices of the former are on the whole higher than those of the fishermen. Therefore the fact that auction prices tend to be lower might well be only because they are fishermen's prices, and not by their having been produced by auction <u>per se</u>. Direct bargain prices on the other hand are affected by the fact that the sellers can be either fish traders or fishermen.

To allow for this, Table I.4 has been prepared which shows the average direct bargain and auction prices where the seller was a fisherman for each of the seven cases shown above to have significant differences when both sellers' prices were included. That is to say, all fish trader sales have been extracted. Comparing this table with Table I.2 indicates that although in most cases the removal of the fish trader sales reduces the difference between the direct bargain and

Table I.4 : Average prices of the best recorded categories sold by direct bargain and auction when only fishermen sales are included (in baisas per kilogram)

Species Group	Field Season	Direct Bargain Sales average price per kg.	Direct Bargain Sales no.of records	Auction Sales average price per kg.	Auction Sales no.of records	Average auction price as percentage of average direct bargain price
II	1	415	(6)	309	(7)	74.46%
II	3	400	(53)	339	(90)	84.75%
IV	1	558	(5)	368	(11)	65.95%
IV	3	651	(17)	493	(42)	75.73%
V	2	424	(6)	521	(37)	122.88%
VII	1	188	(3)	152	(4)	80.85%
VIII	3	198	(27)	194	(31)	97.98%

auction averages, substantial differences nevertheless remain, and the overall pattern is the same. There remain therefore differences which are attributable to the different methods of sale when the influence of the seller is removed, even though the statistical significance of these differences is possibly reduced in some instances. The conclusions arrived at above still hold true.

However, it has been the object of this section to enquire into the consumers' view that auction prices are on the whole lower than those of direct bargaining, irrespective of seller: that is to say, to view the situation from the point of view of the consumer who is free, subject to the availability of the type of fish he wants, to buy by auction or by direct bargaining. Further, the fish trader could if he wished resell his fish by auction. The fact that none ever does so tends to support the contention that auctioning does of itself produce lower prices on average than direct bargaining, and that fish bought by direct bargaining could not on the whole be resold at a profit by auctioning.

2. Influence of seller : fisherman versus fish trader

Out of a total of 1,435 price records, the seller was noted in 753 cases, mostly in the second and third field seasons. Concerning the small fish (individuals under 300 gm), nearly all were retailed by fish traders and consequently these will be excluded from the present discussion as they were above when the method of sale was considered. This leaves 699 price records for the medium to large fish (Groups I to IX) for which the seller is known.

As was shown in the previous section however, there is a relationship between seller and method of sale in that fish traders sell only by direct bargain whereas fishermen sell by both direct bargain and auction. Since what is required here is an analysis of the effect of the seller by himself on the price, the influence of method of sale must be excluded. For this reason, only direct bargain sales are considered since auction sales are not common to both sellers. This unfortunately reduces the number of records still further - to 207 fishermen sales and 149 fish trader sales.

Table I.5 summarises in the form of average prices per kilogram the sales from fishermen and from fish traders when the method of sale was direct bargaining. The overall average price for fishermen sales is 402 baisas per kilogram while that for fish trader sales is 442 baisas per kilogram, some ten percent higher. The well liked fish (Groups I to VI) taken overall apparently show a smaller average difference in price (eight percent) between the sellers, while with the less liked fish the apparent difference is much larger (thirty-eight percent). However, because of unequal sampling over the table, overall averages have little meaning in themselves, as was the case when the method of sale was considered in the previous section, and are in fact misleading, as will be shown.

Table I.6 lists the seven 'best recorded' cells. In the case of the well liked fish, 'best recorded' is taken to mean at least seven records in both of the samples of each pair. For the less liked fish, Group VII in the first field season and Groups VIII and IX in the third field season have been chosen as the 'best recorded' cases even though the samples are

Table I.5 : Average prices of fish sold by fishermen (FM) and fish traders (FT) in sales sampled when the method of sale is direct bargain (in baisas per kilogram).

Species Group	Seller	First Field Season		Second Field Season		Third Field Season		All Field Seasons	
		Average price per kg.	no. of records	Average price per kg.	no. of records	Average price per kg.	no. of records	Average price per kg.	no.of records
I	FM	-	(0)	445	(21)	489	(5)	453	(26)
	FT	602	(7)	559	(20)	287	(4)	533	(31)
II	FM	415	(6)	596	(13)	400	(53)	437	(72)
	FT	(800)	(1)	-	(0)	402	(26)	417	(27)
III	FM	(214)	(1)	-	(0)	-	(0)	(214)	(1)
	FT	529	(5)	-	(0)	-	(0)	529	(5)
IV	FM	558	(5)	(779)	(1)	651	(17)	636	(23)
	FT	747	(2)	494	(23)	946	(7)	609	(32)
V	FM	342	(3)	424	(6)	451	(25)	437	(34)
	FT	-	(0)	406	(3)	383	(12)	388	(15)
VI	FM	-	(0)	-	(0)	328	(6)	328	(6)
	FT	(364)	(1)	(240)	(1)	(300)	(1)	301	(3)
I to VI	FM	434	(15)	498	(41)	452	(106)	462	(162)
	FT	595	(16)	510	(47)	462	(50)	501	(113)

/Continued

Table I.5 (Cont.)

Species Group	Seller	First Field Season Average price per kg.	First Field Season no. of records	Second Field Season Average price per kg.	Second Field Season no. of records	Third Field Season Average price per kg.	Third Field Season no. of records	All Field Seasons Average price per kg.	All Field Seasons no. of records
VII	FM	188	(3)	-	(0)	238	(2)	208	(5)
	FT	236	(3)	-	(0)	-	(0)	236	(3)
VIII	FM	171	(2)	117	(2)	198	(27)	191	(31)
	FT	239	(2)	-	(0)	288	(25)	285	(27)
IX	FM	79	(2)	362	(2)	97	(5)	152	(9)
	FT	-	(0)	115	(3)	146	(3)	131	(6)
VII to IX	FM	152	(7)	239	(4)	186	(34)	185	(45)
	FT	237	(5)	115	(3)	273	(28)	255	(36)
All Groups I to IX	FM	345	(22)	475	(45)	388	(140)	402	(207)
	FT	510	(21)	487	(50)	394	(78)	442	(149)

Table I.6 : Average prices of the best recorded categories sold by fishermen and fish traders when the method of sale is direct bargain (in baisas per kilogram).

Species Group	Field Season	Fishermen Sales average price per kg.	Fishermen Sales no.of records	Fish Trader Sales average price per kg.	Fish Trader Sales no.of records	Fish traders' average percentage of fishermen's average price
I	2	445	(21)	559	(20)	125.62%
II	3	400	(53)	402	(26)	100.05%
IV	3	651	(17)	946	(7)	145.31%
V	3	451	(25)	383	(12)	84.92%
VII	1	188	(3)	236	(3)	125.53%
VIII	3	198	(27)	288	(25)	145.45%
IX	3	97	(5)	146	(3)	150.52%

mostly very small. As can be seen, in six cases out of the seven the average fish traders' price is more than the fishermen's as would be expected, though in one of these cases the fish traders' average is only just higher. In the seventh case the fish traders' average is considerably lower than the fishermen's.

Any or all of these differences may however be due to chance sampling. The seven pairs of individual distributions have therefore to be tested against the probability of chance occurrence. The t-test and the Mann-Whitney U-test are used here as before, the procedure being the same as when methods of sale were considered in the previous section. Figure I.2 summarises the distributions and Table I.7 presents the results of the significance tests.

In only three cases out of the seven considered is the difference between fishermen's and fish traders' sample prices significant at the 0.05 level. In all three however the difference is in favour of the fish traders, as is to be expected. In two cases the difference is forty-five percent and in the third twenty-six percent. If the level of stringency is lowered to 0.10, a further two cases show significant differences - of twenty-six percent and fifty-one percent, again in favour of the fish traders. The single case in which the difference in the averages is in the favour of the fishermen on the other hand turns out not to be significant at even the 0.10 level.

Two points can be concluded from the data as analysed above. First, fish traders do on the whole sell at higher prices than the fishermen even when fishermen's auction sales are excluded. From the consumers' point of view therefore

Figure I-2 Prices of whole fish at Khabura market during field survey : fishermen's sales versus fish traders' sales

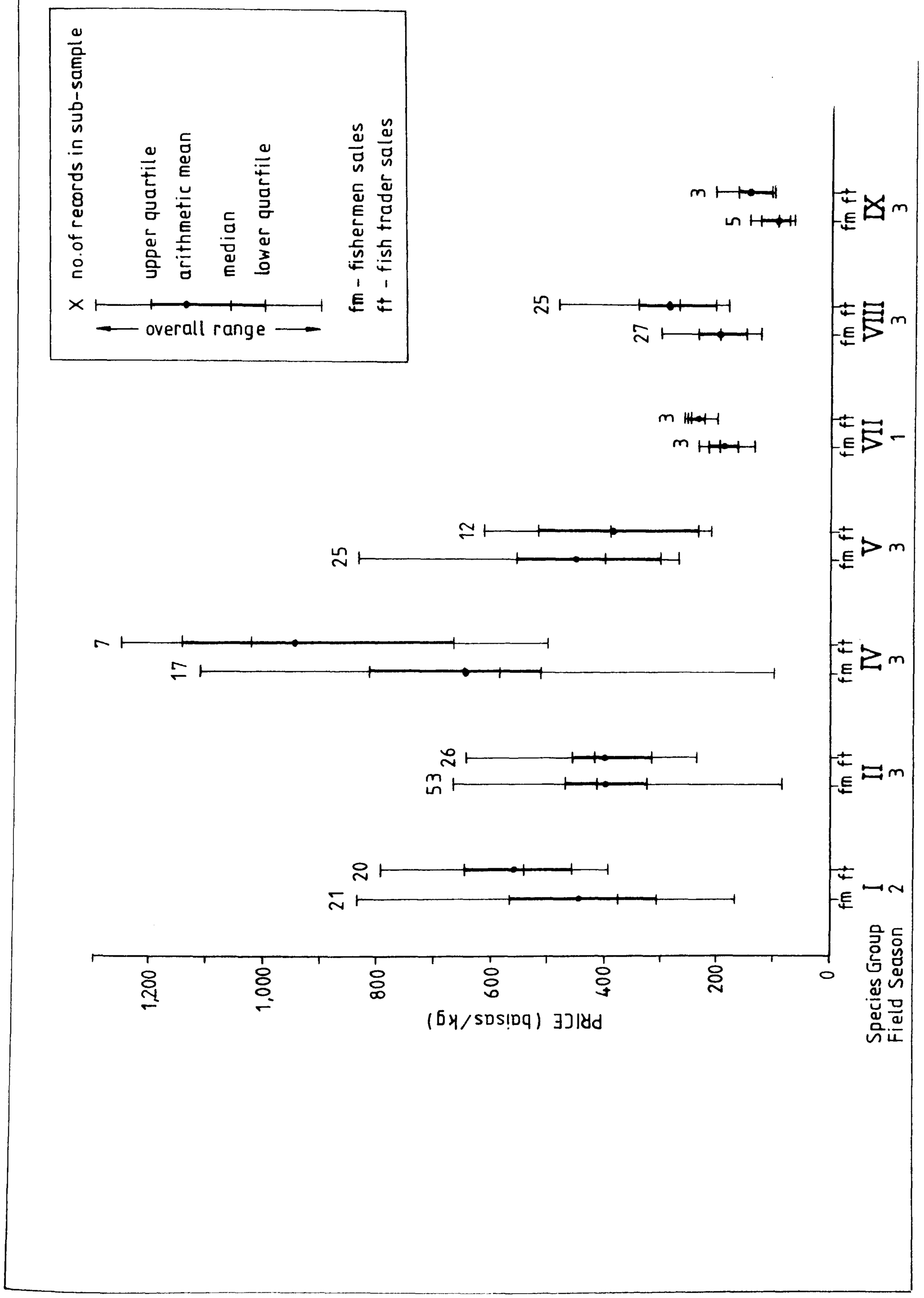


Table I.7 : Statistical significance of between sample differences in the best recorded categories: fishermen's sales and fish traders' sales

Species Group	Field Season	Fish traders' average price as percentage of fishermen's average price	Significance of Difference	
			t-test	Mann-Whitney U-test
I	2	125.62%	(not applic-able	signif.at p = 0.021
II	3	100.05%	N.S.(p > 0.90)	N.S. (p ≃ 0.92)
IV	3	145.31%	signif. at p ≃ 0.03	signif. at p ≃ 0.04
V	3	84.92%	N.S.(p > 0.10)	N.S. (p ≃ 0.28)
VII	1	125.53%	N.S.(p > 0.10)	N.S. (p = 0.10)
VIII	3	145.45%	(not applic-able)	signif. at p < 0.0005
IX	3	150.52%	(not applic-able)	N.S. (p = 0.098)

Notes: not applicable : Variance ratio test against the F-distribution at p = 0.05 indicates that difference between sample variances is too great for t-test to be applied.

p = level of significance at which null hypothesis (that there is no significant difference between the samples) can be rejected.

N.S. = difference between samples is not statistically significant at the p = 0.05 (i.e. 95%) level (two-tailed).

it can be considerably cheaper on average to buy from fishermen even by direct bargaining (which tends to produce higher prices) than from fish traders. In the case of some fish at some times the fish traders' price can be even on average between one-quarter and one-half as much again as the fishermen's, if the present sample data are taken as a basis. That many consumers do still choose to buy from fish traders rather than fishermen, even knowing the latter to be cheaper and even when whole fish are involved, which require no subdivision, can best be explained as the result of convenience. Fish traders are present in the market for many more hours a day than are the fishermen.

The second conclusion is that the overall average prices for well liked and less liked fish calculated at the beginning of this section can now be seen to be misleading when the data are analysed in more detail and tested for statistical significance. It appeared initially that the difference between the fishermen's and fish traders' average prices was much higher for less liked fish (38% difference) than for well liked fish (only 8% difference). The cases which show statistically significant differences however indicate that this is unlikely to be so but rather to be the result of unequal combinations across the table. Those cases in which the differences are significant at either the 0.05 level or the 0.10 level show differences of a similar order in both the well liked and the less liked groups: all are between twenty-five and fifty-one percent. The cases with lower or negative differences in the well liked fish all proved not to be significant at the 0.10 level.

What cannot be concluded from the above analysis however

is any estimation of fish traders' overall profits. There are two reasons for this. First, the small number of records in most of the samples has made it possible to focus on only a small and possibly unrepresentative number of cases, and of these even fewer turned out to exhibit statistically significant differences. Statistical significance does not prove that the sample distributions so tested are in any way typical of the overall situation. Secondly, and more important, the present data deal only with whole fish whereas fish traders derive much of their profit from dividing up large fish into smaller more convenient pieces as is described in Chapter Nine (Section 2).

APPENDIX J

Ibri market and the Ibri auction system

1. Ibri market

The settlement of Ibri with a population of about 6,000 is the regional capital of the part of the Northern Interior known as the Dhahira. Like Khabura, it is the headquarters of a local governor or wali, though Ibri's commercial services are of a higher order than those of Khabura (Durham Oman Project Reports 1978 Vol. VI). Indeed Ibri has one of the largest and most important markets outside the Capital Area and a hinterland which in area and population probably rivals or exceeds that of other large Omani provincial markets such as Nizwa.

There are two aspects of the commercial activity in Ibri market. These are centred respectively on the shops and stalls on the one hand and on the arsa or maydan, the open 'market square', on the other. The shops and stalls, of which there were 125 during the periods of survey, deal almost wholly with imported, or at least non-local, commodities, and the method of sale is direct bargaining. The maydan-centred activity in contrast consists almost wholly of auctions and it is through the auctions that local produce and produce from other parts of the Sultanate enter the market. Thus the normal pattern is for both fresh and cured fish, together with dried dates, live animals and other local commodities, to be sold in Ibri market initially by auction in the maydan. The commercial framework in Ibri thus differs from that in Khabura where auctioning has been comparatively uncommon since 1970.

Like all other markets in Oman, with the exception of Majis on the Batina, Ibri market is a daily market. Activity is found on every day and no day of the week was observed to be busier than any other, except possibly Friday. There is however a degree of complimentarity or daily periodicity between Ibri when the main activity takes place in the morning, and the smaller subsidiary markets of its hinterland where activity is confined almost wholly to the afternoons. The reasons for this pattern are probably of some age. One result in the last few years however has been that traders of fresh fish and other perishable commodities can buy their supplies in Ibri in the morning auctions and sell them at their local markets in the afternoon of the same day.

2. The Ibri auction system

The system of auctioning in Ibri market is substantially the same as in other Interior markets in Oman, and has remained more or less unchanged since before the accession of the present sultan. Ibri is notable however for the large quantity of goods which continue to be sold daily by this method. In many other markets including Khabura where auctioning of a wide range of commodities used to be an important and indeed compulsory feature of market activity, the system has largely gone out of use since 1970.

The mode of auctioning is essentially similar for both fish and other commodities. Each auction is conducted by an auctioneer or caller (dallal) assisted by a recorder (katib or musajjil). The caller opens the auction by calling out a number of standard phrases which serve as notice that an auction is about to start.

This is often done while briefly touring the maydan. Once the caller considers that sufficient onlookers have collected, he will start the bidding. The steps of each bid are decided by the caller and their size naturally depends on the type of goods being auctioned. Steps of RO 1 or RO 2 for each bid are usual for high value goods such as cattle, whereas for lots of five or six tomatoes steps of 10 baisas are the norm. For sacks of dried dates, fresh fish and cured shark the auction usually proceeds in 100 baisa steps, and for sacks of dried sardines and anchovies the step is generally 200 or 250 baisas.

There are about ten regular auctioneers in Ibri market and about the same number of regular recorders. Several of them always work in the same pairs, and there is a degree of specialisation among them. Those who regularly auction fish will also auction animals when called upon, but not dried dates or local fruit and vegetables. Similarly, the callers and recorders of dried dates tend to restrict themselves to that commodity.

In Ibri it is customary for the caller to call at each bid the value of the latest accepted bid, so that the last call made is the final selling price. In the much smaller markets of Sulayf and Araqi, both close to Ibri, the caller calls at each bid the next stage in anticipation of its being accepted by someone, with the result that the final selling price is the penultimate to be called.

At any stage during the auction the prospective seller can withdraw either because he feels insufficient people are present or because he considers the final price to be called is not high enough. Generally however, attempts to persuade him to

accept will be made not only by the prospective buyer but by the caller as well since without an agreed sale the latter collects no fee. The caller and recorder also have rights in that they are both entitled to make bids during the auction they are conducting, and frequently do so.

When the seller accepts the auction price, it is recorded along with his name and that of the buyer. If the buyer is not personally known to the recorder (which seems to be rare), the latter will ask where he lives and possibly from which tribe he comes. Since several auctions frequently take place at the same time in the maydan the present writer could not attend all at once. For those at which he was not personally present, these records, with the recorders' cooperation, proved to be an invaluable means of extending the number of auctions on which information could be collected.

In the case of fish in particular, whether fresh or cured, the loads auctioned are generally large, consisting of many whole fish or sacks of fish. In such cases, and with the seller's permission, several units will be auctioned together as a single lot. Dried sardines and anchovies are usually auctioned in lots of one or five sacks, while small dried shark are in most cases auctioned in lots of five, twenty, forty and multiples of forty pieces.

After the sale is agreed, it is the responsibility of the recorder to see that the buyer pays and the seller receives his money. In auctions where there is a large number of buyers and only one seller, as is the case with fish, and moreover where the seller is anxious to be on his way, the duty of

covering the interval between paying the seller and collecting all the debts from the buyers also rest on the recorder. In fish auctions in particular the auctioned load is commonly worth RO 250 and on occasions exceeds RO 500, and it is necessary for the recorder to provide this sum in cash immediately. Many of the buyers will pay him at the time of the sale or later the same morning, but often not all receipts will be received until two or three days or more have elapsed. In cases of unwillingness on the part of buyers to pay up the recorder has recourse to the wali, though such action seems seldom to be necessary.

In cases of auctions with large numbers of lots, it is necessary for the caller and recorder to calculate the sum owing to the seller in his presence to ensure fair dealing. This is done by the recorder reading the value of each lot in turn and the caller adding them by means of counters. Old bronze baisa coins of Sultan Faysal bin Turki which are no longer legal tender are most commonly used for this purpose.

When the total for the auction has been calculated, a deduction of 60 baisas in the riyal is made. Of this, 20 baisas goes to the caller and 20 baisas to the recorder as their fees. The remaining 20 baisas is levied on behalf of the Ministry of Awqaf and Islamic Affairs under the jurisdiction of which Ibri auctions are carried out and which is responsible for the upkeep of the fabric of the market. The wakil or commissioner of the ministry in Ibri collects periodically from all the recorders the sums due to the ministry.

APPENDIX K

The Ibri hinterland: the Dhahira

The region of which Ibri is the centre, the Dhahira, has a population estimated by the present writer to be about 15,000, partly bedu and partly sedentary. Many of the predominantly sedentary tribes have bedu sections, while some tribes, notably the Duruᶜ, are almost wholly nomadic. The dar or tribal area of the Duruᶜ extends to the south and southeast of Ibri into the Desert Interior. The settled population are to be found mainly to the north, northeast and east of Ibri in a large number of settlements ranging in size from a few tens of households to several hundred. A location map of the Dhahira and adjacent areas is to be found in Chapter Ten (Figure 10.7). The population of the Dhahira, settled or bedu, relies predominantly on Ibri market as its immediate source of imported commodities and both cured and fresh fish.

Many of the small subordinate settlements have one or more trader-transporters, often with a shop, who typically buy from Ibri auctions in the morning and sell in their home settlement in the afternoon. In addition, the larger subordinate settlements have small markets of their own. In Ibri Wilaya there are three such markets: in the settlements of Sulayf and Araqi, each about ten minutes drive by Landrover from Ibri, and Dariz, some twenty minutes away. Yunqul, about an hour's

drive due north of Ibri, is the centre of its own wilaya, but in terms of most non-local commodities, including fish, Yunqul is also commercially dependent on Ibri. Dhank, about the same distance to the northwest, also has a wali and is to some extent dependent on Ibri, but questioning of the traders there revealed that most of its supplies come directly from the U.A.E.

Several features characterise these subsidiary markets which contrast them with the central market of Ibri. Firstly, they are all very much smaller than Ibri market with its large maydan and 125 shops. Sulayf market and Dariz market each has some eighteen shops and those of Araqi, Yunqul and Dhank around twenty-two each. Auction activity in all is even less in proportion.

Secondly, customers at each of these markets tend to come only from the settlement in question itself and from the plain immediately surrounding the settlement. The inhabitants of other settlements in the vicinity visit Ibri rather than one of the smaller markets, even if one of the latter is closer. This is partly the result of the present transport pattern: it is generally easier to rent a place in a Landrover taxi from an outlying settlement to Ibri and back than to and from one of the smaller markets. The main reason however lies in the advantages of choice and price which Ibri offers, and also in the range of ancillary services which are found in Ibri which include a sub-post office and a clinic. For inhabitants of Ibri Wilaya, Ibri has the added attraction in that it is the headquarters of their wali.

Thirdly, nearly all the activity in the five smaller markets takes place in the afternoons, including all the auctions and the retailing of fish. In Ibri in contrast, the busiest time for the market is in the morning. This pattern allows perishable commodities, especially fresh fish, to be sold without ice on the same day as they are auctioned in Ibri.

Fourthly, only a very small proportion of the non-local commodities arrive in the smaller markets directly from their source without passing through Ibri. With the exception of Dhank, nearly all the imported goods and fresh and cured fish are brought from Ibri by local traders. This is the result of the much smaller size of the subordinate markets and of the demand in them.

Partly as a result of this last point, non-local goods are generally more expensive in the smaller outlying markets than the same commodities in Ibri since the goods have changed hands one more time before reaching the consumers in the outlying settlements. The greater distance of the subordinate settlements from the source is also important: non-local commodities tend to be dearer in Yunqul (one hour's distant) than in Sulayf and Araqi (each ten minutes distant). On the other hand, local produce sold in the smaller markets by auction tends to realise lower prices than in Ibri, reflecting the lower local demand.

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