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Fishing Livelihoods: Successful Diversification, or Sinking into Poverty?

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Introduction

Every year, international agencies publish many reports about the situation in Africa, which focus almost entirely on the urban–rural divide that is analysed and interpreted with reference to the dynamics of farming alone. However, in some African countries, especially in West Africa, the livelihoods of an increasing number of rural and peri-urban communities are based on fishing. This means that such people have specific features and behaviour patterns, which are not understood nor taken into account when designing development policies. Drawing on recent research into fishing and fishing communities in West Africa, this chapter shows why this needs to be remedied and describes some of the initiatives already taken in this regard.

Diverse People and Livelihoods

The description of someone whose livelihood is based on fishing covers a wide range of circumstances. The most obvious is that of a fishermen in the strict sense, that is someone who 'goes on the water' to catch fish. However, someone who owns his boat must be distinguished from someone who goes on board as a crew member or apprentice, whether paid or unpaid. In some cases, the captain of a boat may not be its owner, the latter being an investor, usually with a fishing background.

At one end of the scale, the boat may be relatively light, made by a local craftsman and have no motor or be equipped with an outboard motor that can easily be removed when the boat is beached after a fishing trip. This is referred to as 'canoe (*pirogue*) fishing' (or simply small-scale fishing). At the other end, if the boat is heavy and decked, if it can only berth at ports equipped with quays, if it

is fitted with a cabin, an inboard diesel motor and hydraulic winches to lift heavy fishing equipment, this is known as industrial fishing.[1] These two forms of fishing are, however, distinguished not just by their technical characteristics but especially by their entirely different social and financial origins and their very different modes of organization. Canoe fishing, which is always based on local initiatives, is still far more common than industrial fishing in almost all West African countries, both in terms of production (Table 2.2, columns 3 and 4) and, to an even greater extent, the number of workers involved. It is in fact the development over the last few decades of this type of fishing that has employed hundreds of thousands of people and also encouraged the establishment of many related jobs, thereby providing a livelihood for an ever-growing number of families.

The distinction between canoe fishing and industrial fishing applies not only to the way the fish is caught but also to the many other occupational activities connected with fishing. For example, there are many people who buy and sell fish, such as those who collect fish when the boats come in, who sell on to other traders. Some people, especially women, work in fish smoking, drying and salting. There are also all kinds of casual labourers, paid by the day or on a piecework basis, at the landing sites and fish markets: porters, packers etc. Finally, many people do not handle fish but supply inputs or services to the fishermen or traders: suppliers of motors for fishing boats, canoe manufacturers, people who guard and maintain the canoes on land, canoe motor mechanics, suppliers of wood for smoking the fish, suppliers of ice, hauliers and so on. The vast majority of these jobs have developed around canoe fishing, although there are some exceptions, including the small traders who specialize in buying and selling the other accidental fish caught by the industrial tuna fishing fleet and landed at the port of Abidjan (Romagny et al, 2000).

In some coastal countries, a substantial industry has grown up, processing and packing fish mainly for export. The factories get their supplies from both the industrial fishing fleet[2] that lands its catches only in the few ports equipped with infrastructure and from the dealers who collect the fish landed from canoes at the many beach landing sites. These factories make a major contribution towards maintaining and boosting canoe fishing, while providing employment for the female population in many coastal towns.

In addition to the workers in the fisheries sector described above, there are many other people (children, old people, the sick and unemployed) who live with them, depend on their income and are usually more numerous, within each household, than those who are active. They too must of course be counted as people whose livelihoods depend on fishing.

Fisheries as a Growing Livelihood Opportunity

Assessment of the current position

The importance of the fisheries sector for the livelihoods of West African communities cannot be appreciated simply on the basis of statistics relating to the number of boats or the number of fishermen. Many other people are engaged in

Table 2.1 *Employment in the fisheries sector in Senegal, excluding the river basin*

Year	Catch		Processing				Marketing		Total jobs
			Artisanal	Industrial					
	Canoe fishing	Industrial fishing		Freezing	Canning	Fish meal	Artisanal, small-scale	Industrial	
1976	49,001	1829	24,501	3,262	1310	100	98,002	45	178,050
1996	57,067	3351	171,201	11,143	2590	115	342,402	152	588,021

NB: The many jobs in small-scale processing and marketing must be considered as part-time, insofar as most of them are held by women who devote a large proportion of their time to household and family tasks.

Source: Sy (1998)

a range of other trades and services related to fishing, but are not usually accounted for under this heading, as they form part of the huge informal sector found in most African countries. However, studies have shown that for each person working full-time in sea fishing, between 5 and 9 jobs are created in the wider sector, the highest ratio (a ninefold multiplier) being recorded in Senegal, where processing and marketing activities are highly developed as shown in Table 2.1.

However, in the absence of a specific study for each country, a more modest figure of 7 should be assumed for the job creation ratio. This falls to 3.5 for professional fishing in inland waters, where the annual production landed per fisherman is smaller, and down to one-to-one for fishing practised in conjunction with many other activities since, in this case, a large proportion of the small catch is used for family consumption.

Finally, to get a rough calculation of the total number of people whose livelihoods depend on fishing, the total number of estimated jobs in the sector should be multiplied by a factor of 2.3. The application of such ratios to statistical data covering the number of canoes or fishermen thus allows the importance of fishing for the people of several West African countries to be assessed as in column eight of Table 2.2.

It can thus be seen that in four out of five countries, the proportion of people whose livelihoods are heavily or mainly based[3] on fishing is between 5 and 10 per cent, while this proportion is as much as 23 per cent in the case of Senegal.

A growing trend

The current situation, where fishing occupies an extremely important place within the livelihoods of West African communities, is partly the result of recent developments. Data from the national fishery administrations show that the seagoing canoe fleet of six countries on the West African Atlantic shoreline (Mauritania, Senegal, Cape Verde, Gambia, Guinea-Bissau and Guinea Conakry) has increased by a factor of at least six during the last 50 years, in other words an average rate of increase of 3.6 per cent per year. However, as the size and average number of crew members of the canoes have also increased by a third over the same period, rising from 3 or 3.5 people to 5 or more,[4] the numbers of fishermen may be taken

Table 2.2 *Estimated importance of fishing for livelihoods in five West African countries*

	Fishing area: sea (m) or inland (c)	*Production of canoe fishing (t/year)*	*Share (%) of canoe fishing in total production*	*Number of fishing canoes*	*Number of jobs for fishermen stricto sensu (in canoe fishing)*	*Estimated number of jobs in other parts of the sector (mainly processing and trade; secondarily in the industrial component, on board and on land)*	*Estimated number of people heavily dependent on fishing for their livelihoods*
Guinea (1, 2)	m	**53,000**	65 to 70	**2400**	**12,000**	*100,000*	*375,000* (or 6 % of the total population)
	c	*2500*		**1200**	**2500**		
Mali (3)	c	**60,000** to **130,000**	100		Full-time: 20,000 part-time: 70,000	*140,000*	*759,000* (or 7.6% of the total population)
Ghana (4, 5)	m	**300,000**	77	**8700**	**96,500**	*400,000 to 450,000*	> **1,500,000** (or 8.6% of the total population)
	c	**50,000**			*40,000*		
Mauritania (6, 7)	m	**50,000**	*20 to 25*	**2746**	**10,000 to 14,000**	> **50,000** (including **5500** in the industrial component)	*165,000* (or 6.7% of the total population)
	c	*3000*		*1500*	*3000*		
Senegal (8, 9)	m	**250,000** to **325,000**	80	**10,600**	**57,100**	**525,000** (including **17,350** in the industrial component)	*194,000* (or 23% of the total population)
	c	8000		**3000**	*6000*		

In bold: figures provided by the authors numbered in the first column and referenced below. The other figures are calculated using the ratios described in the text or are estimated figures (in italics). All the data are from the period 1990–98. Within that period, the most recent data available for each country have been used. The total national production used to calculate column 4 come from the FAO yearbook (average values 1995–98). The total population figures used for the ratio in column 8 are from the United Nations (1996).

1. Domain et al (1999); 2. Greboval (1997); 3. Breuil et al (1996); 4. Koranteng (1990); 5. Chaboud and Charles-Dominique (1991); 6. FAO (1999); 7. Bru and Hatti (2000); 8. CEP (2000); 9. Sy (1998).

to have increased by a factor of at least 8, resulting in an estimated average annual growth rate of 4.2 per cent. Such a figure appears to be substantially higher than the average annual rate of population increase in West African countries, which fluctuated between 2.6 and 3.2 per cent over the second half of the 20th century. It stands in even sharper contrast to the annual rate of increase in the active farming population, which did not exceed 1.7–1.9 per cent over the years 1960–90 in West Africa (Quesnel, 1996).

Another way of assessing the phenomenon is to observe the increasing number of fishing communities settled along the coast or on the banks of rivers and lakes. In many places, new clusters can be seen that did not exist ten or more years ago. These 'fishing camps' have become more numerous around the new lakes formed behind the major hydroelectric dams constructed over the last two decades (eg the reservoirs of Akosombo, Kossou, Sélingué and Manantali). In addition, fishing communities have settled around the hundreds of lakes formed recently by the building of small dams in Côte d'Ivoire and Burkina Faso. New fishing camps are also appearing on the banks of natural bodies of water, such as the upper Niger basin in Guinea and the large island of Bol in the heart of Lake Chad, which is now home to a cosmopolitan community of fishermen who arrived at the end of the 1980s. This also applies to the camps recently set up along the 'Grande Côte' of Senegal, the southern part of the Mauritanian coastline and the Boké region in the northeast of Guinea.

The picture is not uniform, either in time or space: each country has experienced its own period of strong growth in canoe fishing, often associated with a particular economic situation. In Guinea, for example, economic liberalization in the 1980s seems to have played a part in the sharp expansion of the canoe fleet in that country, from 1788 to 2356 units between 1989 and 1996 (Chavance, 2002). This phase of strong growth seems to have come to an end along the Senegalese coast, where the numbers of canoe fishermen rose from 13,600 to 49,000 people between 1960 and 1976 (an increase of 8 per cent per year), reaching 57,100 people in 1996 (an increase of 0.7 per cent per year). The wave of growth flowed on towards Mauritania, which now plays host to fishermen from Senegal and whose canoe fleet has increased fourfold between 1991 and 1997, rising from 677 to 2746 units. Another demonstration of this unevenness comes from the large Sahelian wetland of the inner Niger delta in Mali which was hard hit by drought between 1973 and 1993. It experienced only a slight rise in the numbers of fishermen, tending instead to be the source of migrants heading for new fishing areas, particularly the reservoirs formed behind the major dams (Herry, 1994; Kassibo, 2000). Despite these variations, the overall trend towards rising numbers of people engaged in fishing in West Africa is clear. Moreover, it would appear that this development is even more marked as regards occupations connected with fishing, especially post-catch activities (see below).

The increase in numbers of people working in the fisheries sector is of course partly because of general demographic growth, but it would appear also to be owing to factors specific to fishing. The sector appears to be more than maintaining its share of the active population in West Africa, whereas other primary and rural sectors of activity have, over the same period, lost a relative share of numbers to the towns. What could be the explanation? There are few studies of demography

dealing specifically with fishing communities, but such studies as have been done (Herry, 1994) show that natural growth (fertility less mortality) among fishing groups is around 3 per cent per year, which barely differs from that of the West African population as a whole.

The Attraction of the Fisheries Sector

The high growth rate in the canoe fishing sector results from the fact that thousands of people have turned to this activity as a main source of livelihood. They have chosen fishing in preference to previous activities or those practised by their parents. How did this happen and what are the attractions of fishing?

Two livelihood patterns linked to fishing activity

Describing the historical and socio-economic processes that have encouraged the growth in canoe fishing requires some initial scene-setting. It is important to remember the extreme seasonal and inter-annual variations in climatic conditions that prevail in tropical areas, as a result of which very few aquatic environments have permanently high availability of fish. In view of this natural phenomenon, West African communities have developed two livelihood strategies based on fishing:

- a sedentary lifestyle in which fishing is a seasonal pursuit combined with other activities providing supplementary income: the model of the 'multi-active sedentary fisherman' or 'farmer fisherman' (Cormier-Salem, 1991);
- mobility in search of fish and opportunities for marketing fish, using specialist gear and, usually, giving up farming: the model of the 'migrant fisherman' (Haakonsen and Diaw, 1991).

This bipolarity has long been known, since it emerges from work done long ago by ethnographers and the colonial administration (analysed by Chauveau, 1986). The second model was seen as specific to a small number of ethnic groups: the Wolof of Guet-N'Dar and the Lebou of the Cape Verde Peninsula (Senegal), the Fanti and Ga/Adangme of the Gold Coast and the Bozo along the river Niger in Mali. These groups appear to have been the first to include families whose livelihood strategies were entirely based on fishing, with all the constraints (mobility), equipment (large canoes) and know-how (navigation) that this implies. This singular way of life resulted in a particular mindset and this is why these groups continue to be thought of as the 'real fishermen'. However, the first model of livelihood strategy long remained the most widespread and common in West Africa, probably because it is the safest: the farmer fisherman produces his domestic needs in cereals and can thus feed his family without depending on the market. By contrast, the migrant professional fisherman is exposed to a larger number of risks of all kinds. However, he has the advantage, when everything is going well, of deriving substantial monetary income from the sale of fish, which enables him more easily to move within the now dominant market economy.

The expanding canoe fishing sector

Settlement of 'professional fishermen' from elsewhere

Until the end of the 19th century, only a few ethnic groups on the Senegalese coast and what is now Ghana were really specialized in navigation and fishing. It was then that migratory flows from these two locations began to increase, leading successive waves of fishermen to colonize almost the entire West African coastline, within the space of three or four generations (Chauveau, 1986). More specifically, 'Ghanaian' pioneer groups spread from The Gambia to the Congo, broadly overlapping the area of expansion of the 'Senegalese' pioneers that extended from Mauritania to Côte d'Ivoire (Haakonsen and Diaw, 1991).

A very similar phenomenon arose around inland waters: the Bozo from the upstream area of the inner Niger delta, whose lifestyle was that of 'migrant professional fishermen', spread towards the centre and then the downstream areas of this vast wetland zone. Subsequently, in the 1970s, these same groups fanned out into the new lake areas in West Africa, created as a result of dam construction (Kassibo, 2000), as well as upstream of the river Niger in Guinea.

In this way, most of the coastal, river or lakeside areas of West Africa received people from at least one of these groups of migrant professional fishermen during the 20th century. In each of these areas, this influx was a determining factor in the local development of canoe fishing.

Farmer-fishermen convert to professional fishermen

In places where pioneer groups of professional fishermen settled, there were usually indigenous communities who, although relying mainly on farming, were not indifferent to the opportunities provided by aquatic resources. They engaged in gathering activities (such as collecting shellfish) or fishing with light equipment, such as traps, harpoons or individually operated nets, with a preference for shoreline, estuary or lagoon environments (Cormier-Salem, 1991; Bouju, 1999). The temporary and then permanent settlement of groups of migrant professional fishermen alongside them had the effect of encouraging some of these farmer fishermen to undertake more intensive fishing activities at sea, until they themselves became fully professional fishermen. This is what happened with the Nyominka of Sine-Saloum (Senegal) and, more recently, the Soussou in Guinea.

However, some indigenous communities spurned the opportunity to learn sea fishing and remained attached to their ancient practices of coastal and lagoon fishing combined with farming (eg the Baga and Nbalou in Guinea – Bouju, 1999). In the case of freshwater or confined bodies of water (lagoons) and where indigenous communities had long made a relatively substantial investment in fishing, the arrival of migrant professionals using much more efficient and thus potentially destructive techniques was often perceived as negative. Far from being imitated by the local people, in many places these migrants and their methods were rejected.

However farmer-fishermen (or the sons of farmer-fishermen) elsewhere came to specialize to a greater extent in fishing after having contact with migrant fishermen settled in their communities, some of them becoming full-time professionals.

This on-site trend played a part in the process of development of canoe fishing in areas where that activity was still underdeveloped in the mid-20th century.

New groups enter the fishery sector

In some countries, the variety of communities involved in the fisheries sector now extends far beyond the confines of groups formerly considered as 'fishermen' or 'coastal dwellers'. In fact, many canoes are crewed by descendants of families from the Sahelian hinterland who used to specialize in transhumant herding or rainfed agriculture. In Mauritania, the estimated number of Moors who have recently come into fishing in this way is 3000, representing around 30 per cent of total canoe fishermen[5] (FAO, 1999). In Burkina Faso, where most fishing areas involve recently created artificial water bodies, young Mossi farmers have taken up fishing, initially on a seasonal basis and then permanently.

The reason for this new influx into fishing is unclear. It is undoubtedly linked to some extent to the phenomenon of young rural dwellers seeking incomes and employment. One of the entry points seems to be the seasonal jobs available at landing sites. In Senegal, taking this type of casual employment has proved to be a springboard for boys into the better paid occupation of crewing fishing boats. However, this is not true everywhere: in some traditional inland fishing centres (such as the river Niger in Mali) new entrants are kept well away from actually catching fish.

Apart from such inland situations, which represent ancient patterns of economic organization based on complementarity between ethnic groups, it can be said that the origins of those taking jobs in the fisheries sector are gradually becoming of less importance, at least as regards sea fishing. Being a fisherman no longer means having to belong to a particular ethnic group. This lowering of identity barriers to entry into the sector encourages the growth in numbers.

Processes amplifying growth in fishing activity

Apart from the three key processes described above, other factors have encouraged the development of the sector.

The first concerns the expansion in areas becoming accessible or profitable for fishing. This expansion in itself stems from three causes: motorization and the increased size of canoes, which has made the high seas (up to 20 nautical miles), formerly reserved for industrial fishing fleets, available to canoe fishing; the creation of reservoirs by almost all countries in West Africa to expand the production of hydroelectric power; and the building of roads which has enabled the supply chain to reach areas rich in fish but which, owing to isolation, were little exploited until recently. All these 'new' fishing areas have proved particularly welcome for migrants and new fishermen.

The second factor results from the development of the sector in terms of diversification and differentiation. Over the years, new sub-sectors have emerged that seek to gain maximum value from fishing on the basis of the characteristics of the catch on one hand and the needs of the market on the other. This includes the rapid transport of fresh fish for sale in urban markets (quite a recent development

since it has gone hand-in-hand with the expansion and greater accessibility of road transport), the production of fish meal (from small pelagic fish) and export of fresh or frozen processed produce by air to Europe and Asia, while not compromising the existence of more traditional industries based on smoking and drying. Such diversification generates not only more added value but also increased demand for labour and operators of all kinds, thereby increasing the number of jobs in the sector for every fisherman onboard.

Explanatory factors

Increased need for cash

One of the main factors that has encouraged the growing professionalization of canoe fishing is that this activity can generate cash income on an almost daily basis, since almost the entire production is sold on return from each fishing trip, with the exception of the usually very small share set aside for family consumption. At the same time, the cash requirements of rural communities are growing since, in many regions, an increasingly large share of commodities, such as rice and oil, is no longer produced in the village but purchased in the shop or from travelling traders. In addition, products such as sugar and tea that are more and more sought-after also have to be purchased in the market. Furthermore, some goods and products that used to be considered as 'luxuries' (such as foam mattresses, plastic shoes, battery-operated cassette players and bicycles) are now seen as essentials. Finally, more and more cash is required for social events.

Few other livelihood opportunities

The second factor encouraging people to take up canoe fishing and associated trades relates to the lack of other livelihood opportunities available in rural areas. Various aspects need to be borne in mind here:

- the growing shortage of farmland, in the context of current fallowing systems;
- the low profitability of rainfed African cereal cultivation, facing heavy competition in urban markets from rice, wheat and imported flour;
- the risky nature of rainfed cultivation in the Sahel, and increased frequency of years with inadequate rainfall;
- the lack of access to paid work in the towns for uneducated rural people;
- the problem of survival for those in the informal sector.

Who gets hooked on fishing and why

However, the main reason for increasing numbers in canoe fishing is related to the consistently favourable market situation, which allows for a long-term increase in price paid to producers and dealers – except at times of seasonal over-production. This is due in part to sustained local and national demand: the urban population is growing fast and increasingly equipped with refrigerators, while fish has no real competition in the market for animal protein at affordable prices, except

from poultry.[6] In addition, the harvest from the sea has a growing international market, since there is a structural deficit in supply on a world scale. In West Africa, canoe fishing provides a growing share of the quantities exported.

The fisheries sector is also relatively open access. This is because of the relatively low level of investment capital required to acquire the means of production and to the scope for social mobility, in terms of access to jobs in fishing and to fishing areas, although this last point must be qualified to some extent.

In economic terms, coming into the canoe fishing sector as the owner of a fishing unit requires a relatively modest investment in relation to the expected profits. This investment depends on the environment (it is usually higher in sea as opposed to river or lake fishing) and also varies according to the level of specialization in the type of fishing activity undertaken (Table 2.3). The average outlay on equipment in relation to number of fishermen is around CFA 90,000 to 265,000 per person, which may be taken as the estimated cost of creating one job. This figure is low in comparison with industrial fishing (around CFA 12 million – Henry and Moal, 1998) and other economic sectors. Moreover, this investment barrier may be crossed more easily still by means of a collective strategy, as shown by the example of the 'seine unions' on the Aby Lagoon in Côte d'Ivoire (Verdeaux, 1989) or the multi-owner fishing units of Sine Saloum in Senegal (one fisherman owns the canoe, another the motor etc). However, even though the level of investment required is not a substantial barrier, direct access to the profession of self-employed fisherman remains problematic for new entrants in view of the very high level of know-how required, especially for sea fishing. An investor may, however, have a canoe built and entrust it to a captain who will be responsible for operating it on his behalf.[7]

Table 2.3 *Capital requirements for canoe fishing*

Type of fishing unit	*Number of workers*	*Boat (s)*		*Outboard motor(s)*		*Fishing gear and miscellaneous (in capital)*	*Total equipment outlay*
		Number and type	*Capital*	*Number and type*	*Capital*		
Seine net fishing unit (inshore fishing)	20	1 large fishing canoe	1,800,000 to 2,000,000	1 x 30 hp motor	800,000 to 900,000	2,000,000 to 2,400,000	4,600,000 to 5,300,000
Set gillnet fishing unit (inshore fishing)	6	1 fishing canoe	400,000	1 x 15 hp motor	500,000	500,000	1,400,000
'Migrant professional' household (inland waters)	10	1 pinnace for migration	600,000	1 x 15 hp motor	600,000	600,000 to 800,000	2,000,000 to 2,200,000
		2 fishing canoes	200,000	Nil			
'Farmer fisherman' household (inland waters)	5	2 fishing canoes	200,000	Nil		250,000	450,000

Source: based on updated data from Bauman et al (1994) and Kebe (1997) in CFA francs (CFA1 = US$0.0015)

The situation is different as regards jobs in the marketing sector, which require few particular skills and involve only a very modest initial investment (from CFA 50,000). This is where many independent small operators are found, representing the majority of those working in the fisheries sector (Table 2.1), having taken advantage of the fact that fish marketing networks have always remained open, with a low level of intervention on the part of government. Some state fish marketing boards have been set up (such as 'Opération Pêche' in Mopti, Mali and the SMCP[8] in Mauritania), but they have not established restrictive policies, unlike the boards set up to handle farm produce.

Finally, for those with no seed capital and just their labour power to offer, the fisheries sector provides many opportunities for work as casual labourers or apprentices with fishing boat captains and traders. Access to these jobs is easy during the seasonal boom in activity at landing sites and wholesale markets.

As regards the degree of open access to wild fish resources, it is important to distinguish between:

- the open seas and very large lakes, such as Lake Chad, which are technically difficult to exploit and monitor and are, de facto, freely accessible to those able to venture there; however, modern constraints related to the boundaries of territorial waters are beginning to bite, although the ability of governments to patrol these borders is still weak;
- inshore and estuary waters, both of which the indigenous coastal communities are usually still keen to control, although they do not always have the means to prevent the intrusion of better equipped migrant fishermen; and
- lagoon and inland waters, over which indigenous people claim community ownership and where they have real capacity to control access, although this does not necessarily mean that migrant fishermen from elsewhere cannot gain access.

In the last case, although foreign fishermen must request authorization and pay local taxes to the customary authorities in order to operate in these waters, it is unlikely that they will in the end be refused access, as their powerful fishing techniques enable them to afford to pay a high fee, which is clearly of interest to the host authorities.

All this shows that the system of access to fishery resources is multifaceted and quite flexible. It tends to be much more favourable to new arrivals and migrants than the system of access to land, the latter being almost exclusively based on lineage rights.

However, changes in the institutional framework of access to water and fishing resources are beginning to emerge with the decentralization initiatives launched in several West African countries in the 1990s. These reforms make some moves towards more institutionalized forms of community-based management (see below: case studies), which strengthen the position of indigenous communities. This may increasingly hinder free access by migrant fishermen to foreign waters in the future, particularly inland.

How easy is it to leave fishing?

Finally, there is another explanation for the growth in numbers in the fisheries sector: while there is a flow of incomers, there are very few people leaving the sector, because of the difficulties people face in taking up other activities.

The first of these difficulties relates to the pattern of life for migrant fishermen: because of their frequent moves, their status as foreigners which penalizes them in social and political relations and the fact that they live close to the water in remote areas that are not accessible in all seasons, fishermen are a people 'apart'. This has many negative consequences, one of which is the low school enrolment rate of children in fishing communities. This is often below 20 per cent and, in all cases, systematically lower than the average rates in the wider population. Under the circumstances, the children of fishermen have little chance of getting into better forms of employment.

Furthermore, owing to social factors, a shift in strategy from being a farmer-fisherman to becoming a migrant fisherman tends to be irreversible. Abandoning cultivation for several years or, worse still, leaving ancestral lands over which the family had customary use rights means that those who become migrant fishermen cannot usually return to farming especially as arable land becomes increasingly scarce. Moving from farmer-fisherman to migrant fisherman therefore seems, to a very large extent, to be a one-way journey.[9]

Consequently, there are only two pathways for a self-employed fisherman: upward mobility which involves becoming a dealer or ship owner with several canoes, or downward mobility, which means becoming an assistant or labourer working for other fishermen. This latter path is often the result of a process by which the fisherman, having had no luck, eventually finds himself unable to renew his equipment.

Effects on Livelihood Security and Sustainability

Having described the variety of people who depend on the fisheries sector in West Africa and the causes for the constant rise in their numbers, we now turn to examine the sustainability and security of their livelihoods.

How renewable are fish stocks?

Fishing experts have long thought that, as a result of the open access system characteristic of most aquatic resources, fishing tends to develop beyond the limits of sustainability, exhausting resources through excess offtake. However, the recent history of fisheries (see for example Pavé and Charles-Dominique, 1999, on West Africa), as well as new scientific knowledge, has altered the picture. In fact, for this type of fishery, there have been virtually no cases of collapse of the total catch from an aquatic ecosystem, despite the extraordinary rise in fishing effort over the last few decades. Since the 'Gordon-Schaefer' reference model for fishery management (Gordon, 1954) did not provide a satisfactory explanatory framework in the face of this evidence, it is now tending to be replaced by a 'plateau response' model

which better incorporates the multispecies nature of the resource and gives a better account of historical, local and regional dynamics.

According to this model (based notably on observations and studies of Regier, 1973; Marten and Polovina, 1982; Morand and Bousquet, 1994; Laë, 1997; Welcomme, 1999), increased effort over the first phases of development of a fishery allows larger catches to be made up to a maximum Y_{max}. After this, catches stabilize and the 'full exploitation' or plateau phase is reached, which extends over a wide scale of additional increase in effort. It is only beyond an extremely high level of effort that there is a theoretical (but rarely observed) possibility of a fall in overall catch occurring.

The catch volume (Y_{max}) achieved during the full exploitation phase corresponds to the old notion of 'potential fish yield', which depends on the size and biotic features of the ecosystem as well as environmental conditions. As regards the length or duration of the plateau phase, this reflects the resilience of the resource as a whole and its foundation (ie the aquatic ecosystem) in the face of intensified exploitation. This resilience brings into play many bio-ecological mechanisms whose overall result is the increasing proportion of short-lived species (Pauly et al, 1998) and, therefore, an accelerated turnover in resource biomass. This acceleration enables the ecosystem to sustain the same level of annual offtake despite the fact that the biomass present in the water at any given time is shrinking.

In parallel with these developments in ecological parameters, fishermen alter their practices because catches per unit of effort fall, as witnessed by the usual observation: 'there are fewer fish now than before'. In an attempt to maintain their individual yields and incomes, fishermen will therefore turn to areas they did not previously fish (eg the open sea), cast more nets per trip or seek to catch smaller fish, particularly by using finer mesh or more efficient nets, such as monofilament[10] nets. These responses from the fishermen contribute towards even greater intensification.

Although fishery experts all agree that most inland and coastal West African waters are currently at an advanced stage of full exploitation, there is no sign that we are coming dangerously close to the cut-off point that would lead to a collapse in the total catch. It is therefore possible that a substantial increase in the number of fishermen or in fishing effort in the years to come will lead merely to stagnation in fishing output, as has already been observed over the last decade. Such a scenario is not desirable, since it would have serious consequences for fishermen's livelihoods.

Effects on household income and wealth

While total catch can indeed be sustained over a wide scale of increased effort, the same is not true for the efficiency of fishing, as measured by the volume of catch per unit of effort (for instance per hour's fishing) and the total annual catch per boat. These ratios are the ones that have the most direct influence on fishermen's incomes and they are falling.

Commonly, the fishing boat captains try to maintain production, despite the decreased availability of the resource, by increasing the length of fishing trips, and thereby expenditure on fuel and supplies as well as wear on equipment. Their operating income should fall, in view of the increase in operating costs. However,

by good fortune, a concomitant increase in the price of fish – caused by rising demand – has more or less offset this rise in costs. This has made it possible to maintain economic viability. However, if new canoes enter the fishery, the overall situation will be more critical.

Changes to the fishery, such as the smaller proportion of large fish and the increase in species with a short life cycle, also have an impact on levels of income through:

- a possible drop in the average species value (per kilo) of the catch; and
- an increase in the sensitivity of fishing to environmental fluctuations. Short cycle species have much larger inter-annual biomass variations (Caverivière et al, 2002) than long-lived species whose populations are made up of several age groups.

Moving into the full exploitation phase consequently has a negative impact on the average level and stability of incomes for fishermen, so that some of them will have difficulty in renewing their equipment and will become impoverished.

Safety and health concerns

To maintain their catches and income, fishermen are obliged to increase the length and range of their fishing trips. Fishermen travel further and further out to sea into areas operated by industrial vessels which, at night, may collide with the canoes and whose trawling gear may destroy the nets set by canoe fishermen. On the Senegalese coast, where large canoes stay at sea for up to eight days and travel as much as 20 miles or more from the coast, accidents are common, especially when there is a deterioration in weather conditions.

Furthermore, the livelihood strategy adopted by professional fishermen, based on seeking out where the best possible income may be obtained from fishing, implies changing their place of residence, on a seasonal or longer basis. Permanent settlement in a new area is, however, rare: moving is usually repeated several times during the life of a fisherman and his household. During the settlement phase following a move, fishermen will live in a 'camp', for anything from a few months to more than a decade. In such camps, daily living conditions are harsh, with no latrines or large trees, few drinking water sources and frequent flooding contaminating such wells as do exist. Moreover, the tracks leading to these camps are often almost impassable, making it difficult to evacuate the sick when necessary. In the circumstances, it is not surprising that children's survival and adults' working capacity are seriously affected by waterborne diseases (diarrhoea, bilharzia and malaria) and lack of access to medical care.

Effects on social cohesion and peace

The involvement of an increasing number of people in the fisheries sector and their increased mobility are likely to give rise to more tension and conflicts. However, it is important to be clear about the nature and location of such conflicts, as they are not necessarily found where one would expect.

Despite the increasing scarcity of the resource and increased struggle to catch fish at sea, clashes on the water between canoes are rare because of the rules of conduct to which fishermen are much attached: for example, a shoal of fish always 'belongs' to the first canoe that finds it. Disputes relating to technical incompatibility of fishing gear are more common but there again, the fishermen are usually able to get together to discuss and establish rules to put an end to such conflicts.

The most serious conflicts take place on land and relate to issues such as settlement rights (activities sharing and trading terms), reflecting the social relations within groups of migrant professional fishermen and between them and indigenous communities (Fay, 1994). Many factors determine how harmonious or conflict-ridden such relationships may be. For example, in economic terms, limited initial involvement of indigenous communities in fishing may be a favourable factor in establishing good relations with migrants, because of complementarity between the activities of the two groups. In the same way, participation of women and young members of the indigenous community in trade and casual work associated with fishing can be advantageous. On the other hand, requests for access to farm land, often put forward by migrant fishermen seeking to grow cereals for subsistence, tend to be badly received by the indigenous population who are sometimes themselves suffering from shortage of land and consider such requests as a breach of the rule that the two groups' activities should be clearly separate and non-competitive.

In addition, migrant fishermen who are not nationals of the host country are often the victims of discrimination by government policies designed to allow nationals to maintain control of the fisheries sector. Other scenarios, such as accusations of political plotting or the resurgence of xenophobia, are even more critical and can lead to expulsion of migrant fishermen. Unfortunately, such crises have become common in West Africa.

Migrant fishermen are vulnerable not only in their places of settlement, but also when out fishing, especially when their trips are extended and become veritable expeditions in search of new, under-exploited fishing areas, ranging over several hundred kilometres and lasting several weeks. In this case the fishermen will leave the territorial waters of their country of origin or settlement to try their luck along the coast of neighbouring countries. For example, Senegalese fishermen may find themselves fined or even imprisoned by the maritime authorities of Guinea-Bissau or Mauritania, the latter having recently invested in armed coast-guard vessels.

Coping Strategies at Micro- and Macro-levels

Household and group strategies in Kayar, Senegal

Origin of the Kayar fishing community

Kayar is a village in the region of Thiès, 50km from Dakar, with an estimated population of 20,000. At the end of the 19th century, the inhabitants of this Lebou and Wolof village were engaged in agriculture during the rainy season and

in local fishing for the rest of the year. It was only from around 1940 that some inhabitants began to turn professional, continuing their fishing activities throughout the year, as a result of the relatively continuous availability of fish throughout the year, because of specific maritime conditions and the geographical proximity of Dakar, a rapidly expanding consumer market.

Fishing activities gradually became dominant and the village acquired a degree of renown for its produce that was marketed in the large colonial town nearby. This encouraged the government to begin construction of a tarmac road from Kayar to Dakar in 1951, giving a further boost to fish marketing and the specialization of Kayar's people in fishing. During the 1970s, as a result of drought, the last few inhabitants still farming fell back completely and for good on fishing.

Another process contributed towards the development of Kayar as a major centre for canoe fishing: the arrival of migrant fishermen from St Louis, in northern Senegal, from the 1940s. These migrants were particularly attracted by the opportunities to market fish from Kayar in nearby urban markets, especially Dakar. Having initially settled on a seasonal basis, they have remained more or less permanently, and they now account for 30 per cent of the total canoe fleet. This figure rises to 40 per cent during the intensive phase of the fishing season, when numbers are swelled by seasonal migrants, from December to May.

Under the impact of these two phenomena and overall demographic growth, the number of fishermen in Kayar rose from 814 to 5000 between 1948 and 1999, that is an average annual growth rate of 3.6 per cent.

At the same time as the number of fishermen increased, the canoe fleet has also developed, with the introduction of motors as of 1952 and the appearance of new types of canoes. These are larger than the old ones and allow for new types of fishing, such as seine net fishing for small pelagic fish using powerful canoes working in tandem, fishing at sea for several days using canoes equipped with ice boxes to keep the catch fresh etc. Fishing areas were therefore expanded and fished more intensively, which led to an increase in volume landed from 4500 tonnes in 1948 to 40,000 tonnes in 1999, an average annual rise of 4 per cent. This production, although it has now reached its ceiling, had an estimated commercial value of CFA 5 billion in 1999.

Local mechanisms for managing resource conflicts

Cohabitation between the two groups, natives of Kayar on the one hand and migrant fishermen originating from St Louis on the other, has often been difficult. The main cause of tension between the groups has long been the issue of using two competing and incompatible types of fishing gear: lines and gillnets. Although the former were used by both groups, use of the latter was a speciality of the fishermen originating from St Louis. Apart from the fact that gillnets allow for a large catch, they directly hinder use of lines. Local people from Kayar were therefore keen to get rid of gillnets, but those from St Louis, who used gillnets, argued that the sea does not belong to anyone. As a result, this matter has caused recurrent conflict since the 1960s. Finally, a body known as the 'Kayar/St Louis Solidarity Committee' (CSKSL) was set up in the early 1990s and succeeded in marking out separate fishing areas for the two types of gear. Both groups of fishermen as well as the local

government are represented on this committee, with a small group appointed to monitor enforcement of the agreed measures.

Such measures, accompanied by penalties in the event of breach of the rules, help not only to reduce tension between the two groups but also to conserve fish breeding areas where only lines, which cause little disturbance, are now entitled to operate.

Diverse local incomes despite constraints

To maintain income from fishing despite the natural ceiling reached in total catch, several community-based strategies have been developed.

The first of these strategies relates to diversification in modes of operation and exploitation of fish resources, leading to the production of a wide range of products whose quality and price are adapted to various segments of the national and international market. Figure 2.1 portrays the diverse types of operator involved from catching the fish through to distribution and shows the 'client–supplier' relationship between them. Various sub-sectors can be seen, one of which (now accounting for 5 per cent of the catch) is geared towards industrial processing for export.

Another strategy is designed to support the sale price of fish by limiting daily landings. At the initiative of the 'Kayar/St Louis Solidarity Committee' (CSKSL), the first attempt of this type was made in 1992. It consisted of limiting the number of fishing trips using seine nets to one per day, in order to avoid oversupply of small pelagic fish that cause a sharp drop in prices. As of 1994, the same committee

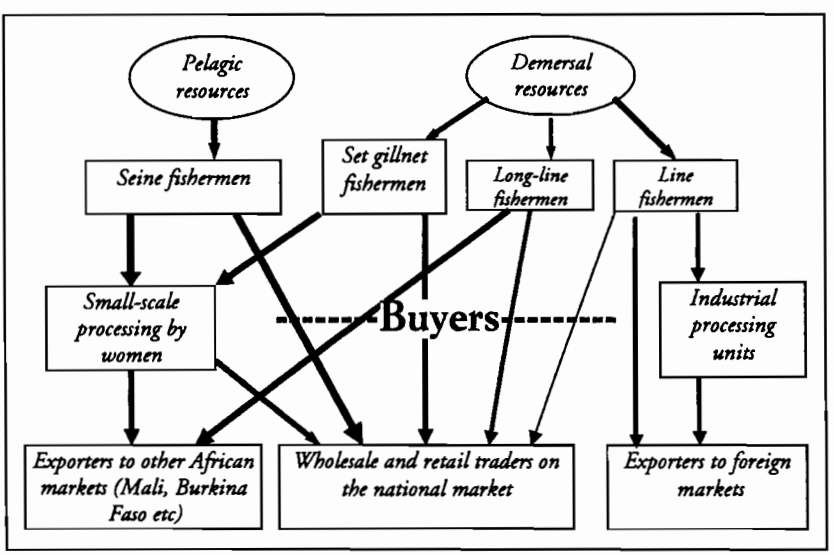

Figure 2.1 *Diagram of main stakeholders in the fish production and processing sector (Kayar, Senegal)*

initiated a comparable measure in respect of line fishing which targets species intended for the European market: when the canoes come in, the number of 15kg boxes of fish may not exceed three. In addition, the committee has established a floor price for the sale of different categories of fish, in consultation with the dealers. These various measures have had two effects:

- prices have held up better and brought increased income derived from selling fish;
- variable costs have gone down to some extent,[11] since trips are often cut short or are less frequent.

Another positive result is some reduction in competition between line fishing crews, meaning that fewer risks are taken at sea.

Protecting the interests of canoe fishing against outside threats

The CSKSL is a member of the CNPS (Senegalese national fishermen's association) which engages in active lobbying at an international level, with the support of northern NGOs. When fishing agreements with the European Commission (see Kaczynski and Fluarty, 2002) were last renegotiated in 2002, representatives of the CNPS were part of the Senegalese delegation that travelled to Brussels on several occasions. Their presence helped to ensure rejection of one of the main European demands, which related to access for European industrial vessels to the Kayar trench, considered by scientists as one of the most important areas for biological renewal of fish stocks on the main coast of Senegal. Fishing in the trench by European industrial trawlers would probably have affected the volume of catches and, consequently, the income of Kayar fishermen. Furthermore, Senegalese fishermen have formed a union that is struggling to secure access for canoe fishing to the development funds made available for the Senegalese fisheries sector financed through fishing agreements or international aid.

By means of these various strategies, Kayar fishermen have been able to stabilize their income at a relatively satisfactory level (CFA 55,000–80,000 per month after deduction of equipment costs) and protect their livelihood, despite their large number and the very heavy pressure they exert on the resource.

Managing fisheries in the Sahelian zone[12]

Inland Sahelian fisheries

In West Africa, the Sahel region includes three major watersheds: the Niger and Senegal rivers and part of Lake Chad. It is estimated that the potential fish catch in this area is between 200,000 and 400,000 tons per year depending on hydroclimatic conditions (Bonzon and Breuil, 1992). On the basis of this annual production, it may be estimated that these fisheries generate around 600,000 jobs (including about 230,000 fishermen, most of them part time) with around 1.9 million people depending heavily on this sector for their livelihoods. Consequently, inland fishing in the Sahel is critical to development of the countries concerned, especially in terms of combating poverty.

In seeking to understand the management problems facing Sahelian fisheries, two of their main characteristics should first be considered:

- First, these fisheries are very heavily dependent on environmental conditions. The amount of water received by the region is subject to extreme variation, within and between years. Consequently, the size of aquatic environments varies considerably over time, and some bodies of water are not permanent.
- Second, associated with the above, the communities involved in fishing frequently resort to multiple activities as part of their livelihood strategies (Sarch and Allison, 2000). Households do not depend for their survival on income from catching fish alone. Wives usually have their own occupations in processing and marketing fish, other trading activities or market gardening. Men may be involved to varying degrees, as occasional fishermen, farmer fishermen (the most numerous) and full-time fishermen, the latter most often being migrants, sometimes more or less settled.

Key issues in Sahelian inland fisheries management

The plateau response model, discussed earlier, also applies to Sahelian fisheries, since these are multispecies fisheries whose productivity and sustainability depend primarily on the quality of aquatic environments and hydrological conditions. The risk of a collapse in fish stocks due to excess fishing is very low in this type of fishery, at least in the absence of destructive fishing techniques (chemical poison, explosives etc) and provided that a minimum quantity of breeding fish, however small, survives at the end of the dry season (Welcomme, 1999). However, environmental degradation is the key problem, and one that fishery managers should tackle as a priority, rather than the risk of over-fishing. Changes in the aquatic environment (eutrophication, pollution, damming, silting up, destruction of banks) are usually caused by activities such as intensive agriculture (irrigated sugarcane and rice cropping), mining, sand extraction etc. Unfortunately, fishermen have very few means at their disposal to combat this degradation.

The third issue relates to government policy and the conflicting interests and claims of different groups. As regards policy options, mention can be made of two scenarios frequently observed in the newly established fisheries in the reservoirs formed behind dams:

- Who should have preferential access to the resource: migrant fishermen or indigenous fishermen? A choice must be made between these two options knowing that the strength of claim asserted by each of the two groups is not the same, that the results in terms of sector performance (level and regularity of production) will not be the same either and that management of the system will differ as a result.
- Which processing and marketing networks should be encouraged, bearing in mind the fact that stakeholders involved in marketing fresh fish and processed products are usually not the same and that the distribution of value added will be very different depending on which sector is involved?

Sound management of inland Sahelian fisheries must focus primarily on efforts to combat environmental degradation and trade-offs between socio-economic priorities and their distributional consequences. To facilitate resolution of such problems, specialists in Sahelian fishery management are now calling for a differentiated approach depending on the type of fishery. In this regard, they distinguish between river fisheries (usually associated with flood plains), major natural lakes (such as Lake Chad), reservoir lakes and, finally, small stretches of water.

Institutional aspects of inland Sahelian fisheries

In most countries, the prevailing situation since independence and until the early 1990s was that the state, considering itself as the owner of water resources, attempted to apply a centralized management model, at least on paper. This was based on levying fishing duty, services supporting technology transfer and applying national regulations intended to prevent the supposed risks of 'overexploitation' (eg minimum mesh size for nets). This management model was based on a poor understanding of management requirements and profoundly out of step with existing practices, leading to many problems. Another weakness of the approach was its uniform deployment throughout the country, leaving no possibility of adapting management to the specific features of the different types of fishery. Moreover, this management mode, primarily based on coercion, generated substantial institutional costs for no appreciable benefit. All of this militated in favour of redefining relations between the state and resource-users.

From the end of the 1980s, most Sahelian states began the process of changing the governance of fishing, especially attempting to involve stakeholders to a greater extent in management. This process was consolidated in the early 1990s as a result of new approaches to fishery management at international level, particularly the adoption by the FAO of the Code of Conduct for Responsible Fisheries in 1995. Some of the principles in the code are particularly relevant to the management of Sahelian fisheries: the need for attention to the conservation of aquatic environments; the promotion of more adaptable management models (such as the plateau response model) that take account of social and economic parameters in management decisions; the participation of stakeholders in management on the basis of joint management systems; and acknowledgement of the role played by fishing as a social safety net. Finally, at the end of the 1990s, the emergence of decentralization policies in most states of the Sahelian region encouraged the establishment of legal frameworks for community participation in fishery planning, at least in the form of consultation procedures.

How effective have these new management methods been? As regards the environmental issue, little progress has been made despite the establishment of institutions at sub-regional level for coordinated watershed management (eg OMVS and ABN[13]) and despite local efforts at environmental education and rehabilitation. Environmental policies come up against budget problems and resistance to change from other watershed users. In addition, the fishery administrations do not have the capacity to defend vigorously the sector's interests within national and regional bodies.

On the other hand, as regards the second key issue (trading-off socio-economic priorities), genuine progress has been recorded over the last decade following the

implementation of co-management policies. This is illustrated by two examples below.

Joint management mechanisms in Mali and Burkina Faso

For historical reasons, these two countries have not followed the same approach to promoting joint management. As Mali is a country with a strong fishing tradition, the national authorities have built on existing institutional structures. Burkina Faso, on the other hand, had plenty of scope to work out completely new arrangements. In both cases, policies were implemented by government to lay the foundations for participation by fishing communities, as in Mali, or to set up genuine co-management mechanisms, as in Burkina Faso. These various policies include:

- *Clarifying ownership rights and restricting open access* Legislation in Burkina Faso (the 1997 forestry code) has gone furthest in this respect in that it has replaced national permits with sub-national permits at regional level to limit the mobility of migrant fishermen. It has also established legal systems appropriate to the different types of fishery, such as the introduction of a specific permit scheme governing access to fish resources in the major artificial lakes. Malian legislation passed in 1995 introduced the concept of 'fishing property', whereby local government is now better able to control access to resources in accordance with the new powers given to them by the laws on decentralization.
- *Developing regulations specific to the local context* In both countries, legislation provides for the drafting of rules for individual fisheries, provided that these are at least in line with the minimum conservation measures laid down in national law. In Mali, these regulations take the form of 'local fishing agreements'. The laws passed in Burkina Faso in 1997 provide for the drafting of 'schedules of conditions' for fishing in the major reservoirs.
- *Community participation in management measures* In Mali, fishing councils provide the forum where the public authorities and communities come together to determine new contractual relations and have an important role to play in preparing draft local agreements. Recent initiatives around Lake Sélingué show that these draft conventions are beginning to incorporate unwritten rules based on customary law. In Burkina Faso, co-management is undertaken by joint management committees, which have equal representation from the communities and the public authorities. These committees are responsible for preparing a management plan that they will monitor and evaluate.

It is now acknowledged that joint management is one of the pillars of sustainable development in the field of natural resource management, which also holds true for Sahelian fisheries. Experience to date has shown that participatory management systems provide more powerful groups with plenty of scope to exercise their influence, and there is no certainty that these leaders' perceptions of management will always be compatible with the aim of combating poverty more generally. Because of this, parallel government action must be taken to build the capacity of the most vulnerable groups and monitor the impact of participatory management on different people.

Conclusions

The rapid growth in canoe fishing in West Africa over the 20th century, especially the second half, raises many questions. As a result of this growth, canoe fishing is now one of the main sources of income and wealth for populations in the region. In view of the fact that this sector is entirely based on African skills and capital, should this be seen as an exemplary success story for economic development of the continent? Or should one be alarmed to note that a growing number of people are basing their livelihoods on the exploitation of resources whose availability is limited by nature?

As a consequence of the growing influence of international experts in the field of environment and fish biology, it is the second perception that now dominates within international agencies. Increasingly conservationist policies are being promoted, with many projects to establish protected areas designed to give fish shelter from fishermen. One may wonder whether these policies are realistic and ethically acceptable in the social and economic context of West African countries. They stand in strong contrast to the policy previously supported by international aid, that is 'support to development of the sector', which was and is based on grants of equipment or incentives to investment and training. Finally and most importantly, conservationist policies overlook the importance of the social safety net provided by fishing in West African countries over the last few decades.

This does not mean that we should ignore the danger that continued rapid expansion in numbers and fishing capacity would pose for fishing communities. It is therefore urgent to design and establish new policies so that these communities may avoid a crisis. To this end, policies should support work along the following lines: capacity development to ensure greater value added of landed output; greater coherence between regulations governing access to resources; promotion of local regulatory practices that have shown their worth; protection of traditional livelihood strategies based on multiple activity; integration of migrant fishing into local development in the host areas; and empowerment of communities through educating young people. Such activities would seem essential to prevent the exposure of fishing families to increasing social and economic risks and to enable them to improve their incomes.

Notes

1. In the case of industrial fishing, the shipowner is always separate from the crew; in fact, this is usually a company whose capital is often of foreign origin.
2. For example, when tuna or large prawns are required that only industrial fishing techniques can catch.
3. But not 'exclusively', as it is uncommon in Africa for all the active members of a household to devote their entire working time to a single sector of activity.
4. The 1960 census of Senegalese fishing (excluding the river) counted 13,600 men and 3900 canoes, while the 1996 census showed 57,100 men and 10,600 canoes. This development results from the appearance of new types of larger canoe allowing the use of pelagic seine nets (in the 1970s) and fishing trips

extending over several days (in the 1980s). These innovations were encouraged by motorization which has become widespread along the coast in the last 50 years.

5. This case is somewhat exceptional, since communities in this country (apart from the Imraguen) had virtually no seagoing tradition and so there was a void to be filled.
6. Since farmed poultry is partly fed on products based on fish meal, increased consumption of eggs and chicken indirectly contributes towards increasing outlets for the fishing industry.
7. It is, however, rare for an investor from outside the sector to risk launching a fishing unit, as the likelihood of cheating (especially as regards the quantities produced) is extremely high.
8. Société Mauritanienne de Commercialisation du Poisson = Mauritanian fish marketing board.
9. Bearing in mind the risky nature of such a move, some households try to do more fishing while continuing to pursue other activities, which involves some of the household members going away to fish while the others remain on the family land to cultivate. This livelihood strategy seems to be the best and most desirable (Fay, 1994; Béné et al, 2000). However, it is not always possible: only households with considerable labour power and material resources can implement it.
10. This type of net, which allows for a large catch but is costly to use because it is very difficult to repair, is a growing success with fishermen. It is prohibited in some countries (such as Senegal) as it is thought to be dangerous for the environment because it does not degrade.
11. These costs represent the largest share of operating costs (about 75 per cent), fuel being the most important item of expenditure. The longer and more numerous the trips are, the higher this item of expenditure will be.
12. The information in this section is drawn from various technical reports produced in connection with the FAO/DFID Sustainable Fisheries Livelihood Programme in West Africa (PMEDP-SFLP) (www.sflp.org).
13. OMVS: Senegal river valley development office; ABN: Niger river basin agency.

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Towards a New Map of Africa

Edited by

Ben Wisner, Camilla Toulmin and Rutendo Chitiga

EARTHSCAN
London • Sterling, VA

First published by Earthscan in the UK and USA in 2005

ISBN-10: 1-84407-093-X paperback
1-84407-092-1 hardback

ISBN-13: 978-1-84407-093-0 paperback
978-1-84407-092-3 hardback

Typesetting by Composition and Design Services
Printed and bound in the UK by CPI Bath
Cover design by Susanne Harris

For a full list of publications please contact:

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London, NW1 0JH, UK
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22883 Quicksilver Drive, Sterling, VA 20166-2012, USA

Earthscan is an imprint of James and James (Science Publishers) Ltd and publishes in association with the International Institute for Environment and Development

A catalogue record for this book is available from the British Library

Library of Congress Cataloging-in-Publication Data has been applied for

Printed on elemental chlorine-free paper