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SMALL-SCALE FISHERIES: ASSESSING THEIR CONTRIBUTION TO RURAL LIVELIHOODS IN DEVELOPING COUNTRIES

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SMALL-SCALE FISHERIES: ASSESSING THEIR CONTRIBUTION TO RURAL LIVELIHOODS IN DEVELOPING COUNTRIES

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Rome, 2006

PREPARATION OF THIS DOCUMENT

This Circular was prepared in response to the recommendation of the FAO Advisory Committee on Fisheries Research, that an evaluation of the role and importance of small-scale fisheries should be undertaken with a view to improving understanding on the contributions of the sector to rural livelihoods in developing countries.

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ABSTRACT

Traditionally, the contribution, role and importance of small-scale fisheries have often been described in thematic terms such as economic, social, employment and source of food. However, the contributions of small-scale fisheries are often interlinked and interdependent and some of their major contributions lie at the interface between these themes/sectors rather than within each. Also some of the major contributions to small-scale fisheries result from the synergies between various domains particularly economic and social aspects as conventionally recognized. In keeping with the vision for small-scale fisheries as proposed by the Advisory Committee on Fisheries Research (ACFR) Working Party on Small-scale Fisheries, it would seem appropriate to give in any such analysis due regard to the evolving concepts of food security, poverty alleviation, rural and economic development as well as the environmental and cultural dimensions of small-scale fisheries. The analysis incorporates these various concepts and moves away from the more conventional sector type or thematic approach.

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ACRONYMS

ACFR	Advisory Committee on Fisheries Research
CGIAR	Consultative Group on International Agricultural Research
COFI	Committee on Fisheries
DANIDA	Danish International Development Agency
DFID	Department for International Development
FAO	Food and Agriculture Organization of the United Nations
GTZ	German Agency for Technical Cooperation
IFAD	International Fund for Agricultural Development
IIFET	International Institute for Fisheries Economics and Trade
IUCN	International Union for Conservation of Nature and Natural Resources
IUU	Illegal, Unreported and Unregulated (fishing)
MRAG	Marine Resources Assessment Group
NGO	Non-governmental Organization
NPRS	National Poverty Reduction Strategies
ODI	Overseas Development Institute
SADC	Southern African Development Community
SFLP	Sustainable Fisheries Livelihoods Programme
SIDS	Small Island Developing States
SLA	Sustainable Livelihoods Approach

EXECUTIVE SUMMARY

This report is a first attempt to provide a critical overview of the contribution, role and importance of small-scale fisheries to the livelihoods of rural populations in developing countries. The review points out some preliminary conclusions. First, although some potential positive results can be identified which confirm that inland and coastal small-scale fisheries can play an important role with respect to key development issues such as poverty alleviation, food security and pro-poor growth, the analysis also shows that assessing the global contribution and importance of small-scale fisheries is not straightforward. At the present time one of the greatest limiting factor is the lack of data which prevents researchers from being able to assess in a rigorous and reliable manner the true importance of small-scale fisheries. For illustration the estimate of the number of people who depend directly or indirectly on fish for their livelihood in the world is still unknown and the few figures which are proposed in the literature are thought to be largely underestimated. In addition to this lack of data, the review also shows that the outcome of the assessment depends to a large extent (a) on the indicators chosen to carry out the analysis and (b) the economic levels at which the analysis is carried out.

At the macro-economic level, the review recognizes that the importance of small-scale fisheries is likely to be relatively modest in comparison to other sectors (such as agriculture) and only few countries may have their gross domestic product (GDP) significantly increased by the contribution of the small-scale fisheries sector. Those are essentially the small islands developing States (SIDSs) and few other developing countries such as Senegal or Bangladesh, which should be considered as exceptions rather than general cases. For the rest of the developing countries, the impact of the sector at the macro-economic level will remain small. In contrast, at lower (micro) level the potential contribution of small-scale fisheries may be much more tangible in terms of livelihoods support. In particular the role played by the sector in the household and local economies or even at the provincial level in geographic areas (coast, river, lake, floodplain) where fishing is important, can be substantial. The review showed that through direct and indirect food security mechanisms, income and employer multipliers effect, fisheries and related activities (processing and trade) play a significant role especially for the poorest households who depend more heavily on these activities. For the households with limited or not access to land and/or other factors of production (e.g. access to financial capital) small-scale fisheries, processing and trading play an extremely important role in supplementing alternative low per capita food production options and in providing one – or even the main – source of cash income. Small-scale fisheries play therefore extremely important economic and “welfare” functions at the local level (including safety-net and labour buffer mechanisms) in many rural areas of the developing world. Unfortunately these economic and welfare functions are still very rarely adequately documented and evaluated and the role that the sector is subsequently playing as an engine for rural development in many regions of the world is still not quantified. Similarly very little has been done on how small-scale fisheries institutions can indirectly impact positively upon rural (political) development by strengthening, for instance, local communities’ empowerment and fostering gender equity (through women economic empowerment).

On the basis of this analysis, the report concludes that there is an urgent need, not only to enhance our knowledge about the extent to which small-scale fisheries are important for poverty alleviation, food security and pro-poor growth, but also to improve our (conceptual and empirical) understanding of the various mechanisms through which those small-scale fisheries do participate to the general socio-economic advancement of developing countries. Very little has been done on this question so far and in the absence of such information it will remain extremely difficult to attract the attention and support of the decision-makers and donors.

1. INTRODUCTION

1.1 The issue

It is common in the literature to come across statements such as "small-scale fisheries contribute to poverty alleviation and rural development through income generation and employment, and supply of food", or sentences like "fisheries provide livelihoods to millions of dwellers, in particular in rural areas where the bulk of the poor live". It is also frequently stated that small-scale fishery is a particularly pro-poor activity because it is an economic sector that is labour-intensive and relatively easy to enter -therefore providing livelihoods to a large number of unskilled people – including women through their involvement in fish processing activities.

It could however be argued that agriculture or forestry also provide employment, income and food to millions – in fact billions – of people.[1] This certainly does not tell us anything about whether agriculture or forestry contributes to a greater (or lower) extent to poverty alleviation than fisheries. In other words the capacity of an activity to lift people out of poverty is not simply correlated to the absolute number of people depending upon this activity to sustain their livelihoods. In fact, to the common statement that "fisheries provide livelihoods to millions of poor people across the world", it could be replied that it is so because small-scale fisheries are in fact characterized by low-productivity and open-access, leading to a "tragedy of the common" scenario, with high level of risks and uncertainty; and that this uncertainty worsens the vulnerability of the poor who are attracted and "fall" into this poverty trap.

As suggested by these points above, considerable confusion and oversimplifications exist about how to define and measure the contribution of small-scale fisheries, either to poverty alleviation or to local or national economic growth. This confusion however does not only affect our capacity to evaluate the real contribution of small-scale fisheries. It can also lead to mis-judgments and errors in the rationale of the interventions or policies supporting small-scale fisheries. To illustrate this point let us assume that some poor households living on floodplain margins derive a high share of their income from fishing – say 30percent (subsistence and cash income combined). Using this information, researchers – or even policy-makers – would probably conclude that fisheries intervention is therefore a key "entry-point" to reducing poverty in these areas. This extrapolation is flawed. In fact, as suggested above, a high dependence on fishing activity might in the first place have been the cause of poverty (the poverty trap concept). More typically high dependence of the poor on fishery activities may be due to the fact that other employment options with higher returns are not accessible to the poor. In which cases, interventions targeting sectors or activities *outside* the fisheries may have more beneficial impacts than interventions *within* the sector itself.

There is a need therefore, not only to enhance our knowledge about the correct extent to which small-scale fisheries are important, but also to improve our understanding of the various mechanisms through which small-scale fisheries do participate to poverty alleviation and to the general socio-economic advancement of developing countries. This paper is an attempt toward this understanding. As such it will not provide a *comprehensive* assessment of the importance and roles of small-scale fisheries, nor will it offer a *complete* answer regarding the mechanisms through which these small-scale fisheries contribute to poverty alleviation, food security and economic development. Instead, it calls for more research (both theoretical and empirical) on these questions. For instance, there is a striking gap between, on the one hand, the almost complete neglect of fishery in economic development and poverty reduction debate – as illustrated through their total absence from most

[1] The World Bank (2001, pp.14-15) estimates that 1.6 billion people depend to varying degrees on forest for their livelihood. About 60 million indigenous people are almost wholly dependent on forest. Some 350 million people who live within or adjacent to dense forests depend on them to a high degree of subsistence and income. In developing countries about 1.2 billion people rely on agro-forestry farming systems that help to sustain agricultural productivity and generate income.

National Poverty Reduction Strategies (FAO-DFID, 2002; Thorpes, 2004) or their total neglect by academics working on rural development and poverty issues (Béné, 2003, p.949) and on the other hand, the raising number of reports and documents within the fishery literature which highlight the role that fish as a tradable product may play for the national economies of developing countries. Empirically, although evidence starts to emerge from various recent analyses (e.g. Delgado *et al*., 2003; Kurien, 2004), too little is known about the real role that fish trade may play, and currently both neglect and unrealistic expectations coexist.

More globally, as this report will highlight, fisheries have both potential and limitations in regards to poverty alleviation and rural development and these need to be teased out and assessed more comprehensively and more rigorously if one wants this sector to play a greater role in the local and national development of developing countries in the future.

1.2 Structure of the document

Conventionally, seven components have been used as possible "entry-points" for examining the contribution and importance of small-scale fisheries:

- Economic roles of small-scale fisheries
- Social roles of small-scale fisheries
- Environmental roles of small-scale fisheries
- Cultural roles of small-scale fisheries
- Food security roles of small-scale fisheries
- Poverty alleviation roles of small-scale fisheries
- Interactions between small-scale fisheries and other rural activities

These components provide us with a good overall "coverage" of the different domains where small-scale fisheries are expected to play important roles at local and national (or even global) levels. One straightforward articulation for the analysis could therefore be to follow a simple linear structure where each of those entry-points is treated individually in a distinct section. This is the approach adopted in this document. It could be argued however that it is rather difficult to analyse and truly evaluate small-scale fisheries simply through this linear framework. Indeed, small-scale fisheries' contributions are often interlinked and interdependent. A good illustration is the economic and the social contributions of these activities: should the creation of employment through small-scale fisheries be considered as an economic contribution or a social one? Similarly, where does the "boundary" lie between the social and the cultural roles of small-scale fisheries?

In reality, some of the major contributions of small-scale fisheries lie at the interface between these entry-points, rather than within each. The contribution of small-scale fisheries to food security, for instance, results from a combination of different mechanisms that operate at different levels (micro, meso, macro) and derived directly from the economic, social and cultural dimensions of the activities. In particular the links between income generation, trade activities and the continuously evolving balance between subsistence and commercialisation is a crucial element in that food security dimension. Likewise the role of fishing (and related activities such as fish processing and trading) in poverty alleviation cannot be treated in isolation from the economic role of these activities and from the interactions that exist between the sector and the other rural activities.

Overall, it could therefore be stated that some of the major contributions of small-scale fisheries result from the *synergies* between various domains as conventionally recognized – where the terms synergy would refer to the idea that "the whole is bigger than the sum of its parts". In other words, it seems that the overall contribution of small-scale fisheries is more than simply the sum of its economic, social, environmental, cultural, food security and poverty alleviation contributions, and the conventional (Cartesian) approach adopted in this document to disaggregate and analyse reality through a discipline-based framework may not be the only way to address the question.

2. BACKGROUND

2.1 The misleading (old) debate about poverty and environment

Fisheries have bad reputation nowadays in the international community. FAO recently estimated that worldwide 18 percent of the fish stocks or species groups are overexploited, while 10 percent have become significantly depleted, or are recovering from depletion (FAO, 2002). For the World Environment Day (5 June 2004), the United Nations Environment Programme (UNEP) chose the slogan "Wanted! Seas and Oceans, Dead or Alive?" and recently the World Bank posted on its front webpage an article by Ian Johnson[2] entitled "One World, One Ocean. It's time to save it" (World Bank, 2004). The responsibility of fisheries (both large- and small-scale) in this situation is undisputable and it is likely that it will affect and influence the way development agencies and governments will consider initiatives related to the support of fisheries in the near future.

At the same time, food security and poverty alleviation are now back on the top of agenda of these development agencies and government. Through initiatives such as the Millennium Development Goals as a normative framework at the international level, or the design and implementation of National Poverty Reduction Strategies (NPRS) at the national level, these agencies and governments are attempting to reduce the rate of poverty and to improve the livelihoods and the food security status of the 1.2 billion people living below the poverty line.[3]

In that context – where environmental degradations and poverty are recognized as major and urgent issues to be addressed – it is tempting to make an explicit connection between them through the "downward spiral" of the "environment-poverty nexus" – where poverty is seen as a cause of fish stock exploitation and fish stock depletion as contributing to deeper poverty. One of the implications of the adoption of this environment-poverty nexus is the widely accepted perception that economic development and poverty reduction should help improve the conditions of fisheries resource and vice versa, that development of fisheries resources can be an important vehicle for poverty reduction. At the last World Fish Congress in May 2004 for instance it has been claimed that

> *"Conservation of the world's oceans can only be achieved if larger problems of poverty, hunger and underdevelopment are adequately addressed (…). Implementing stronger conservation measures and more sustainable fishing practices in these areas hinges on addressing the root causes of poverty and food insecurity there" (Cochrane, 2004).*

This two-way link (fish depletion leading to poverty and poverty leading to fish depletion) needs nonetheless to be questioned with both causal directions having some empirical evidence going against them. Recent research findings tend to de-emphasize the importance and question the general validity of the link from poverty to resource degradation. The state of the world fish resources is actually as much threatened by wealth and economic development as it is by poverty and destitution, and a large part of the current overexploitation of the world fish resource is the result of developed countries' overcapitalized fleets rather than the impact of small-scale fishers. Hence the belief that one could halt fish stock loss *just* by bringing development to the South is probably partly based on wishful thinking. More fundamentally this approach does not offer a correct framework to analyse the relationship between poverty and fisheries, even if, as many still think, "fishers are amongst the poorest of the poor".

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[2] World Bank's Vice-President on Sustainable Development.

[3] In the world, in the year 2000, 842 million people were estimated to be undernourished (FAO-SOFIA, 2003), most of them making the bulk of the 1.2 billions who live below the 1 dollar-per-day poverty line.

2.2 The renewed debate

In this context it is encouraging to see that a real, open debate has been recently initiated amongst academics, practitioners, civil society organisations and development agencies, which attempts to go beyond these clichés. As part of this debate, several different initiatives were launched in the early 2000s, which had for a large number of them some close links with the Sustainable Fisheries Livelihoods Programme initiated and founded by the Department for International Development (DFID) in 1999 and implemented since then by FAO (www.sflp.org/eng/).

In November 2001 an international Workshop on "Small-scale fisheries, Poverty and the Code of Conduct" was organized in Cotonou, which brought together experts from the South and North to debate and share their experience about small-scale fisheries in West Africa and their relation to poverty (Neiland and Béné, 2004). Academics also started to refocus their attention on the relatively neglected issue of poverty (their cause, their origins) in fisheries and some key papers were published in major international journals, which raised the profile of both the sector itself and the contribution that research in this sector can make to the more general debate about poverty (e.g. Allison and Ellis, 2001; Béné, 2003). At the same time FAO through its Advisory Committee on Fisheries Research (ACFR) and its Committee of Fisheries (COFI) recognized that small scale fisheries had not received the attention that they deserved considering the important contribution that they seem to make to nutrition and food security, sustainable livelihoods and poverty alleviation, especially in developing countries. In its Twenty–sixth session in February 2003 the COFI discussed "strategies for increasing the sustainable contribution of small-scale fisheries to food security and poverty alleviation" (FAO 2003), and also welcomed the suggestion made by the FAO fisheries department to elaborate, in the context of the Code of Conduct for Responsible Fisheries, a series of "Technical Guidelines for increasing the contribution of small-scale fisheries to food security and poverty alleviation". These guidelines are currently being developed (FAO forthcoming). Finally, in November 2003, an ACFR Working Party on Small-scale Fisheries was convened in Bangkok with the participation of 18 experts to undertake an evaluation of the role and importance of small-scale fisheries, elaborate a research agenda, and review strategies and mechanisms to bridge the gap between research and action (FAO, 2004). All these various initiatives have produced and continue to generate major progress in our understanding of the relationship between poverty and fisheries.

The present paper is part of this on-going process. Its objective is twofold. First it will attempt to improve our general knowledge about the degree to which small-scale fisheries contribute effectively to poverty alleviation, food security and economic development, through an overview of the literature recently published on these questions. Put in simple words the first dimension of this work is to report on "how important small-scale fisheries are". However, as mentioned earlier, this descriptive exercise does not pretend to be exhaustive, for the very reason that the heterogeneity that characterizes small-scale fisheries across the world also applies to their levels of contribution. The situation observed in Senegal for instance where the artisanal (pirogue) fisheries is estimated to contribute about 7 percent of the GDP of the country is not transferable to every other countries (even in West Africa). Therefore no generalization should be made and using the Senegal example in an attempt to raise the general profile of small-scale fisheries as it is now widely made in numerous documents or articles without mentioning the exceptional character of this situation is scientifically incorrect and dangerous from a policy point of view. It might generate unrealistic expectations.

Second, the paper will also attempt to provide some more "in-depth" analysis of the mechanisms through which these different contributions operate. Here the focus will not be on how important small-scale fisheries are for the poor, or for economic development, or for the livelihood of people in rural areas, but rather on trying to identify the underlying mechanisms which condition and shape these outcomes. Indeed we believe – using the Senegalese example again – that, beyond the absolute figure (e.g. 7 percent of the GDP), what is more important is the understanding of the process(es) and the causal relationships which led to these outcomes. In this domain, the report does not pretend to provide clear and definite answers. In effect the analysis raises more questions than it provides answers. This was expected: while, as noted earlier, our understanding of the relationship between

poverty and small-scale fisheries has dramatically improved over the last five years, on the other hand our understanding of the way small-scale fisheries can effectively contribute to poverty alleviation, food security and rural development is still fragmentary and incomplete. There is still a long way to go and this work is only one initial step to stimulate further progress in that direction.

3. DEFINITION AND CONCEPTS

3.1 Small-scale fisheries

As a preliminary step it is important to clarify a few concepts and definitions. FAO ACFR Working Party on Small-scale Fisheries proposed in December 2003 a useful descriptive paragraph that can be used as a basis to better refine the concept of small-scale fisheries:

> *"Small-scale fisheries can be broadly characterized as a dynamic and evolving sector employing labour intensive harvesting, processing and distribution technologies to exploit marine and inland water fishery resources. The activities of this sub-sector, conducted full-time or part-time, or just seasonally, are often targeted on supplying fish and fishery products to local and domestic markets, and for subsistence consumption. Export-oriented production, however, has increased in many small-scale fisheries during the last one to two decades because of greater market integration and globalization. While typically men are engaged in fishing and women in fish processing and marketing, women are also known to engage in near shore harvesting activities and men are known to engage in fish marketing and distribution. Other ancillary activities such as net-making, boat-building, engine repair and maintenance, etc. can provide additional fishery-related employment and income opportunities in marine and inland fishing communities. Small-scale fisheries operate at widely differing organizational levels ranging from self-employed single operators through informal micro-enterprises to formal sector businesses. This sub-sector, therefore, is not homogenous within and across countries and regions and attention to this fact is warranted when formulating strategies and policies for enhancing its contribution to food security and poverty alleviation." (FAO, 2004)*

It could be argued that, although quite comprehensive with respect to the socio-economic realm of small-scale fish-related activities, this paragraph fails to encompass the technological dimensions, and in particular the fact that small-scale fishers usually operate inshore, target multiple species and use a large range of different fishing gears and techniques some of which may be relatively simple. Tietze Groen and Marcoux (2000) for instance remind that:

> *"In technological terms, marine artisanal and small-scale fisheries are characterized in most cases by fishing craft with non-mechanized propulsion systems (sails and oars) or low-horsepower outboard or inboard engines; use of passive fishing methods, manual operation of fishing gear (setting, shooting and hauling) and the absence of electronic fish-finding and navigational devices".*

Likewise, McGoodwin (2002, p.10) indicates:

> *"[while] In temperate or colder waters, small-scale fishing communities generally exploit only a few species, … in tropical waters a greater variety of species are typically exploited. Moreover, small-scale fishers in tropical regions typically utilize a greater variety of fishing gear."*

3.2 Rural development

Bailey and Jentoft (1990, p.335) suggest that "development" is "a process of change through which sustainable and equitable improvement are made to the quality of life for all or most members of a society". Similarly Carley and Christie (1992, p.3) see development as

> *"a process by which the members of a society increase their personal and institutional capacities to mobilize and manage resources to produce sustainable and justly distributed improvements in quality of life consistent with their own aspirations".*

Both definitions are fairly representative of current perception of development (or even sustainable development) in the international community. In particular both emphasize that development is about changes and improvements, and that those improvements should be related to "quality of life". While the term "quality of life" might be open to wide interpretation, it clearly embodies a much broader range of measures than simply material wealth. In that sense we will make the distinction throughout this report between economic growth (which can be estimated through macro-economic indicators such as per capita income or GDP) and sustainable development or improved livelihoods.

One the other hand, even if remarkable progresses have been made since the 1990s in the way one perceives and measures improvements in people's quality of life, (for instance through the stimulating work of the Unirted Nations Development Programme (UNDP) Human Development Reports), clearly "one size doesn't fit all". Quality of life should be the subject of local level research and of continual democratic consensus forming in order to determine development priorities. It is clear from the above that development is a normative concept.[4] Despite this, it is possible to argue that socio-economic activities – such as small-scale fisheries – can contribute to this process for those who depends directly, or indirectly, upon them for part, or the totality, of their livelihoods. Furthermore, given that small-scale fisheries are mostly located in rural areas, we will thereafter focus more specifically on the potential contribution of this activity for "rural development", i.e. the improvement in the quality of life of rural populations. It will however appear clearly during the analysis that the contributions of small-scale fisheries (and related activities) go beyond the geographical areas within which these activities are operated.

3.3 Food security

3.3.1 Definition

Although poverty is now recognized to be a multi-dimensional issue, food insecurity remains one of the most visible, and probably the first, sign of extreme destitution. It is certainly not pure coincidence that Sen's major conceptual breakthroughs on poverty were underpinned by his research on famine (Sen 1981). Food security and poverty are closely linked, and eliminating hunger and malnutrition is therefore a precondition for the eradication of poverty.

[4] In that respect Coleman and Nixon (1985) outline development as: "a process of improvement with respect to a set of values. The values in question relate to desired condition in society. Self-evidently, there is no universal agreement about what these desired conditions should be; individuals certainly have different preferences regarding their lifestyle and relationships with the rest of society; and through their political manifestos and the policies operated by government, nations express different collective (majority and minority) view about the desired state of society-views which change through time".

Food security was defined during the 1996 World Food Summit as

> *"a condition when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life"*.

This definition emphasized two important dimensions of food security. First food security applies at the individual level ("all *people*") and second it has a temporal dimension ("all *times*"). Food insecurity may indeed affect people temporary (transitory) or in a permanent manner (chronic). A major flaw of the definition, though, is that it does not allow for *changes* in food security level. In particular this makes it inappropriate for measuring *progress* towards (or away from) food (in)security.

3.3.2 Dimensions of food (in)security

Despite the individual dimension highlighted in this definition, food security is also sometimes considered from a collective and/or national viewpoint. In that case, it is referred to as "national food self-sufficiency", i.e. the capacity of a country to produce (or import) sufficient food to cover its total population food requirement. Some would argue however that individual food security and national food self-sufficiency are two different – and unrelated – concepts. Broca (2002) for instance points out that national self-sufficiency is neither necessary nor sufficient to guarantee food security at the individual level. India for instance is self-sufficient but a large part of its population is not food secure; on the other hand Hong-Kong and Singapore are not self-sufficient but their populations are food secure – thanks to the capacity of these countries to import sufficient quantities of food. This last point underscores that food security depends upon a whole range of individual, household, community, national and even international factors. In particular, for national self-sufficiency to be "translated" at the local level into individual food security requires and presupposes efficient "trickle-down" and redistribution mechanisms, and transfer-based entitlements[5] (i.e. individual-based access to these mechanisms). These issues of transfer-based entitlements are at the heart of the food security problem. Michael Lipton for instance recalled that "work in Ethiopia and India confirms that food inadequacy (whether in famine or chronic protein-energy malnutrition) is usually due *not* to lack of available food, globally or nationally, but to inadequate individual food entitlement" (Lipton, 2001, p.208).

The recognition of these different levels of food security (individual, collective, or national) raises also another important issue in the present case. While Broca emphasized that the two concepts of food security and national food self-sufficiency are not necessarily linked, we will highlight that in the case of fisheries theoretical considerations suggest that the two concepts may even be inversely related: increasing the food security at the national level may lead to decline in individual food security (see section p.33).

Another important aspect of food security needs clarification, especially when one focuses on the relation between food as a commodity and its potential to contribute to food security as an economic activity. Producing food, e.g. wheat, cassava or fish, through farming or fishing activity can contribute *directly* to individual or national food security through the supply of the food commodity itself -this refers to the subsistence dimension of the activity.[6] But it may also contribute *indirectly* to the individual's or household's food security through the revenues which are generated from the fishing and/or related activities (processing, marketing), which can be used to purchase food. In other words fish can contribute to food security directly through subsistence mechanisms, or indirectly through

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[5] A. Sen. 1996. Economic Interdependence and the World Food Summit *Development* 4: 5-10.

[6] In this document "subsistence" is defined as an economic system or activity adopted by households primarily organized around a domestic mode of production which depends heavily on natural resource harvesting (i.e. fishing) and mainly geared towards home-consumption, but it may also involve bartering or even low levels of trading (usually limited to local markets).

incomes (whether individuals are self-employed or paid wages) or a combination of both. Put in simple terms, this refers to a "food security through income security" mechanism.

Finally, since the influencing work of Malthus more than two centuries ago, we are left with a recurrent question which is regularly brought back to the front of the scene: Will the Earth's diminishing resources be enough to feed the world increasing population in the future? Since the late 1990s, the fish version of this Malthusian question has been stimulated by the alarming situation of the world fisheries and the growing imbalance between fish supply and fish demand. The fact that the world's capture fisheries have reached a plateau around 100 000 million tonnes per year contrasts with the still increasing world population and its associated growing demand for food in general and fish in particular. Measured in terms of per capita fish supply, these opposite trends resulted in an aggregate decrease per capita of 10 percent in 13 years (from 14.6 kg in 1987 to 13.1 kg in 2000). Unfortunately, the effects of this imbalance are not felt equally across the world. While many countries and regions have made considerable progress in reducing food energy deficiencies, many others (notably in sub-Saharan Africa) have either experienced a worsening of food security (both at national and household levels), or have only managed to achieve improvements through a greater reliance on food imports from developed countries. Under these conditions the role of fisheries in contributing to food security may be even more crucial. However the limited nature of wild fisheries emphasizes the crucial role that aquaculture will have to play in the future to compensate for this growing food availability/demand dis-equilibrium.

Table 1 summarizes the different dimensions of the concept of "fish food security" as discussed above. The second part of the table highlights the temporal dimension of food insecurity. The table provides an initial framework for a more rigorous assessment of the contribution of small-scale fisheries to food security to be undertaken in the second part of this report.

Table 1. Dimension of food (in)security

Fish food security	**Contribution**	
	***Direct* contribution**	***Indirect* contribution**
Individual/household level (micro)	Through subsistence. Assume the ability of the household to utilize the commodity through adequate non-food input, i.e. clean water, sanitation and health care	Through self-employment or wage. Assume efficient labour, commodity markets, and "fair" trade mechanisms
National level (meso, macro)	Direct food self-sufficiency through effective commercialisation or redistribution of national surplus	Indirect food self-sufficiency through foreign exchange earnings (food import)
Global (World)	Limited nature of wild caught fisheries. Highlights the crucial role of aquaculture in the future to ensure World fish food security	

Food insecurity	**Temporal dimension**	
	***Acute* insecurity**	***Chronic* insecurity**
Individual/household level (micro)	Temporary break-down in the household's income (e.g. loss of employment, illness)	Insufficient assets (e.g. education, labour, access to credit), lack of access to market opportunities
Domestic level (meso, macro)	Temporary crisis (e.g. food price fluctuations); local or national crop failure, natural disaster, armed conflicts	Structural meso or macro-economic failures (e.g. markets or balance of payment) inappropriate policies

3.4 Poverty and small-scale fisheries

3.4.1 The new consensus on poverty

A recent widely-adopted definition of poverty is that proposed by the Development Action Committee's (DAC) Guidelines on Poverty Reduction (OECD, 2001):

> *"Poverty encompasses different dimensions of deprivation that relate to human capabilities including consumption and food security, health, education, rights, voice, security, dignity and decent work"(OECD (2001), p.8).*

This conceptualization of poverty results from a long evolution in the ways poverty has been perceived, understood and measured (see Shaffer, 1996; Baulch, 1996 , Lipton 1997; and Maxwell, 2001 for reviews). Influenced by the "income-poverty" approach widely used in the 1960s, the concept of poverty was at that time closely associated to low income or consumption. The limitation of the income-poverty model gave rise in the 1970s to the development of the "basic needs" model pioneered by the International Labour Organization (ILO) and UN Research Institute on Social Development (UNRISD). This model arose from recognition that poverty is not simply the result of low income but also reflects a general deprivation of the material requirements to meet minimally acceptable human needs such as health and education, clean water and other services required to sustain livelihoods. This basic needs model, premised on a multidimensional definition of poverty, later led to the formulation of UNDP's Human Development model.

The 1980s marked an even more drastic redefining of the concept of poverty. As mentioned earlier, one instrumental element in this new approach was the work of Sen (1981) and his concept of "food entitlement", i.e. the recognition that peoples' command over food does not simply depend on its production and availability in the market, but is also governed by a range of social, economic, cultural and political factors. Other influential concepts, such as the role of power and empowerment, emerged during the same period, either in relation/reaction to Sen's entitlement concept, or independently. Chambers (1983) stressed for instance that the poor usually suffer from a low level of socio-political organization and that their capacity to make their voice heard is consequently weak, resulting in exclusion from political and decision-making processes. The 1980s were also characterized by the wide recognition of the previously neglected issue of gender-related poverty (e.g. Agarwal, 1985). In the 1990s ILO's "basic needs" approach, with its multi-dimensional concept of poverty, was adapted by the UNDP for its Human Development Index approach. This model, which has clearly influenced the OECD DAC definition above, seems to have achieved broad consensus in the international community. This multi-dimensionality is for instance one of the main features constituting the Sustainable Livelihood Approach (SLA) now adopted by numerous International NGOS (e.g. CARE, Oxfam) and development agencies (e.g. DFID, UNDP) – see Carney (1999) for a comparative analysis of the SLA amongst institutions.

3.4.2 Poverty in small-scale fisheries

To a certain degree, the evolution and debate that have taken place in the international development community over the last 30 years have also been reflected (more recently) in the fisheries arena. In particular it is now frequently recognized that the multidimensional nature of poverty (inadequate public service provision, low level of education, politically poorly organized communities, vulnerability) widely affect fishing communities as well. This shift in our perception means that it is more and more frequently admitted that the cause of poverty in small-scale fishing communities is not necessarily directly – or only – related to the levels of the resource-base or the catch, but to other socio-institutional constraints as well. For example, although resource overexploitation may be a major cause of impoverishment for fishing communities, extreme poverty can also be observed in

remote fishing camps where fishers catch and trade reasonable volumes of fish but lack access to health and other public services, or are politically un-represented. This progress in our understanding of poverty in fisheries has also been reflected in recent attempts to develop new methods of assessing the different dimensions of poverty in fish-dependent communities that combine measures of incomes, assets and vulnerability context, often carried out under the organizing framework of the "Sustainable Livelihoods Approach".

More fundamentally, these various observations also help us to realize that part of the "newly" defined nature of poverty in fishing communities is not specific to fishing communities *per se*. Rather it reflects the wider issue of rural poverty and the general lack of economic, political, and institutional development that affects rural areas within which fishing communities tend to live. Two important comments derive from this. First, it underlies the necessity to raise the question of the degree of *relative* poverty of small-scale fishing communities in comparison to other parts, or distinct communities, of the rural population. If, as it is sometimes asserted fishers are "the poorest of the poor" then it means that not only fishing communities experience constraints which derived directly from their status of rural dwellers in common with other non-fishing rural communities, but also that they face additional constraints specific to the sector that make their living conditions and/o socio-economic status worse than that of the other rural dwellers. Empirical evidence, however, seriously questions this perception. Second, it also raises the question of vulnerability. Fishing communities might not be "economically" (in the income-poverty sense) worse off than other rural communities but it is conceivable that they suffer from higher vulnerability.

3.4.3 Small-scale fisheries and vulnerability

Vulnerability refers to "exposure to contingencies and stress, and difficulty in coping with them" (Chambers 1989, p.1). Vulnerability is therefore different from poverty. The two concepts, however, are intimately related, and it is sometimes argued that vulnerability is in fact part of poverty – in the sense that vulnerability may be a consequence of poverty: poor people appear to be more vulnerable than non-poor – for instance because they can not access insurance or good quality public services (e.g. health, education) or because they are "economically insecure".[7] However, in a given environment and with the same level of income and similar access to public services, some people may still be more vulnerable than others, due to the very nature of their livelihoods. Experience suggests that it may be the case for fishing households. Fishing households in general, and poor fishers in small-scale fisheries in particular, are prone to very high level of vulnerability closely related to their activity (fishing) and the livelihoods associated to it. This vulnerability affects them through various sources of risks: first and foremost a high occupational risk: as recalled by McGoodwin (2001, p.27) few land-based occupations confront their participants with the risks of losing all of their productive capital, as well as their lives, every time they go to work. Yet these possibilities are commonplace among many small-scale fishers. McGoodwin goes on to assert: "both large- and small-scale approach to fishing comprise some of the most hazardous and economically risky occupations in the world". This risk dimension also includes high exposure to natural disasters (e.g. floods, hurricanes) – although this is not specific to small-scale fishers only-, high exposure to changes in macro-economic factors (e.g. fuel and input price, fish price,[8] etc.), high exposure to conflicts with other users (including industrial fishing fleets), and recently high exposure to HIV/AID, especially in Africa. Finally, a specific reference may also have to be made regarding gender-related vulnerability.[9]

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[7] In reference to the 1992 IFAD study which identifies what it terms "functionally vulnerable groups", defined as those groups which are "economically insecure and thus particularly sensitive to the slightest change in external factors" (Jazairy *et al*., 1992, p. 468).

[8] It is generally recognized that fishers (especially small-scale individual fishers) are price takers.

[9] Women in the fisheries sector may be more disadvantaged and vulnerable than men, and certain forms of social marginalization may be gender specific (Williams *et al.,* 2002). The question remains, however, whether these higher vulnerabilities – which are particularly perceptible in certain countries (e.g. India, Bangladesh) – are specific to fisheries or reflect more generally broader gender issues within society.

More fundamentally fishing is by nature an unpredictable activity: although there undoubtedly exists a "loose" relationship between capital investment and returns to investment in fisheries, this relationship is particularly uncertain and variable in small-scale fisheries both in the short and longer terms. The yield (and therefore the revenues)[10] that fishers derive from fishing is not simply a function of the number of nets or the time spent at sea. It largely depends on exogenous factors, and in particular the availability/catchability of the resource – which fluctuates on a daily, monthly, seasonal and annual basis. This uncertainty represents a major difference between fisheries and other major rural activities such as farming, even if some would argue that farming activities are also unpredictable (see, e.g. Eldin and Milleville, 1989).[11] Finally, this uncertainty affecting capture fisheries is also transferred – perhaps to a lesser extent – to the fisheries-related activities (processing, trading), thus affecting some other members of the same community (and sometimes of same households).

For all these reasons, it is often stated that fishing-related communities are probably amongst the most vulnerable socio-economic working groups, in particular in developing countries – where both institutional and human capacities to address the inherent uncertainty of fishing activity are lower than in developed countries. In that sense fishing activity may be seen as a source of vulnerability, where vulnerability becomes a cause of poverty: people are more prone to poverty because they are more vulnerable; and they are more vulnerable because of the type of activities they pursue, namely fisheries.

3.5 The concept of poverty alleviation

3.5.1 Definition

Although people may use them indistinctively, it is important to keep in mind the difference between poverty alleviation, poverty prevention and poverty reduction (Figure 1). Failure to do so is likely to lead to confusion, inappropriate policies and unwanted outcomes. In this review we use the term *poverty reduction* to describe a situation where people are becoming measurably better off over time due to their involvement/investment in economic activities. Poverty reduction in small-scale fisheries therefore refers to the cases where wealth is generated and capital accumulated through investments made in the fishery, which then helps to lift people out of poverty. In this regard, poverty reduction may be closely monitored or measured through changes in income-poverty (i.e. the total number of people below a given poverty line). In contrast *poverty prevention* refers to the role of an economic activity in helping people to maintain a minimum standard of living (even when this minimum standard of living is below a given poverty line) and which prevents them from falling any deeper into destitution. Poverty prevention in small-scale fisheries therefore refers to situations where fishing contributes – through various mechanisms – to reduce risks and create safety-net mechanisms in a general context of *vulnerability*. Finally the term *poverty alleviation* is used as an inclusive concept encompassing both poverty reduction and poverty prevention. The overall framework is represented in Figure 1.

[10] Notwithstanding price fluctuations.

[11] The fact that farmers in agriculture control the entire cycle of production improves dramatically the predictability of the relation investment – returns to investment, and therefore represents an important advantage in comparison to capture fisheries.

Figure 1. The two dimensions of poverty alleviation

Poverty reduction (lifts people out of poverty)	**Poverty alleviation** (prevents people from falling deeper into poverty)
Through - Capital accumulation - Wealth generation	Through - Safety-net mechanisms - Welfare function
Leading to - **Economic growth** - **Capital accumulation**	Leading to - **Poverty impact mitigation and** - **Reduction of vulnerability**

Three additional comments need to be made:

- First, the distinction made in this conceptualization between poverty reduction and poverty prevention is not simply a matter of semantics. The maintain of a minimum standard of living (poverty prevention scenario) through fishing activity strongly depends on the common-pool nature of the fisheries and on whether or not people – and especially poor people – can access the resource (see section on poverty prevention mechanisms below and Table 2 in particular). On the contrary, experience suggests that condition for capital accumulation and wealth generation (poverty reduction scenario) will be ensured only if rent is created, i.e. if the resource access is restricted to a limited number of people. Therefore, even if one may still talk about "poverty alleviation" in both scenarios, the distinction is crucial because it carries with it very important political and social implications. These political and social implications need in particular to be recognized and addressed when pro-poor policies are designed and implemented.

- Second, although this distinction is crucial from a policy point of view, the reality for the fishers is not so clear-cut. In fact for the large majority of them, fishers will oscillate between periods where they manage to generate wealth or even accumulate capital through their involvement in fisheries, and period where they will just manage to support their family's needs. For fishers, the frontier between poverty reduction and poverty prevention is therefore fuzzy and shifts over time.

- Third, the framework, as presented in Figure.1, essentially reflects an economic-centred approach of the poverty issue. Although it does not exclusively focus on income-poverty, it mainly considers economic mechanisms to achieve poverty alleviation. No reference is made, for instance, to empowerment, improved governance or institutional capacity. Some would argue, however, that poverty alleviation cannot be conceived without addressing power-relationship or capacity building issues.

3.5.2 Poverty reduction mechanisms in small-scale fisheries

In some cases, small-scale fisheries can be a very remunerative activity and the wealth generated through fishing (or related activities such as fish trading) may be a powerful factor of poverty reduction for those involved in the sector. Furthermore, fishing activities can have effects on the other sectors in the rural economy through a series of linkages. These include production links, both upstream from the fishers in demand for inputs and services for fishing, as well as downstream in the demand for processing, storage, and transport of produce. There are also consumption links as fishers (self-employed and wage-labourers) spend their incomes on goods and services in the local rural economy. The precise degree and form of these linkages are likely to be affected by factors such as the amount of rural infrastructure, rural population density, the need for immediate and local processing of fish produce, the nature of technical change in fishing, and the tradability of both fish outputs and the goods and services demanded by fishing communities. Finally fisheries output may also generate tax revenues, allowing more public investment in infrastructure, the demand of which may be stimulated by the growth of the fishing sector. Small-scale fisheries can therefore play an important role in for rural development: it creates wealth within the sector, which may then spread to the rest of the local community, or even trickle up to the national economy through tax revenues and foreign exchanges generated by regional or international trades.

It is therefore important to realize that there are three economic levels (household, local and national) at which poverty reduction mechanisms can operate, and which depend on different mechanisms and therefore relate to, and require, different policies. In the rest of this review we propose to make this distinction explicit by dividing up the overall contribution of small-scale fisheries to poverty reduction into:

- *wealth generation* at the household level and its distribution within households – to men, women and children;
- a *rural development engine* at the community level; and
- *economic growth* at the national level.

The interdependence between these three levels is complex and not straightforward. A migrant fisher may earn significant cash income that is not remitted back to his household, leaving his wife and children in conditions of poverty. A few fishers may become very rich (wealth generation) without necessarily making the community within which they live benefit from their wealth. On the other hand, in several of the countries where artisanal fisheries contribute significantly to national economic growth (e.g. Senegal or Ghana), many fisheries communities (and consequently fishing households) in remote coastal areas are still living at the margins of subsistence and in great level of destitution.

3.5.3 Poverty prevention mechanisms in small-scale fisheries

Although small-scale fisheries may contribute to poverty reduction and create substantial income for households involved in fishing, it should be recognized that at the present time the most important contribution of small-scale fisheries to poverty alleviation might be through their role in poverty prevention – at least in terms of number of people concerned. Experience suggests that for the large majority of households involved in fishing activities (full-time, temporary or occasional fishers) in developing countries, fishing and related activities do not generate high economic returns but instead help them to sustain their livelihoods and prevent them from falling deeper into deprivation. The literature, which emphasizes how important this role is for the poor, usually refers to mechanisms such as “safety-net activity”, “labour safety valve” or “last resort activity” to describe these poverty prevention mechanisms.[12] The review of this literature reveals that these different terms are generally used indistinctively and interchangeably. This confusion is conceptually incorrect and at least two

[12] I have highlighted the pre-eminence of these terms in the fishery literature in a previous paper – see Table 3, p.956 in Béné (2003).

distinct mechanisms should be differentiated: (i) a welfare mechanism and (ii) a safety-net mechanism. A discussion reviewing empirical evidence will be provided in the second section of this document, but it is important first to disaggregate further these mechanisms in order to highlight their underlying assumptions and thus assess their real potentials and limitations.

Welfare mechanisms

The "welfare" dimension of fisheries refers to the fact that poor people in rural areas often appear to rely to a larger extent on fishing activities to sustain their livelihood than the better-off households. In situations of (economically or institutionally) restricted access to other capital (e.g. financial capital such as credit) or production factors (such as private land), the supposedly relatively easy/free access to fishing grounds allows poor people to engage more heavily in the local commons resources (fisheries but also common grassland or forest) to obtain/extract the goods and services they need to sustain their livelihoods. This welfare dimension of fisheries is obviously of greater importance and relevance to the poor and marginalized households, since the latter are generally those with limited access to land and/or other resources.[13] Within this approach, fishing is considered as a fundamental pillar on which poor families facing chronic (long-term) destitution rely to sustain their livelihoods. An important proportion of these poor usually includes unskilled labour with low or non education, which explains why expressions such as "last resort activity" or "labour safety valve" are generally used in that case: due to their common, or semi-open access nature, fisheries are seen as the sector which can "absorb" these unskilled workers and provide them with a minimum living.

Table 2. Poverty prevention mechanisms in small-scale fisheries

Poverty prevention dimension	Pro-poor mechanisms	Beneficiaries	Strategies
Welfare dimension of fisheries	*Last resort activity/ Labour safety valve*: Poor rural household rely more heavily on common-pool resources	*Poor* households unable to maintain a minimum living standard	*Ex-ante* strategy against long-term (chronic) poverty
Safety-net capacity of fisheries	*Safety-net effect*: Fishery provides alternative and/or additional source of support in case of chock	*Vulnerable* households – may or may not be below the "poverty line"	*Ex-post* reaction against transient poverty/chocks

Safety-net function

In contrast, the "safety-net capacity" of fisheries refers to the fact that in periods of individual or collective economic crisis, fishing provides alternative or additional sources of income, employment

[13] In that respect a dimension of this "last resort" is comparable to the role that other Common Pool Resources (CPRs) are recognized to play in livelihoods of the poor. Beck and Nesmith (2001) for instance provide evidence of the importance of CPRs such as forests, rangeland, bushland, fallow fields, inland waterways, wetlands, seasonal ponds, etc., for the poor in India and Africa. As part of these CPRs, fisheries play therefore an important role for poor people.

and food for the households – poor and near-poor – whose livelihoods have been temporarily reduced or affected by the crisis. When rural (or urban) household-head losses his/her wage-based job, when farm crops fail, or when the entire local – or even national – economy collapses, the fishery sector very often represents additional or alternative sources of income, food and/or employment which can help the household to reduce the impact of the crisis. Civil or military wars, population displacements or natural disasters are also events that may drive entire populations to (re)turn to commons property resources (and in particular fisheries) to palliate the loss of their regular source of livelihoods. The important point to notice is that safety nets are mainly concerned with temporary poverty and vulnerability rather than chronic poverty. While chronically poor individuals are unable to maintain a minimum living standard with the resource at their disposal, vulnerable individuals can be people who were already below the poverty line but also sometimes households who were initially above it but have experienced unexpected shocks which could drive them below the line without an intervening safety net to cushion their fall. The example of the thousand miners working in the copper-belt in Zambia who lost their jobs in the mid-1970s and migrated to the Lake Kariba region, where they undertook fishing as an alternative support for their livelihoods (Jul Larsen, 2003) is a good example of this mechanism.

Table 2 summarizes the different points highlighted in the foregoing analysis. It highlights how the two poverty prevention mechanisms which characterize small-scale fisheries act upon diverse dimensions of poverty – the welfare dimension acting as a positive counterbalance against chronic (long term) poverty while the safety-net capacity is used by the poor as a "cushion" against short term, unexpected, shocks related to vulnerability.

Two additional comments need to be made. First although these mechanisms of poverty prevention are certainly less attractive from a pure economic point of view than poverty reduction because no significant surplus rent is generated, the role of small-scale fisheries as a poverty prevention activity for the rural poor is crucial from a social point of view, especially in remote areas where alternative employment may be scarce and social security programmes either minimal or non-existent. In these areas fisheries can play a critical role as an informal "social protection" system for the poor, which would otherwise have to be provided through other forms of social support by local or central government (e.g. through unemployment programmes).

Second, and in slight contradiction to the just foregoing comment, it is worth noticing the opposite forces which exist within small-scale fisheries, between on one hand the capacity of the sector to play a role of safety-net (risk management) where households engage in the activity as a way to mitigate exogenous shocks generated outside the sector, and on the other hand the uncertainty and risks inherent to the activity itself, exposing those who engage in fishing to an higher vulnerability than in other sectors.

The points raised about the different "dimensions" of poverty alleviation encompassing the sections on poverty reduction, poverty prevention and vulnerability are summarized in Table 3.

Table 3. The different dimensions of (income-) poverty alleviation in small-scale fisheries, including the specific issue of inherent vulnerability

Poverty alleviation					**Fishery as a source of vulnerability**
	Poverty reduction: Fishery contributes to lift people out of poverty		*Poverty and vulnerability prevention*: Fishery contributes to maintain a minimum standard of living		
Level	Contribution	Mechanisms	Contribution	Mechanisms	Causes
Household level / sector	Generation of wealth	Effective capture of fishery rent (capital accumulation) High level of commercialisation Access to effective market mechanisms Fish as cash crop for investment and diversification	Safety-net function (transient poverty) Activity of last resort/labour safety valve for the poor (chronic poverty)	Reduce vulnerability and mitigates poverty effects Food security through direct contribution (subsistence) but also fish as immediate cash-crop for safety-net	High occupational risk Risks of losing physical assets
Local level	Engine for rural development	Increased demand for goods and services Rise in wages and employment opportunities (income and employment multipliers)	Social-redistributive system (welfare)	Alternative sources of income, food and/or employment.	Unpredictability of the natural resource availability Natural disaster risk Conflicts
National level	Economic growth	Trickle up to government through taxes and foreign exchange earnings (regional or international trade)	Re-distributive	Government expenditure from fisheries-related tax and foreign exchange earnings on poverty alleviation measures	High susceptibility to macro-economic fluctuations

4. IMPORTANCE OF SMALL-SCALE FISHERIES: EMPIRICAL EVIDENCE

The objective of the previous section was to clarify a series of concepts which are important bases to assess the role and contributions of small-scale fisheries. Those concepts mainly revolved around the issues of food security, rural and economic development and poverty alleviation, reflecting the general issues currently at the top of the agenda in development. Other important domains however need to be considered as well, such as the environmental, cultural and social dimensions of small-scale fisheries. Those will be examined in greater length in the next sections when discussing the lessons and conclusions that can be derived from the empirical data.

4.1 Macro-economic indicators

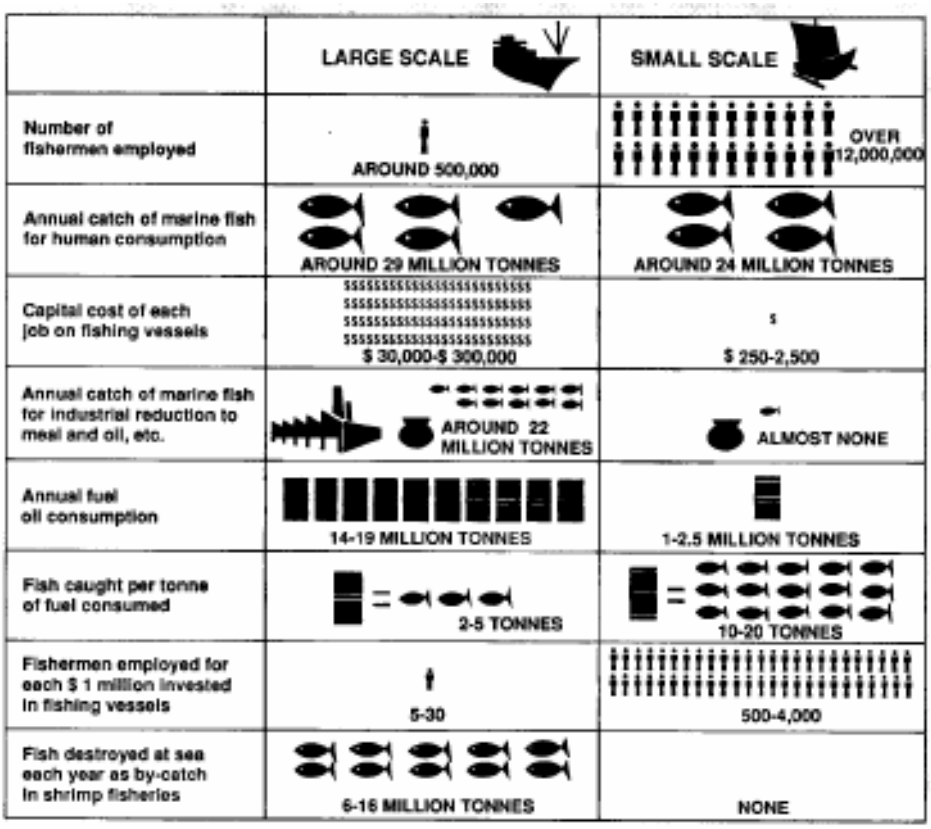
One possible way to start this empirical review is to present Thomson's table "the World's two marine fishing industries" published initially in 1980. In this article Thomson compares small-scale and large-scale fishing 'industries' using a series of 8 criteria: number of fishers employed, annual catch used for human consumption, capital cost per job created on fishing vessel, etc. (the whole list is detailed in Figure 2). The point Thomson was trying to make in his article, namely that small-scale fisheries are "preferable" over large-scale fisheries, were greatly reflected in the choice of its criteria. One could for instance argue that factors such as foreign exchange earnings, or productivity per men on board should have been included in the table, perhaps in place of the annual fuel consumption or the number of fishers employed per US dollar invested. Clearly the result of the assessment depends on the criteria used – which themselves reflect what we consider as being important elements – possibly leading to biased analysis. In Thomson's case, for instance, he undoubtedly decided to emphasize the social dimension of small-scale fisheries and chose his criteria accordingly. However, through his biased analysis, Thomson (1980) was simply trying to rectify a double injustice made to small-scale fisheries.

Injustice first with respect to the relative neglect and lack of attention that the fish sector as a whole is thought to face in comparison to other rural economic activities in general, and farming in particular. Injustice also, regarding the overemphasis that had been put for many years on large-scale offshore fisheries at the detriment of small-scale inshore fisheries. Thus, if Thomson's objective was to promote small-scale fisheries, then he probably chose the appropriate criteria, for the main contributions of the large majority of small-scale fisheries in the world (both in developed and developing) are probably more closely related to social, or "welfare" dimensions, rather than economic ones. Surely, however, his analysis would have been even more resounding if, instead of simply considering small-scale *marine* fisheries, he had also included small-scale *inland* fisheries in his statistics.

4.1.1 Share of fisheries to country's GDP

Perceptions are changing and the reality that Thomson and many others (e.g. Lawson, 1977; Smith, 1979; Durand, Lemoalle and Weber, 1991) have been echoing for many years is now (slowly) coming forward. Some experts within development and funding agencies are becoming more aware of the potentials that fish in general and small-scale fisheries in particular can "bring to the table". But those are the experts who have been working in close contact with fisheries and know the reality behind the figures. The large majority of their colleagues, who work on agriculture (irrigated or non-irrigated) or more widely rural development, are still largely unaware of this reality. Even micro-enterprise development specialists rarely conceive small-scale fisheries (or aquaculture farming) as potential entry-points for their programmes. So even if a few fisheries experts within these international development agencies are now more and more supportive of the small-scale fisheries sector, they still face a very important momentum within their own institutions: for many non-fisheries experts, fisheries – and in particular small-scale fisheries – will always be a sub-part of agriculture, and in most cases, this sub-part is perceived to be relatively negligible.

Figure 2. Thomson's table comparing large-scale and small-scale fishing "industries"(*)



Note: (*) the figures in the table are the original ones (1980) updated in 1988 by A. Lindquist, using FAO 1986 fisheries statistics.

This perception, in some respect, is correct: even in the most favourable cases such as Senegal where 17 percent of the active working population is engaged in fish-related activities, the fishery sector as a whole (industrial and small-scale) hardly represents more than 12 percent of the agriculture GDP. [14] More generally the share of small-scale fisheries is even lower than that. Allison (2004) for instance conducted a review of the importance of fisheries in several countries in the Eastern and Southern African regions. Through his research, he looked more particularly at Malawi, Kenya, Tanzania and Uganda. All four countries have access to the Great Lakes of the East African Rift Valley (Lakes Victoria, Tanganyika and Malawi) which "provide the major contribution to fish supply and employment opportunity in the region" (Allison, 2004). Using a combination of the World Bank data, FAO information and national statistics, he was able to estimate the share of the fishery sector to the respective national GDP and agricultural GDP for those 4 countries. Table summarizes these figures. In the "best" case (Malawi) the fisheries represent 4 and 9 percent of the overall GDP and agriculture GDP respectively.

Table 4. Contribution of fisheries to national economy in Eastern African countries

	Malawi	Kenya	Tanzania	Uganda
Fisheries Share of GDP (%)	4.0	2.0	2.9	2.2
Fisheries Share of Agricultural GDP (%)	9.0	8.7	6.4	5.2

Source: Allison, 2004

[14] FAO fisheries statistics (2004). Country profile: Senegal.

On a wider scale, the World Bank, in its recent Approach Paper on fisheries, collated the list of the countries for which fishery sector (including indistinctively large and small-scale activities) has the highest contribution to national GDP (Table 5). The table indicates that amongst the 13 top countries, six are Small Islands Developing States (SIDS), for which fishery is, by nature, one – if not the – major support of their economies. For these SIDS the share of fisheries can represent up to 13 percent of the GDP (e.g. Kiribati). For the seven others (non-SIDS) countries (Bangladesh, Cambodia, Ghana, Myanmar, Namibia, Senegal and Viet Nam), the shares of fisheries contribution to GDP do not exceed 7 percent.

On the basis of these empirical data it could be concluded that the general position that non-fishery experts (academics, economists and/or experts from development agencies) have adopted in the past about (small-scale) fisheries is correct: except in some particular situations such as SIDS's economy, the contribution of small-scale fisheries to national economic development seems to be negligible, especially if one is convinced that the share to GDP is the appropriate macro-economic indicator for evaluating economic activities and comparing their respective contribution to the country's national economy. One the basis of this criterion, small-scale fisheries are unlikely to attract more attention that they have in the past. On the basis of others criteria, however, it is more likely to be the case. Trade is one of them.

4.1.2 Fish trade

International trade in fish and fishery products has grown rapidly over the last twenty years. In fact fish is the most heavily traded food commodity in the world and the fastest growing agricultural trade commodity on the international markets. In value terms, international trade in fishery products progressed from US$ 6.1 billion in 1980 to US$ 56 billion in 2001. In 1980, developing countries accounted for 39 percent of the value of exports. By 2001, they accounted for half the exports. Between 1980 and 2001 the net receipts from fish trade by developing countries increased from US$ 3.4 billion to US$ 17.4 billion. This was a higher growth rate than the increase in the net exports of other agricultural commodities such as coffee, bananas, rice, and tea (FAO, 2002). In the year 2000, the equivalent of 50 percent of the low-income food deficit countries' import bill for food was paid by receipts from fish exports (Delgado *et al.*, 2003).

Historically the direction of net trade by quantity of total food fish has changed dramatically from the mid-1980s to the late 1990s. Developing countries as a whole went from being net importers from developed countries (over 1.2 metric tonnes of food fish in 1985) to net exporters to developed countries (over 4 metric tonnes in 1997). From a macro-economic perspective the continued significance of international trade in fishery products is therefore undeniable, and since approximately 95 percent of the world fishers are involved in small-scale fisheries in developing countries and produce 50 percent of the global fish catches (FAO, 2002), these small-scale fishers surely must benefit from this. The UNDP's account of the same reality, however, offers a rather different interpretation. They remind us that in the last 50 years, sea catches have multiplied fourfold and that "more than a billion people living in 40 developing countries risk being deprived of their main source of protein because of the overexploitation of fishery reserves associated with an increased in export demand for animal foods and oils, to the detriment of domestic consumption".[15]

[15] Quoted p.3 in the European Commission report on Fisheries and poverty reduction (Anon., 2000).

Table 5. Contribution of fisheries to GDP: countries with the highest shares

Country	Share of GDP (%)	Country	Share of GDP(%)
Kiribati	13	Senegal	7
Maldives	13	Samoa	6.6
Solomon Islands	12.8	Viet Nam	6
Marshall Islands	9	Fiji	5
Namibia	7.5	Myanmar	5
Bangladesh	7	Cambodia	4
Ghana	7		

Source: World Bank, 2004, based on FAO country profile data

As suggested through this last statement, the consensus is yet to be reached about the positive (and negative) benefits of fish trade-oriented policy. In fact, much of the current literature discusses the apparent opposition between national food security (supply) and international trade (export), focusing therefore implicitly on the *direct* contribution of fish to food security. In actual fact the relationship between balance of trade and food security is much more complex, partly due to the *indirect* contribution through wages and employment (the "food security through income security" mechanisms). The theory predicts that production for exports can substantially enhance the incomes of poor fishers, or poor (women) labourers in processing factories, and raise their economic purchasing power, thus ensuring greater food security at the household level. Similarly, the foreign exchange earned is certainly precious to most of the economies and contributes to the fund of hard currency needed to import food and other resources for national development. But because there are very few effective re-distributive (fiscal) mechanisms in place that can ensure that foreign exchange generated in one sector of the economy is utilized to supply to the specific requirements -such as the food security needs of the producers- of that sector, the overall outcome is rather mixed.

Based on an 11-countries review (Kenya, Ghana, Namibia, Sri Lanka, Thailand, and the Philippines, Nicaragua, Brazil, Chile, Senegal, Fiji), Kurien recently carried out an in-depth analysis of the contributions of fish trade (Kurien, 2004) which corroborates the points made above. In most cases where fishers are directly and substantially related to harvesting and production of export-oriented products, the case studies show that these fishers' incomes have increased. However, whether their money incomes adequately compensate for other "dis-benefits" associated with fishing for export is more difficult to establish. In particular even if (poor) local small-scale producers *may* become better off, Kurien points out that the poor local consumers who were relying on the production of these small-scale fisheries to ensure part of their nutritional and food security are now *probably* much worse-off. Similarly it is not clear whether the local (women) fish processors and traders are benefiting from these fish exports. In effect, part or the totality of the products that they used to trade on the local markets is now directed towards the export industry, cutting these many people from their main source of income.

On the whole, the case studies suggest that there is little evidence of significant real improvement in the overall food security of local households (both producers and consumers) that can be directly associated with harvesting or producing high priced fishery products for export. This contrasts with the substantial net gains in foreign exchange that the countries make from the hard labour of these food producers. The exporting firms also on aggregate make huge profits. Kurien concludes: "Clearly, the 'trickle down' theory has little credibility. The shark's share of the benefits from international fish trade accrue somewhere between the rich-country consumer and the poor-country producer" (ibid. p.46).

4.1.3 Number of fishers in the world

If there is one socio-economic indicator that receives an almost universal consensus amongst the fishery experts' community, it is certainly the figures referring to the number of people involved in small-scale fisheries. It is indeed almost impossible to find any article, report or document discussing small-scale fisheries which does not start its introduction by re-asserting how "big" (in terms of people) the world's small-scale fisheries are. But how big is "big"? Do we actually have a precise idea?

FAO (1997) estimated that during the two decades 1970 – 1990, the total number of fishers -including those involved in marine and inland capture fisheries and aquaculture- more than doubled, increasing from 12.5 to 29 millions. This corresponds to a faster increase than the world's population! Another estimate for the same period is that of Pomeroy and Williams (1994), who estimated that 14–20 million people were depending on small-scale fisheries for their livelihoods during the 1990s. The difference between the two estimates may reflect the fact that fish farmers were included in the FAO estimate. More recently the FAO produced another estimate where it was stated that worldwide there is about 35 million persons involved in catching and fish processing, 75–80 percent of which are associated with artisanal and small-scale capture fisheries (FAO, 2001). The comparison between this more recent estimate and the previous figure put forward by Pomeroy and Williams is difficult, since the 2001 FAO estimate not only includes fishers but also people involved in processing activities. Lastly, Williams proposed another estimate of the world fish-processing workers and other related activities. She suggested that "there are at least 50 million developing country women employed in the fishing industry, involved in processing, marketing, gear manufacture and repair and fishing" (www.futureharvest.org). No comparable figure was made for male employment.

McGoodwin (2001) stated that nearly 95 percent of the world's fishers are small-scale fishers and that there are in the world "more than 20 million primary producers plus another 20 million small-scale processors, marketers and distributors, totalling approximately 40 million people worldwide who are directly employed in the small-scale sector".[16] These figures are lower than those of Williams. Using a 1-to-5 multiplier, McGoodwin also calculated that when ancillary workers and the dependents of all these foregoing people are included, "small-scale fishing support the livelihoods of more then 200 million people worldwide" (ibid., p.2). McGoodwin does not, however, indicates what the contributions of the ancillary workers and the dependent are respectively in these 200 millions. Finally he reports that Safina (1995, p.52) provides a relatively similar global estimate, claiming that about "200 million people worldwide depend on fishing for their livelihoods". It is not clear however how Safina's calculations distinguish fishers from others workers who also depend on the fisheries for their livelihoods.

Berkes *et al.* (2001) quoting FAO (1999a) propose a relatively different number. According to these authors the total number of fishers (coastal marine and freshwater) is over 51 million in the world, amongst which 99 percent are small-scale fishers, and 95 percent from developing countries. Then quoting ICLARM (1999) they put forward an estimate of 50 million people in "developing countries directly involved in the harvesting and processing of fish and other aquatic products". This is similar to the figure proposed by Williams, except that this includes both women and men. Drawing upon this and assuming an average household size of five persons, they then calculated that "250 million people in developing countries are directly dependent upon the fishery for food, income and livelihood" and that "additionally 150 million people in developing countries are also employed in associated sectors such as marketing, boat building, gear making, and bait" (Berkes *et al*., 2001, p.203). Unfortunately it is not indicated whether this last figure includes just the individuals (as the sentence itself suggests) or if Berkes and his co-authors have had already multiplied by 5 the initial estimate to account for the dependents. If the first alternative were correct, the overall number of people dependent on fish and related activities would be 1 billion (250 + 150 x 5). If, on the other hand, they have already accounted

[16] Unfortunately McGoodwin does not indicate the source of his data, so no cross-checking attempt is possible.

for the dependent ratio, the total number of people who depend upon small-scale fisheries and related activity is 400 millions (150 + 250). In both cases, this a significantly higher figure than any other estimates provided so far in the literature. Note also that the 1-to-5 dependent ration is different from the 1-to-5 multiplier used by McGoodwin, since the later included both dependent and ancillary activities.

Finally, Delgado *et al*., using FAO's relatively old figures (1997) and assuming a growth rate for the last five years similar to the one observed in the 1990s,[17] estimate that the number of fish farmers and fishers should be approximately 40 millions nowadays (Delgado *et al*., 2003, p.125). Delgado and his co-authors also estimate that if allowance is made for the people employed in associated industries, and those who derived significant income from the local expenditure of fishers, between 60 and 100 million workers are estimated to derive their incomes from the fisheries sector. "With dependents, it is conjectured that well over 200 million persons are thus dependent on fisheries for their livelihoods at the present time" (ibid., p.125). This last estimate of 200 million means that the authors have assumed a dependency ratio of 1-to-3.3 or 1-to-2 (depending on whether they consider 60 or 100 millions as the initial condition), which is significantly lower than the ratio of 1-to-5 used by Berkes.

A series of immediate comments follows these figures. First there is an obvious lack of homogeneity in these different estimates. Some authors include fish-farmers (aquaculturists), some don't, some account for inland fishers, some don't, some estimate the number of fishers *sensus stricto*, some extrapolate the numbers of dependents using some arbitrary multipliers, while others include fish traders and processors, or even "people employed in associated industries" (Delgado *et al*., 2003, p.125) – without specifying what these associated industries are exactly. As a consequence, one ends up with diverging and confusing estimates. Second comment; all of these figures rely partially, or even totally, on FAO data, which raises another issue, that is, underestimation.

Although FAO has made very significant effort recently to improve the reliability and quality of their *own* information, they still depend on initial national statistics provided by the individual countries. In a recent report addressing the issue of statistics in fisheries, Coates (2002) pointed out clearly some of these limitations. Based on the South East Asia experience, underestimates were noted, in particular for the number of inland capture fishers: while FAO estimates a total number of 4.5 million inland fishers worldwide, from the information available at a workshop in the Mekong Basin, this estimate was already exceeded by the data from the eight countries represented at the workshop (Coates, 2002). Underestimated recording is therefore a particular acute problem especially for (small-scale) inland fisheries. Similar underestimates, although probably at a lower scale, are also experienced in marine fisheries. For example, Ninnes (2003) reports that FAO (2001) estimated that employment data for Angola, Namibia, South Africa, Mozambique and Tanzania within the small-scale marine fisheries was 215 000, while SADC (2003) estimated that 2.3 million people in these countries depend actually on these fisheries for their livelihoods.

Part of the problem ensues from the low capacities and lack of (human, financial and administrative) resources faced by some developing countries to complete accurate census. But it could be argued that this does not affect only fishing activities, and other economic sectors or socio-economic groups (such as forest-dependent communities) may be under-represented as well. It does not explain either why SADC and FAO – which are both international institutions relying on national data systems- display such different figures. The issue in fact comes from the perception of who a "fishery-dependent" household is. In the specific example reported above, FAO estimates this number of "fishery-dependent" household through the number of full-time fishers involved in small-scale marine fisheries. SADC on the other hand, considering that part-time fishers are also "fishery-dependent"

[17] This assumption may be questioned. In a recent 6-country demographic analysis, Tietze Groenewold and Marcoux (2000) showed that the number of coastal fishers has actually started to decline or stagnate in four of the six countries studied, namely the Philippines, Malaysia, Tanzania and Senegal, while it is still increasing, although to a much lesser extent than in previous decades, in India and Bangladesh.

people, included both full-time and part-time fishers in their estimation. Their figure is therefore probably closer to the reality, especially if we recognize that in the world the number of seasonal or part-time fishers is possibly twice or three times higher than the number of full-time professional fishers. Using the number of people directly involved in the sector on a full-time basis does not capture the true importance of the small-scale sector.

4.2 Contribution of small-scale fisheries at the local level

4.2.1 Multipliers effects

If we consider employment as a useful criteria to evaluate the importance of small-scale fisheries to the local or national economies, it can be argued that this should not only include the employments created within the sector itself but also those created in other related sectors. This relates to the concepts of "upstream" and "downstream" links mentioned earlier in this report. Table 6[18] illustrates some of the upstream and downstream links that can be created by small-scale fisheries. Upstream activities are those activities supplying inputs to the fishing operation. Many of these inputs are typically provided by small-scale individuals or micro-enterprises located nearby within the local rural area, although some e.g. fishing gear and fuel, may originally be manufactured further away, either nationally, or internationally and supplied locally through local businesses/traders. Downstream activities are those following the harvesting of product, which themselves require inputs. As with upstream inputs, small-scale individuals or enterprises typically provide many of the downstream inputs and activities within the local rural area, thereby generating sales, income and employment at the local level in addition to these generated by the fishing activity itself.

Although extremely few, the empirical studies that attempt to quantity upstream and downstream links in small-scale fisheries in developing countries tend to suggest that the number of additional employment created through these links may be quite significant. Macfadyen and Aeron-Thomas (2001) for instance in the case of the *bagda* shrimp production in Bangladesh estimated that in addition to the 166 000 direct employments generated by the 50 000 shrimp farms, 142 000 jobs were created along the upstream and downstream links. However, what perhaps is more important than the *number* of job created *per se* – although it is of course an important economic indicator – is the *type* of job created. Macfadyen and Aeron – Thomas notice that among the 308 000 jobs created in the *bagda* shrimp industry, more than 85 percent were for unskilled labour. These authors further estimate that these unskilled labourers receive 61 percent of the total value added/income generated by the sector and its upstream and downstream links.

It would be extremely valuable to undertake similar evaluation exercises in various small-scale fisheries. This would allow us to establish a set of case studies' multiplier values which could then be compared to similar studies carried out in other economic sectors such as agriculture. In that sector, models have been built up since the early 1980s to estimate upstream and downstream and consumption links for specific regions. These studies show usually high multiplier values, and most of them suggest that the bulk – 75 percent or more of the effect arises through consumption linkages (i.e. when farmers and farm labourers spend their increased incomes on good and services in the local rural economy). Some of these studies show greater effects in areas with more infrastructure and well-developed rural-urban links, and correspondingly lower multipliers for cases from Africa where these conditions do not usually apply. On the other hand Delgado and colleagues (1994) have produced

[18] This Table is redrawn from Tables 7 and 8 of the background paper prepared for the "FAO Technical Guidelines for Responsible Fisheries No. 10. Increasing the contribution of small-scale fisheries to poverty alleviation and food security" (FAO, 2005). The original input was provided by G. Macfadyen from various origins (Macfadyen, pers. comm.).

Table 6. Examples of upstream and downstream inputs to small-scale fisheries

Upstream activities: Fishing inputs	Downstream activities: Processing/storage – Marketing/trading
Investments costs in fishing vessels e.g. design and constructions costs of wood, fibreglass, or steel hulls, engines and fittings	Investment in design, construction/use and equipping of processing or marketing sites (e.g. purchasing, renting or leasing of land, construction of buildings, and fixed costs of processing/storage equipment such as drying racks, smoking ovens)
Investments costs in fishing gear e.g. nets, pots, lines, floats, hooks	Variable cost items such as knives, wood for smoking, ice for preservation of products, boxes for packaging, salt for drying
Fuel and lubricants e.g. petrol for outboard engines, diesel for inboard engines, engine oil	Transport e.g. from landing sites or traders, or to retail or wholesale locations/clients which may require investments in vehicles, or entail transport costs
Ice for the preservation of catches onboard vessels, and fish boxes for the storage and sorting of catches	Financial services, e.g. credit and provision of finance to cover start-up investment costs and any cash flow problems
Food for vessel crews	
Bait supply	
Labour/crew	Labour used to cut, clean, smoke, dry, pack, load, and potentially transport fish products
Financial services e.g. credit and provision of finance to cover start-up investment costs and any cash flow problems	Financial services e.g. credit and provision of finance to cover start-up investment costs and any cash flow problems
Maintenance of vessels, engines and gear, e.g. service costs and physical inputs/replacement costs	Maintenance costs of any buildings or equipment, e.g. service costs and physical inputs/replacement costs

equally high if not higher linkages for Africa cases, arguing that isolation in rural Africa means that any exogenous increase in farm earnings will be spent disproportionately on locally produced goods and services.[19] In the case of fishing activities, Delgado claims:

> *"In rural Africa this increased spending by poor consumers has been shown to provide an additional increment to local income through re-pending of the initial income injection that is at least as large as the initial sales of tradable items that started the process (Delgado, Hopkins and Kelly, 1998). In other words if fish can be produced and sold outside an isolated local area, the net income benefit to the area may be more than twice the value of the fish sales" (Delgado* et al.*, 2003, p.125)*

The problem here is that in order to assert this, Delgado extrapolates from his previous studies – although none of them were carried out in fisheries communities. The two economies (farming and fishing) are rather different and it is not clear, *a priori*, why the multiplier effects in small-scale fisheries should be similar to these in small-scale farming system. In fact some elements even suggest that these might be higher for fisheries than for agriculture. For instance it is well known that fishing is an activity characterized by a particularly high cash-flow regime. Fishers can generate income instantaneously (every day) in opposition to farmers who may have to wait harvest time to get any

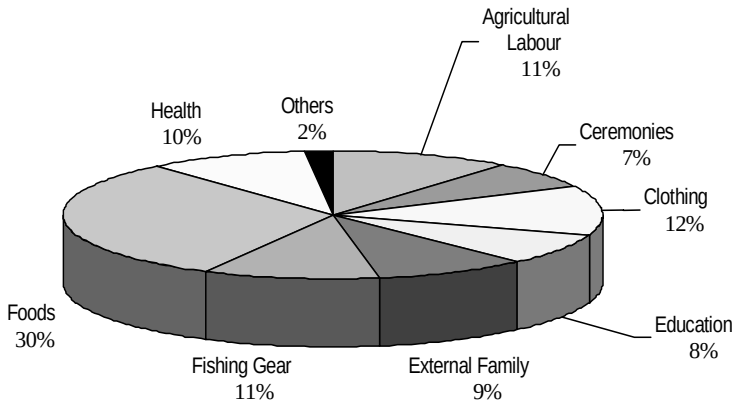
[19] These findings have however been disputed. In particular de Janvry (1994) questioned the assumptions about the perfect elasticity of supply of non-tradable.

returns. Furthermore although fish is a food product, those who harvest fish cannot live by it alone. Additionally fish is also highly perishable. These different characteristics mean that there is a need for fishing households to barter or exchange their "surplus". Kurien in his review on trade comments: "the compulsion to trade is thus more innate to a fishery than to livestock or agriculture" (ibid. p.2). For all these reasons, it might be reasonable to assume that fishing communities – when they are well off – will probably "re-inject" a higher share of their revenues into the local economy than would farmers in the same environment. If it is the case, the role of "engine for rural development" played by fishing activity might be even higher than the one played by agriculture. This is an exciting hypothesis, which remains to be tested.

4.2.2 Income contribution

Strangely enough, even if income-poverty had been perceived for many years as the main dimension of poverty in fishing communities, only very few household surveys had been conducted to investigate this hypothesis. As a consequence, quantitative data on the role of fisheries on household income generation is rather anecdotal and the information provided by these very few case-studies is consequently very valuable. These studies confirm that in coastal fishing communities – where fishing in usually the main activity- the degree of dependence on fisheries for cash income can be extremely high. But they also show that it may not necessarily be 100 percent. For instance Ninnes (2004) reports that the contribution of fisheries to cash income in Southern African coastal households is estimated as between 40 percent for Mozambique and 55 percent for Tanzania of total cash income. In other communities, this contribution, however, can be 10 times that of the next most significant contributor to cash income. This cash income is used to gain access to basic services and consumptive needs that are not possible to satisfy through the household own resources. These include food purchases, health and education, clothing, some fishing inputs, agricultural labour, etc. An example of household expenditure pattern, sampled from three coastal communities in northern Mozambique, is given in Figure 3. (Wilson, Muchave and Garret, 2002). Although the pattern shown in this specific case should not be generalized, it shows that fishing in coastal areas is an important cash earner, and that this cash is the key to gaining access to essential services, goods and foods.

Figure 3. Household expenditure
(sampled from 3 coastal communities in northern Mozambique)



Source: Wilson, Muchave and Garret, 2002

In inland fisheries where fishing is usually only one of several different activities, field data suggests that fishing can also play a critical role in cash generation. Turpie *et al.*, (1999) research in the Zambezi floodplain for instance showed that inland fisheries' contribution to household cash income can generate more cash than cattle-rearing and sometimes more than crops production (Turpie *et al.*, 1999) (Table 7).

Table 7. Contribution of fishery to households' cash income (US$/Household/year) in different parts of the Zambezi basin, compared to other activities [% of total household income]

	Barotse floodplain	Caprivi-Chobe wetlands	Lower Shire wetlands	Zambezi Delta
Cattle	120	422	31	0
Crops	91	219	298	121
Fish	180 [43%]	324 [28%]	56 [13%]	100 [39%]
Wild animals	6	49	1	0.4
Wild plants	24	121	48	29
Wild foods	0	11	7	4
Clay	2	0	8	0.1

Source: Turpie *et al*. (1999)

Bank in the water

All these figures however are static analyses and miss one essential dimension of the income contribution of fishing activities to household economy. They do not show the dynamics relationship that exists between the different activities and in particular they don't reflect the crucial role that the cash generated through fishing can play in this dynamics. In effect, for many smallholder farmers or fish-farmers, fishing is not simply one of the many activities that constitute their diversified portfolios of activities: it is the bank (the "bank in the water"). It is well established that in a diversified portfolio, it is the interactions and synergy between different activities (e.g. through the re-investment of cash generated by one activity to purchase input for another activity) which permits the household to maintain a minimum living standard. Within that general context, fishing – due to its capability to generate cash almost instantaneously – usually plays a very particular function. Poor are not simply characterized by low productivity capacities. They are equally characterized by very limited saving capacities. Their abilities to generate the financial capital necessary for the purchase of essential inputs may be one of the major productivity bottlenecks – explaining their relatively lower productivity. In some cases, although they are engaged in several other farming activities, fishing is the only source of cash for these households.

This function however is not appropriately reflected through the share of fishing in the household's total cash income. For illustration, the income made through occasional or seasonal fishing may represent only 25 percent of the total household income (or even less), but it may be generated at the very crucial period of the year when the household needs cash in order to purchase other farming inputs (e.g. labour, fertiliser, or seeds) and grow the crop on which the whole household's food security will depend for the entire year to come. These few kilogrammes of fish are therefore only valued few dozens of dollars on the local market but their *actual* value is much higher than that. Their actual value is what makes the difference between starvation and food security for the entire household.

4.2.3 Safety-net and welfare function

Fishing as a crucial element of the livelihood of the poor

So far we have mainly discussed the capacities of small-scale fisheries to contribute to poverty alleviation through the generation of wealth and income. This is related to the concept of poverty reduction such as defined in section 1 where the wealth or rent generated by the fisheries (or fish-related activities such as fish trade) is sufficient large to lift households above the poverty line. In the large majority of cases, however, the contribution of small-scale fisheries to the household economy is much more modest and the income generated may just be sufficient to maintain the household at their

current standard of living.[20] This case usually corresponds to situations where the households have limited or not access to land and/or other factors of production (e.g. access to financial capital) and where open access or common pool resources (such as fisheries, but also forestry) may then play an important role in supplementing alternative low per capita food production options and provide additional cash income. In this sense fisheries play an important welfare function (as defined in Section 1) in many rural areas of the developing world. This welfare function is mainly conditioned to the existence of an open, or common (regulated or non-regulated) access to the resources, which allows household members to engage in the activity at low, or no, entry costs. These activities can take various forms, be associated with different levels of time and capital investments, and be undertaken by various members of the households. We review below some of these different "categories" of contribution.

In coastal areas in Africa (e.g. Senegal, Ghana) or in Asia (e.g. Sri-Lanka, Philippines, Thailand, Viet Nam) or on the shores of large man-made or natural lakes (e.g. Great Lakes in East Africa), a large number of men in rural (or even urban) communities may enrol as crew-members on boats for part of the season or the entire year, depending on their abilities to engage in other more remunerative economic activities. This category of wage-based labourers mainly involves young and/or mature males with low (or no) education. The revenues are usually based on share-contract remuneration system and the activity is mainly undertaken for income generation – although some part of the revenue may be paid in kind. Those fishers very rarely own the capital of production (fishing gear, boats) which is the property of urban (absentee) or rural entrepreneurs/patrons. In that case, even if wealth or rent is generated, the latter is generally retained by the owners of the capital and the capacities of the fishers (crew-members) to raise their social and economic status is relatively limited.

Many other millions of people are also engaged in temporary fishing activities where fishing is part of multi-activity livelihood strategies developed either at the individual or family level. Within these strategies, fishing may be undertaken by household members in a rather occasional manner, or may represents a more prominent – but still seasonal- activity strongly integrated into the yearly-planned household's livelihood strategies. Occasional fishing activity generally involves low human and low capital investment and is undertaken by a very large number of households in developing countries either in marine areas, or in rivers, small lakes and reservoirs, seasonal or temporary ponds, wetland and floodplains, essentially for subsistence purposes. This strategy involves cheap and simple fishing gear (e.g. baited fishing lines) and is frequently carried out by non-leading members of the household (children or elders, or sometimes adult women) in addition to the other domestic activities. This type of fishing is usually conducted on the margins of water-bodies located in the vicinity of the house/village. In floodplain areas of the Indian subcontinent, this type of activity may involve up to 70–80 percent of the households during the flood season (Thompson and Hossain, 1998; Hoggarth *et al*., 1999). In West African villages on the coast, or in the vicinity of rivers (e.g. Cameroon, Burkina Faso) or lagoons (e.g. Benin, Ivory Coast), occasional (morning and/or evening) fishing, conducted in association with other activities such as farming, household or agricultural commitments occupying the rest of the day, is very common (Horemans and Jallow, 1997; Williams and Awoyomi, 1998).

Seasonal (or part-time) fishing is usually characterized by a higher labour and financial involvement than occasional fishing. It is also usually conducted by different members of the household: part-time fishers are young and/or mature males who get involved in fishing activities as part of a wider, multi-activity livelihood strategy. They may use relatively cheap and simple fishing gears (e.g. traps, gill nets, hook-lines) or more "sophisticated" gear or techniques (e.g. fences or barriers). This type of activity can last from a few weeks to several months during the season, depending on the combination of activities undertaken by the households and the availability of labour and resources. The catch is used for auto-consumption but more and more frequently also sold in local markets. In Africa, along

[20] This does not mean however that in these cases fishing income does not represent a large share of the household total income. In fact it may still represent the almost totality of household income, but this contribution is not enough to allow the household to get out of poverty.

rivers or in the vicinity of water bodies (e.g. ponds, reservoirs) the active men may get involved in this type of seasonal fishing activities between crops or when other agricultural activities are low (Thomas and Adams, 1999; Sana, 2000). In the Tonle Sap Lake area in the Mekong Basin, hundreds of thousands of households share their time between fishing activity, operated on the open water of the lake and the fringing floodplains during the rainy season, and the cultivation of rice paddy and other subsistence and cash crops during the rest of the year (Ahmed *et al*., 1998).

4.2.4 Post-harvest activity and its role to poverty alleviation

Fish trading as a poverty prevention activity

The reliance on fisheries to provide employment and income for the poorest does not only concern fisheries activities *per se*, but applies also to processing and trading activities. This aspect adds an important gender dimension to the discussion, given that women are usually the main actors in these related sectors. Small-scale processing and/or trading for local markets require relatively few investments, have generally low operational costs, don't specifically require strong physical strength and can be undertaken by unskilled labour. These characteristics allow a large number of people, especially women, from the lowest strata of the community, who lack education, literacy and financial capital, to engage in this activity. Post-harvest activities then display the characteristics of *last resort activity*. Gordon (2003) for example, describes the case of fish trading by women in the Chisense fishery on Lake Mweru (Zambia-Congo border) during the mid-1980s. In these areas, the majority of the women involved in the trading activity were poor, and generally receiving little or no financial support from their husbands. They had to look for economic activities to meet their daily needs in a context where the traditional female activity – cassava farming – was becoming increasingly difficult due to land scarcity and unprofitable prices (Gordon, 2003, p.173).

This function of last resort activity for poor women can reveal particularly important at the household level, given that women have been shown to contribute a larger share of (children) health, food and education expenses than their male counterpart. In Benin for instance, Gnimadi (2004) found that women in the fishing communities that she surveyed contribute approximately 53 percent of the family expenses (mostly food, education and transport). Men dominate the usual expenses, of health and ceremonies in the family but it is the savings of the women that allows the families to survive structural poverty, to overcome the seasonal lean periods and rising inflation. In the very poor families, it is nearly 75 percent of the expenses that are met by women generated income.

In some other circumstances fish processing or trading can also play the role of *safety-net activity* in which people engage after losing their jobs or being forced to migrate, following social or political turmoil. In the Upper Zambezi region, in the Western Province of Zambia, for instance, group interviews revealed that some of the male engaged in fish processing and trading activities were ex-employees of government or para-statal agencies, who lost their jobs following structural reforms and downsizing in government agencies (Jere and Béné, 2004). For these people with education, fish processing provides a temporary safety-net activity in which they can engage due to the low investment required and the low entry costs, with the hope that they will find another more remunerated employment in the near future which better corresponds to their qualification. In that case fish trading plays the role of "informal" welfare system in countries where the state is currently enable to provide a formal unemployment scheme.

Fish trade, poverty reduction and women empowerment

Fish processing or trading can be more than just a last resort or safety net activity and the income gained by women through fish processing and trade may not be simply the main source of income injected in the household's economy. It can also be the "fuel" which allows the whole fishing sector to function. In a large number of cases in developing countries, poor (male) fishers have limited or no access to formal source of credit. In these cases it is frequently the trading and/or processing women whose average incomes can frequently exceed those of the fishermen, who finance equipment and

fishing operations, generally as a way to secure preferential commercial transactions with these fishermen.

Another example that illustrates the poverty reduction capacities of post harvest activities is that accounted by Rubinoff (1999). In her anthropological study, Rubinoff reports the case of a group of women from a fishing community of Goa in India who have been involved in fish trading for the past 20 or 25 years. Based on individual in-depth interviews she shows how these women, though lacking formal education, were able to raise the standard of living and opportunities for their whole families through their activity as fish traders in the local markets. Thus, one of these women claims: "It was only through the women that our family has prospered; we have brought the family up from poverty" (Rubinoff, 1999, p.631). Beyond the pure economic dimension of this analysis, the interviews also reveal the effects of the economic success on these women's class and caste status in local society – how they were perceived by others members of their castes and local societies as well as their own proud identity and recognition of their changing status. In particular, with the enhanced catches due to fisheries development, these trading women became more and more independent from the men in their families for the supply of fish and were able to prosper on their own in the markets. Therefore, while in India, women' status is often determined in relation to men's (father's, husband's) status, in the specific case the social status in terms of wealth or class was determined by both men and women, or even solely by the women. Based on her analysis Rubinoff claims that the trading women in that group, especially those older and married, have acquired considerable freedom of movement and made important and valued economic contribution to their families and the regional economy. However, Rubinoff (ibid) also indicates that although this particular group of (Catholic) women has been highly successful in their businesses the majority of trading women, especially from the Indu fishing community and in the more outlying areas, remain poor and more marginalized.

4.3 Fish and food security in small-scale fisheries

From the time of the first hunter-gatherers along the rivers of Africa or Eurasia, to the modern era, fish have always played an important role in food security. During periods of famine, fish have also frequently provided a crucial product that was bartered for other staple foods, thus preventing the population from starving or from being forced to migrate. Couty and Duran (1968), for instance, report that during the 1902 famine in the Lake Chad area, local Massa populations were able to survive by exchanging dried fish for sorghum with migrant Peul merchants. Today these same Massa populations consume an average of about 40 kg of fish per capita.

4.3.1 Nutritional input

Worldwide, more than 1 billion people rely on fish as an important source of animal proteins especially where other sources of animal protein are scarce or expensive. Fish is essential in East Asia and Africa for instance where it supplies more than 50 percent of the animal protein intake in the diet of the 400 million living in the some of the poorest countries of the world (Gambia, Ghana, Equatorial Guinea, Indonesia, Sierra Leone, Togo, Guinea, Bangladesh, the Republic of Congo and Cambodia). This figure is said to be equal to all four terrestrial animal protein commodity groups combined (beef and veal, sheep, pig and poultry) for these countries (IFPRI, 1996).[21] In the rest of the world, more than half the human population (56 percent) derives at least 20 percent of its animal protein intake from fish. Nutritionally, fish is therefore one very important source of dietary protein especially in the developing countries (Table 8).

[21] Quoted in Berkes *et al*., 2001, p.223.

Table 8. Developing countries with per capita fish supply greater than 20 kg and/or fish proteins / animal proteins ratio greater than 20%

Country	Per capita fish supply (kg)	Fish proteins/ animal proteins (%)	Country	Per capita fish supply (kg)	Fish proteins/ animal proteins (%)
Angola	6.6	27.1	Macao	32.8	23.9
Anguilla	45	–	Madagascar	7.6	16.9
Antigua & Barbuda	24.3	13.9	Malawi	5.7	37.7
Bangladesh	10.6	48.3	Malaysia	56.2	34.5
Barbados	31.8	17.6	Maldives	165.1	64.4
Benin	9.4	28.5	Mauritania	14.2	13
Burundi	3.2	29.6	Micronesia	40.4	43.5
Cambodia	6.6	28.3	Mozambique	2	19.2
Cape Verde	25.3	30.6	Oman	24.1	21.5
Chile	20.2	12.4	Myanmar	17.5	45.4
China	25.7	23.9	Papua N. Guinea	13.9	28
Comoros	20.2	61.8	Peru	26.8	26.1
Congo (Dem.Rep.of)	5.7	31	Philippines	30.3	42.8
Congo (Republic of)	25.3	48.8	Samoa	62.7	41.7
Cook Islands	53.4	29.4	Sao Tome & P.	21.4	61.5
Côte d'Ivoire	11.1	6.9	Senegal	36.3	47.4
Dominica	27.1	15.5	Seychelles	65.6	50.4
Equatorial Guinea	22.6	61.9	Sierra Leone	13.4	63
Fiji Islands	32.9	21.4	Solomon Islands	34.5	73.4
Gabon	44.6	35	Sri Lanka	20.2	54.3
Gambia	23.7	61.7	Surinam	22	26.7
Ghana	22.5	63.2	Tanzania	10.3	33.6
Grenada	20.1	17	Thailand	33.7	41.5
Guinea	16	60.2	Togo	17.3	50.2
Guyana	64.2	51.4	Tonga	32	29.6
Haiti	2.6	12.1	Tuvalu	23.6	41.7
Indonesia	18.2	53.1	Uganda	9.8	30
Kiribati	74.2	66.2	Vanuatu	22.8	29.2
Korea (DPR)	17.6	55.7	Venezuela	20.1	20.4
Korea (Republic of)	50.7	43.3	Viet Nam	17.4	30.4
Lao (PDR of)	8.5	29.7	Yemen	16.3	23.2
Liberia	4.9	23			

Source: Anon., 2000

More recently, there has been greater acknowledgement of the vital role played by fish in human nutrition through its richness in micronutrients. In low-income countries, staples such as rice, wheat, maize and cassava make up the bulk of the food consumed by people, supplying the majority of energy and nutrients. However there are some essential nutrients which are not found in these staples or found only in small quantities. These nutrients must be supplied by other foods such as fish or vegetables. Fish provide a wide variety of vitamins and minerals, including phosphorus, magnesium, selenium and iodine (from marine fish) (Thilsted *et al*., 1997). Even a small amount of fish caught every day can be an important dietary supplement for the poor people who cannot always afford variety of different sources of food.

Furthermore human extract higher amounts of minerals by weight from small fish compared with meat and large fish. Thus the traditional practice in much of Asia of the consumption of whole small fish is especially important to people with nutrient deficiencies. Surveys conducted in Bangladesh

demonstrate for instance that small fish continue to contribute larger proportions of vitamin A, calcium, iron, and zinc to the diets of the rural poor than big fish (Table 9). Finally, fish also contribute fatty acids that are necessary for the development of the brain and body. The use of fish as a central element in the diet of a population is therefore highly recommended, especially for the diets of young children, infants and pregnant women.[22]

Table 9. Vitamin A, calcium and iron content in small and big fish (exploited in Bangladesh) per 100 g raw edible parts

Fish species	Vitamin A (mg)	Calcium (mg)	Iron (mg)
Small fish, whole			
Mola (*Amblypharyngodon mola*)	1960	1071	7
Darkina (*Esomus dancirus*)	1457	–	–
Dhela (*Rohtee cotio*)	937	1260	–
Chanda (*Chanda* sp.)	341	1162	–
Kashi (*Corica soborna*)	93	–	–
Puti (*Puntius* sp.)	37	1059	–
Big fish, adult			
Hilsa (*Hilsa ilisha*)	69	126	3
Rui (*Laboe rohita*)	27	317	–
Siver carp (*Hypophtalmichthys molitrix*)	17	268	–
Big fish, whole juvenile			
Tilapia (*Oreochromis niloticus*)	19	–	5
Silver carp (*Hypophtalmichthys molitrix*)	13	–	–

– not measured (Source: Thilsted and Roos, 1999)

4.3.2 Contribution of small-scale fisheries to food security

Using the framework provided in Table 1, the role of small-scale fisheries to food security can be divided into five main contributions: (i) direct and (ii) indirect contributions to household food security, (iii) direct and (iv) indirect contributions to domestic markets (local and national levels), and (v) contributions to international (world-wide) food security. It should be noted, however, that although these different types of contributions are differentiated for analytical purpose, in reality it is their combined impacts (some positive, some negative), which eventually determine the overall effect of fish and small-scale fishing activities in terms of food security on the daily life of the poor.

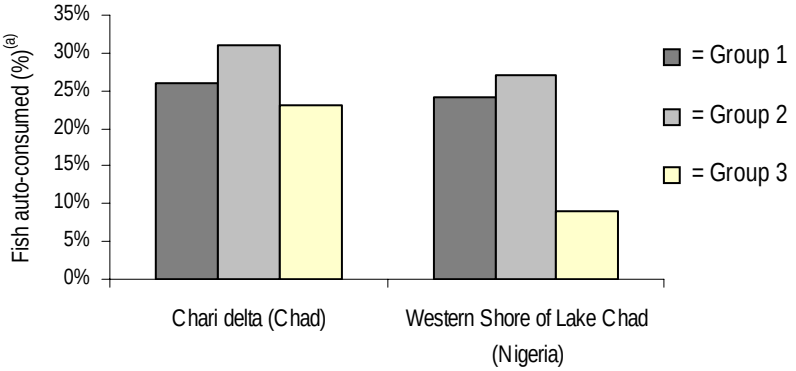
Direct contribution at the individual/household level

The most *direct* contribution of fishing activity to food security is through the consumption of household's own catch, i.e. through subsistence. Subsistence – and its role in food security – is usually evaluated through the market value of the fish. Some would argue however (including the author of this report) that subsistence products imply more than their market values. For those who cannot afford buying food (usually the poorest and most marginalized) who rely on their own catch, subsistence can make the difference between good and bad nutrition, between recovered health and prolonged illness or between food security and starvation. In market-remote areas, this subsistence component may be more important for the household economy than cash income – not simply for the

[22] Recent research carried out in UK suggests that a diet rich in fish boost the fetal growth rate during pregnancy. Based on a 12 000 women sample, research – to be published in the Journal of Epidemiology and Community Health- shows that the more fish the women ate, the lower were the rates of restricted fetal growth.

poorest but for the whole community. In fact in some places the number of persons who receive a regular income from fishing is actually only a tiny proportion of the overall number involved in fishing activity. For example, van der Wal (2000), in his socio-economic profiling of the fishing community of the Mutshindudi catchment in northeast South Africa, found that less than one percent of the people engaged in fishing in the area derive a regular income from fishing. In this area a major portion of the fishers consist of scholars (for the younger) and unemployed (for the older) who fish on a part-time basis. For these people, the relatively low catch per unit effort precludes the generation of a significant income. However, even if they catch only few fish, the analysis indicates that these represent a substantial part of the household's needs in animal protein and micronutrients, thereby contributing significantly to the food security and dietary health of the households.

Figure 4. Share of fish auto-consumed by different wealth groups within fishing communities in the Lake Chad Basin.
G1: better-off households group; G2: intermediate group; G3: poorest households group



Note (a): percentage estimated in each village by key-informants, then averaged at the region level.
Source: Béné *et al*. (2003)

In other places where the household economy has already shifted toward higher degree of commercialization, the balance between food (subsistence) and income (commercialization) is both complex and difficult to generalize. Ninnes (2004) suggest however that the pattern does not change greatly with fish prices, and that "almost the same amount is retained for consumption, irrespective of its market value" (p.6). This analysis, which may be correct in few places on a short-run perspective, and for a given household, is likely to be incorrect both on a longer-term perspective, and on a cross-section analysis. On a historical perspective, empirical work have now clearly established that the degree of subsistence (or symmetrically the share of catch commercialized) of individual households is strongly cross-correlated to the degree of commercialisation of the fishery within which these fishing households are living.

It is also generally assumed – based on experience from farming systems research- that the poor rely more heavily on subsistence than the better-off households who sell a larger share of their catches. This perception may not always reflect the reality. Recent field research in Nigeria, Chad and Cameroon, for instance, showed that the poorest households in these areas consume a lower proportion of their catch than the better-off households (Figure 4) and in fact sell most of their fish in order to be able to purchase cheaper foodstuffs (in this case, essentially millet). The direct contribution of fish to food security for the poorest households may therefore be lower than generally assumed, preventing these households from benefiting the whole nutritional supply that fish offers, and raising at the same time questions about the implications of these household strategies especially with regard to the risk of child and pregnant woman micro-nutrient deficiency.

Indirect contribution at the individual/household level

If fish (as a subsistence product for fishing households) is potentially an important source of direct food security, its contribution through the generation of incomes derived from labour-wages and fish commercialization is probably an even more important source of *indirect* food security. Although employment cannot be taken as the firm assurance of food security for people, it should be emphasized that in a significant number of cases, small-scale fisheries activities take place in rural areas[23] where alternative employment opportunities may be scarce or even non-existent. In these circumstances, access to harvesting of fishery resources, and their associated processing and trading activities, may represent the only option available to make a living and maintain (food) purchasing power, hence strengthening the role of small-scale fisheries in food security.

However, although fish is undoubtedly an important source of direct and indirect food and may in that respect support food security, it would be incorrect to conclude that fishery-dependent communities are less likely to suffer from food shortage or under-nourishment than any other segment of the (rural) population. In fact, food insecurity had been identified long ago as one of the main problems affecting fishing communities. FAO, for instance, observed 30 years ago "the people engaged in these activities and their families continue, with few exceptions, to live at the margin of subsistence and human dignity" (FAO, 1974).[24] More recently poverty profiles conducted in Ivory Coast showed that "food insecurity is endemic amongst artisanal fishers of Ivory Coast in terms of availability and quality of food, and diversification of diets" (Pittaluga, 2002, p.3).

Contribution of small-scale fisheries to food security at national level

At national level, a combination of macro and micro-mechanisms determines the capacity of fisheries to contribute to food self-sufficiency. Very little research has been done in this respect to identify the different mechanisms which link small-scale fisheries to national self-sufficiency. Empirical evidence suggests however that the productive capacity of a country to exploit its own small-scale fisheries resources is not a sufficient condition to ensure the effective contribution of fish to national food security. A striking example of this is Cambodia. Cambodia ranks fourth among the world's top freshwater capture fisheries with an annual production 300 000–400 000 tonnes. However, a recent study pointed out that food availability from this source fell by 29 percent between 1994 and 1999 (Gill *et al*., 2003) and 30 percent of communes in rural Cambodia face chronic food shortages (RGC, 2002). Cambodia is not the only country in this situation. Peru, Viet Nam, Senegal have fish in abundance but still continue to have large numbers of undernourished adults and children.

The second major aspect regarding fish and food security at national level is the current importance that is given to trade (particularly regional and global trade) and its potential contribution to countries' national food security. Analysis of food trade for instance shows that the Asian countries as a group earned enough foreign exchange from fish to finance 34 percent of their food imports in 2000 (FAO, 2001). Analysing fish imports and exports at aggregate levels may be misleading, however. More in-depth analysis of past and projected trade trends indicates that developing countries as a whole have been, and are projected to remain, large net importers of low-value food fish but exporters of high-value finfish (Delgado *et al.,* 2003). At present there is great uncertainty on how these opposite trends will impact upon the poor (both producers and consumers) in terms of food security.[25] What is certain, though, is that the effects of fish trade on the price of fish are likely to be a key factor affecting the nutrition of the urban and rural poor in the future.

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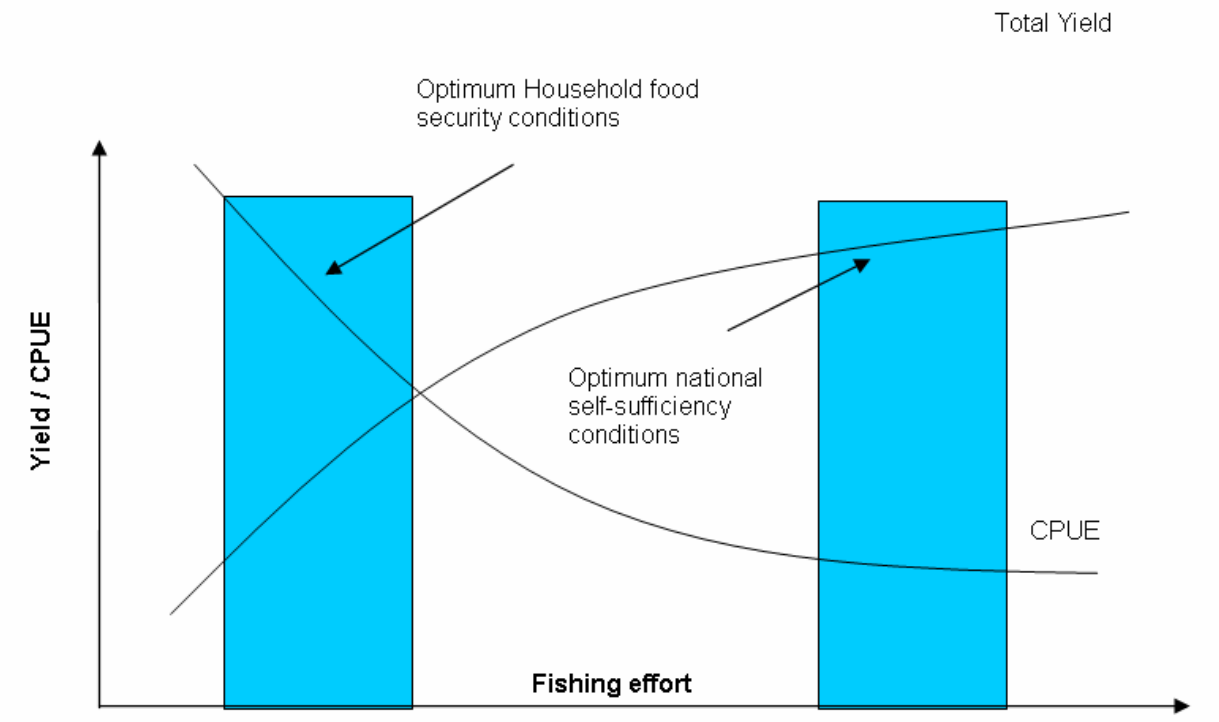
[23] We recognize however that a growing part of small-scale fisheries is now taking place in peri-urban – or even urban – zones.

[24] Quoted in Copes, 1989, p.6.

[25] Low-value fish have traditionally accounted for a higher share of the animal protein consumption by the poor in developing countries, but the growing ranks of middle class will increasingly demand, and beable to pay for, local high-value fisheries items themselves.

A third point needs to be brought into the debate. As highlighted in several occasions in this report, most of the current discussion focuses on trade-offs that may (or may not) exist between fish export-oriented strategies and national food security. This debate is not specific to fish product and can also be applied to other food commodity produced by developing countries. It might however be argued that the limited nature of fisheries creates additional possible conflicts specific to this sector between national self-sufficiency and local or household food security. This point can be illustrated using the classical diagramme representing the conjoint changes in Yield and Capture per Unit of Effort (CPUE) as a function of the total fishing effort (Figure 5). The CPUE can be considered as a proxy for local fishing household's food security level through direct (subsistence) and indirect (employment and income) mechanisms. The higher the CPUE, the higher the capacity of the local fishing communities to maintain, or possibly improve, their food security conditions. On the other hand the fishery total yield can be considered as contributing to national self-sufficiency. The higher the yield generated by the fishery as a whole, the higher the amount of fish direct available for the country – or the higher the exchange rate generated and the subsequent country's capacity to buy alternative food. Thus adopting policies which promote national self-sufficiency would require increasing the total yield extracted from the fishery, possibly at the detriment of the local community/households' individual food security.

Figure 5. Theoretical trade-off between household food security and national food self-sufficiency in the particular case of fisheries



The world fish supply and its impact on fish food security

Global consumption of fish as food has doubled since 1973 and the developing world has been responsible for over 90 percent of this growth. The FAO (1999b) reports that growth of fish consumption in the poorer countries has increased rapidly in recent decades. In particular the consumption of freshwater fish has grown massively, primarily in East Asia. Even if China is

excluded, per capita supply in the Least Developed Food Deficit Countries (LIFDCs)[26] has increased from 5.0 to 8.3 kg since 1960 an annual growth rate of 1.3 percent.

These overall encouraging results should however not be regarded with too exaggerated enthusiasm, mainly for two reasons. First, at present, two-thirds of the total food fish supply is obtained from fishing in marine and inland waters, the remaining one-third being derived from aquaculture. The contribution of inland and marine capture fisheries, however, stabilized at 10 to 11 kg per capita in the period 1970–2000 and recent increases in per capita availability have been obtained mainly from aquaculture production. In other words the contribution of fisheries to global food security is declining and it is likely that this trend will accelerate in the future.

Second, even if in the long term (1950–2000) the overall fish availability has been dramatically improved, more recent trends seem to indicate that the "golden days" are over. Since the late 1980s, population growth (outside China) has outpaced the growth of total fish supply, resulting in a decline in per-capita fish supply from 14.6 kg in 1987 to 13.1 kg in 2000 (FAO, 2002). The predicted rise in global population, and corresponding increases in demand for food including fish, means that the current food security problems are expected to remain (FAO-SOFI, 2003). Furthermore, the status of natural stocks[27] is also likely to threaten further the access to food, income and livelihoods of the small-scale fishers through indirect mechanisms: as demand for fish and competition for access to supplies will continue to increase, lower income groups will be more and more excluded and replaced by more (politically and economically) powerful groups with growing interests in these scarcer natural resources.

4.4 Cultural dimension of small-scale fisheries

Culture refers broadly to "people's shared knowledge, including knowledge about their language, history, mythology, religious beliefs, world view, values, normative behavioural patterns, prevailing means of subsistence, and customary modes of social, economic, political and religious organisation" (McGoodwin, 2001, p.8). Culture, and cultural mechanisms are therefore particularly present in many aspects of fishing communities' life. In effect the cultures of small-scale fishing communities are usually the result of considerable accumulated adaptive experience which are shaped by many internal and external events and changes affecting these communities over time.

This cultural element of small-scale fisheries can also be seen as an important element creating or maintaining self-esteem at the individual level. Among the members of small-scale fishing communities, there is usually a profound pride of their occupational identity as fishers and a correspondingly high devotion to the fishing way of life. Fishing (especially at sea) requires high degrees of independence, self-reliance, autonomy, risk taking, and outdoor work challenging nature. Additionally fishing occupation confers not only important markers of self-identity and individual pride, but also a "satisfaction bonus" that cannot be measured on economic ground alone (Pollnac, 2001).

Small-scale can – and do – therefore play a tremendous role in improving the livelihood of rural communities through these mechanisms of collective actions, shared cultural identity, sense of common social norms, etc. Those are certainly lees tangible than direct increase in household incomes but they have remarkable positive impacts in terms of empowerment, well-being and collective and individual self-esteem.

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[26] Countries included in the LIFDC grouping are those classified (i) by the World Bank as low-income in terms of GNP per capita, and (ii) by FAO as having a trade deficit for food in terms of calorie content.

[27] It is estimated that 47–50 percent of marine fish stocks are fully exploited, 15–18 percent are overexploited, and 9–10 percent have been depleted or are recovering form depletion (FAO, 2002).

It would however be erroneous to believe that the cultural identity which is usually associated with fishing communities is systematically the reflection of a long historical tradition in fisheries. It is for instance not uncommon to observed that some of the ethnic groups which are highly specialized in fishing activity nowadays and who readily claim their historical affiliation to a "traditional" fishing culture are in fact issued from heterogeneous groups which were not necessarily involved in that activity few decades ago. Chauveau and Jul-Larsen (2000) for instance report the example of the Dulsabe – a group considered as specialized in fishing activity in the Casamance and Saloum delta in Senegal. Those fishers were initially farmers who migrate to the region to engage in groundnut production. It is only when the groundnut sector collapsed that the Dulsabe entered the fishing sector.

In reality, fishers frequently make reference to a specific fishing or ethnic identity as an attempt to match their own – sometimes very – recent involvement in the fishing sector with the identity of the local fishing group. Thus, Kassibo (1996) showed that although the majority of the fishers involved in migratory fishing activity along the Ivory Coast claim to belong to the Bozo ethnic group – a group which is recognized to have a long cultural fishing identity in the region, in fact less than 5 percent of them actually originate from this group – most of them are farmers from Burkina Faso. Cases of appropriation of cultural identity are in fact common in a large number of fishing communities, especially in Africa. This instrumentation allows the individuals of these communities to access more easily the fishing resources through their claims to belong to an ethnic community which is perceived as the legitimate group entitled with historical rights over these resources.

4.5 Empowerment (stakeholders' collective action)

Fishing, by its very nature, is a collective action activity. Although fishers can exploit the resource individually, the interaction, crowding effect or possibly conflict between individuals' fishing gears soon creates a need for coordinating and organizing collectively the fishing activity. This need for coordination which is initially related to technological aspects (interactions between fishing gear) is further reinforced by the limiting nature of the resource. When the total fishing effort becomes too important, collective decisions are requested to control and reduce this effort if the long-term sustainability of the resource and the fishing activity which depends upon it, are to be maintained.

This necessity for coordination and collection decisions and actions represents both a challenge and an opportunity. Most of the literature has heavily focused on the challenge aspect, either to highlight its negative impact on the resource and the local communities (e.g. Hardin, 1968) or, in contrast, to demonstrate the capacity of these communities to address and overcome this challenge (e.g. Berkes *et al*., 1989; Feeny *et al*., 1990; Ostrom, 1990). More recent literature has attempted to integrate both perspectives in a more comprehensive way (e.g. Baland and Platteau, 1996; Agrawal and Gibson, 1999) recognizing both positive and negative potential outcomes. What, however, is much more rarely emphasized in that literature is the political empowerment dimension of these collective actions.

Empowerment refers to the means by which entitlements (access to resources) are maintained and defended. Chambers (1983) and many others (e.g. Friedmann, 1992) have stressed that the poor – especially in rural areas usually suffer from a low level of socio-political organization and that their capacity to make their voice heard is consequently weak, resulting in exclusion from political and decision-making processes. In these conditions the necessity for coordination and collection decisions within the fishing sector represents an important potential for political empowerment of those fishing communities. Through collective actions and coordinating mechanisms set up in the forms of fishers organizations, community-based or co-management arrangements, local fishing communities are able to organize themselves and raise their political voice to defend their access or rights to the resource against other users within the sector (e.g. larger-scale fleet) or outside the sector (e.g. agricultural or tourism sectors). Aarnink and van Zwieten (2003) for instance report the example of the fishers associations along the shore of the Lake Mweru at the border between Zambia and Congo. One of the direct motives of the associations was to set up gear restriction systems to regulate the use of nets and other equipment. But these associations were also used by the community as formal platform to complain openly to government about the declining catch. They demanded better local management

and enforcement of conservation measures by the Department of Fisheries. They also requested local councils to use some of the money collected by taxing the fish trade to provide better infrastructure.

This empowerment, which is particularly important for the poorest and most marginalized communities, may actually be the way to be formally (legally) recognized as legitimate users of the resource. The positive outputs of this legal recognition and empowerment process may even have tremendous impacts beyond the fishery sector itself and benefit the community as a whole. A good example of this is the Kainji Lakes fishery community-based project (Nigeria). One of the outputs of this project has been the setting up and enforcement of a licensing system by the communities. Prior to the existence of this license system, the local fishers were not recognized by the local government as valid representatives in discussions on fisheries management. This community-based licensing enforcement system, not only gave legal status to the fishing community and their leaders and allow them to get involved in the management decision making process of the fishery, but it also facilitated access by the community to alternative income opportunities, loans and revenue to invest in village infrastructure (Ayeni and Mdhaili, 1998).

In situations where actors are “left out” from participation and/or decision-making processes, the creation of fishers committees, organizations or associations can represent an effective way to empower the local populations. This empowerment is an important part of the contribution of small-scale fisheries to poverty alleviation, in particular in rural areas where these local communities are more systematically affected by political marginalization. This capacity of community empowerment offered by the small-scale fisheries sector is however still relatively overlooked in the fisheries literature which emphasizes and focuses more readily on the capacity of these local arrangements to offer “efficient” management systems for the conservation of the resource and the (cost) effectiveness of the monitoring/enforcement arrangements. There is therefore an urgent need to shift part of the emphasis toward the empowerment dimension of these local arrangements. Research is needed in particular to analyse in a more comprehensive and systematic way their potentials but also to understand the mechanisms through which they operate and to highlight their limits.

4.6 Contribution of small-scale fisheries to environmental conservation

The relation between small-scale fisheries and environment revolves around the question on whether small-scale fisheries contribute to environmental conservation or, on the contrary, participate to the current general decline affecting fisheries resource in the World. On this question, it is striking to notice that totally antagonistic clichés co-exist in the literature. On one hand a large number of academics and practitioners are claiming that small-scale fisheries are more “environment-friendly” than larger-scale fisheries. If one refers to indicators such as these used by Tompson in his Table (e.g. the fish caught per tonne of fuel consumed or the estimated by-catch rate), it seems indeed justified to claim that small-scale fisheries are less detrimental than industrial fisheries. This fact probably explains why the perception about the “eco-friendly” dimension of small-scale fisheries is so frequently re-asserted in the literature. This perception is further reinforced by the equally widely accepted view that formal and/or informal community-based management approaches such as those observed in many small-scale fisheries in developing countries also contribute to more effective fisheries management regulation enforcement, thus strengthening the capacity of the stakeholders to reduce the risk of overexploitation of the resource.

Yet at the same time it is widely recognized that small-scale fishers can, and do, make use of detrimental fishing techniques (e.g. dynamite, reef bleaching, etc.) to increase, or sometimes simply maintain, their capture levels in a general context of increasing fishing pressure. From a different –but related- perspective, it should also be recognized that over-capacity is becoming a concerning issue in an increasing number of small-scale fisheries around the world. Those facts, which implicitly highlight the possibility of resource overexploitation by small-scale fisheries, clearly go against the position promoted by people who emphasize the eco-friendly dimension of small-scale fisheries. The conclusion may be that no generalization is possible regarding the contribution of small-scale fisheries to environmental issues, and therefore that sweeping generalizations which assert the existence of

poverty-environment nexus or on the contrary which advocate the environment-friendly dimension of small-scale fisheries are inappropriate at such a level of generalization and may in fact be misleading for appropriate supportive interventions at local levels. In fact it is probably correct to say that to every single case-study which tends to suggest/demonstrate that small-scale fisheries are less detrimental than larger-scale fisheries, a counter-example could be brought up that contradicts these conclusions and shows that small-scale fisheries can also lead to resource-base degradation and overexploitation. The key factor is therefore not the scale of the fishery (small *versus* large; artisanal *versus* industrial) but the effectiveness of the management setting to ensure the sustainability of the fisheries. This effectiveness has more to do with the institutional arrangements of the fisheries and the collective capacity of the stakeholders to control individual fishing effort and investment, rather than the level of capitalisation of the fleet itself.

5. SMALL-SCALE FISHERIES AND PRO-POOR GROWTH

The data available through the literature strongly suggests that the vast majority of the millions of households engaged in small-scale fishing activities in developing countries are resource-poor rural dwellers, usually unskilled and with limited financial and/or capital resources. Some of them, in particular in Asia may even have a relatively restricted access to land. In those conditions, the major contribution of the small-scale fishing sector (including processing and trading activities) is to provide these resource-poor households with a partial or sometimes full-time livelihood-basis.

5.1 Small-scale as a buffer for unskilled labour

One term that might appear very pertinent to describe this role is that of "pro-poor growth". Pro-poor growth can be broadly defined as "growth with equity", i.e. economic growth that benefits more specifically the poor. Using pro-poor growth as the central reference to assess small-scale fisheries' contribution to the livelihoods of people is particularly relevant because it provides the basis for a possible compromise between those who remain convinced that economic growth is the best and more efficient way to alleviate poverty over time at aggregate scales, and those who argue that without specific pro-poor interventions/policies, the poor will remain those -groups or individuals at the micro-level who are excluded from the trickle down effect assumed to ensue from macro-economic growth. It also makes sense to emphasize pro-poor interventions, since poverty alleviation has been identified as the objective No.1 of the UN Millennium Declaration signed by 189 countries in September 2000 – now widely referred to as the Millennium Development Goals.

The initial point in this discussion is the recognition that the number of people involved in fishing activity has dramatically increased since the end of the WWII. We recalled earlier in this document that FAO for instance has estimated that this number has doubled between the 1970s and the 1990s (FAO, 1997). If correct, this estimate would mean that the rate of increase in this sector has been even greater than the growth in active population involved in agricultural sector in the same period.[28] This 2-fold increase is however very unlikely to have been stimulated only by the engine for growth that the activity may represent in some isolated cases. As both empirical and theoretical analyses have shown, these conditions of engine for growth (rent generation) are usually encountered when the access to the resource is restricted to a limited number of people. It is therefore much more likely that this huge increase in the number of fishers results from (or reflects) the capacity of the sector to absorb the upsurge in labour engendered by the large developing countries' population growth. In other words, the major contribution of the small-scale fisheries sector over the last five decades (especially

[28] Although the current conventional typology (full-time, part-time, occasional fishers) on which this estimate relies is highly disputable and raises numerous questions regarding the reliability of the countries' statistics used to compile this global estimate, recent reports suggest that this reliability issue is likely to lead to systematic underestimates, rather than overestimates (e.g. Coates, 2002). Overall the number of households which derive partially or totally their livelihood from small-scale fisheries and related activities is therefore very likely to be even more important than these current estimates.

in developing countries where 95 percent of the fishers are small-scale fishers) has been its capacity to play the role of buffer and labour safety valve for the increasing rural (and unskilled) population.

This role is likely to continue in 2000–2025, given the continued rapid growth of workforces in developing countries. The poor obtain their claims to food and sustain their other needs largely from income. Such income almost all derives from work. The large majority of this income and work is rural, as is that of the poor and malnourished population themselves. In 2025 over 60 percent of the dollar-poor will still be rural. Hence the food entitlement of the poor and near-poor will continue to depend largely on rural hired or self-employment income. Growing employment income will therefore to be the main cure of hunger and poverty. In this context, small-scale fisheries can contribute to pro-poor growth through two main mechanisms

5.1.1 The redistributive (welfare) dimension of the sector

Through their overall low entry costs, fisheries, fish processing and trade allow the poor and unskilled men and women to engage in these activities even with relatively limited or no access to other factors of production. This tends to reduce economic inequality, especially in regions where land ownership has been identified as the main factor of inequality. Recent studies have shown that land inequality is the most important assets inequality in many countries and appears to have the largest negative impact on growth and efficiency (Ravaillon and Datt, 1999; Alesina and Rodrik, 1994; Deininger and Squire, 1998; Ray, 1998). In contrast, countries with lower initial inequality, particularly low inequality in land, appear to experience higher subsequent growth (Klasen, 2001). In those conditions small-scale fisheries – through their redistributive capacities- could be a very powerful way to reduce rural inequity and set up the institutional and economic conditions of a pro-poor growth for those who are chronically unable to engage in the productive economy. This may, in turn, favour faster economic growth that can then “trickle down” to these poorest households.

5.1.2 The safety-net function of the sector

In regions across the developing world with dismal prospects for economic development or high uncertainty (agricultural product price volatility, macro-economic crisis, structural reforms, harvest failures, political turmoil, etc.), small-scale fisheries, fish processing and trade provide the population with important – and sometimes crucial safety-net alternatives as part of a multi-activity (risk and vulnerability mitigating) livelihood strategy. Through this function, small-scale fisheries play the role of substitute and/or complement to other economic activities to help the households sustaining their standard of living in absence of formal unemployment and/or insurance schemes. One may therefore argue that the sector is probably more important to prevent worsening poverty than to promote growth and economic advancement. Stressing this role as part of the overall rural development process becomes critical if one focuses more specifically on the very poor and vulnerable – in line with the objectives of the Millennium Development Goals. Without these small-scale fisheries and other associated activities, the (central or local) government and/or other institutions would have to invest financial and human resources to provide these safety-nets. In these conditions, the challenge in the future will be to maintain and support the access of small-scale fisheries to the largest number of poor as possible and preserve the role of safety net of the sector – until other activities and resources can take on that role.

6. CONCLUSION

6.1 The main findings of this review

The objective of this paper was to present an overview of the contribution of small-scale fisheries to the livelihood of fishing communities. The paper argues that, although some positive results can be highlighted which confirm that small-scale fisheries can play an important role with respect to key development issues such as poverty, food security and pro-poor growth, the analysis shows that assessing the global contribution and importance of small-scale fisheries is not an easy task, nor a

straightforward exercise. The greatest limiting factor at the present time is a severe lack of data that prevents researchers from being able to demonstrate in a more rigorous and reliable manner the true importance of small-scale fisheries. In addition to this lack of data, the review also shows that the outcome of the assessment depends to a large extent (a) on the indicators chosen to carry out the analysis and (b) the economic levels at which the analysis is carried out.

Thus, at the macro-economic level, the importance of small-scale fisheries appears to be relatively small in comparison to other major sectors attracting the attention of donors and policy-makers (such as agriculture) and only few countries may see their GDP significantly increased by the contribution of the small-scale fisheries sector. Those are essentially small island developing countries (SIDCs) and few other countries such as Namibia, Senegal or Bangladesh which should be considered as exceptions rather than general cases. For the rest of the developing countries, the impact of the sector will remain relatively modest at the macro-economic level. Even when fish trade figures are considered – where spectacular results have been achieved at aggregate (national and international) levels over the last two decades, recent analyses show that these massive increases in the volume of fish trade have had rather limited positive effects on the ground in terms of poverty reduction and livelihood improvement for the small-scale producers, processors and traders. While textbooks and desk-based expert reports predict major general trickle-down effects, the reality shows a much more varied and uncertain outcome for the poor, with some winners but also a large number of left-aside groups. The integration of these groups into the markets as a result of the globalization process does not seem to be systematic and there is therefore a need to use fish trade aggregate figures with much greater caution than they have been used in the recent past when they were put forward in various types of documents to promote international export of (small-scale) fishing sector as a vector for economic development.

In contrast, it seems that at lower levels the potential contribution of small-scale fisheries may be much more tangible in terms of livelihoods support. In particular the role played by the sector in household and local (community) economies, or even sometimes provincial economies, in geographic areas (coastal, river, lakes, floodplain) where fishing is important, can be substantial. The review showed that through direct and indirect food security mechanisms, income and employer multipliers effect, fisheries and related activities (processing and trade) can play a significant and crucial role, especially for the poorest households who depend more heavily on these activities for their livelihoods.

Even at those micro- or meso-levels, however, the exact role of the sector will still vary greatly, depending on a series of contextual factors – including the resource status (e.g. underexploited or overexploited) and other micro-economic factors such as the households' access to credit and financial facilities, or their wealth level. Equally important is the *nature* of the poverty alleviation mechanisms considered. For illustration, while the poverty *reduction* capacity (generation of wealth and creation of rent) of a local fishery might be substantial, it is usually so only when the access to the fisheries is limited, therefore benefiting only a few. In contrast, it is often the case that small-scale fisheries provide vital poverty *prevention* mechanisms (through welfare function and safety-net mechanisms). This poverty prevention function does not necessarily generate large revenues or wealth but allows a large number of resource-poor and/or vulnerable households in rural communities to survive both economically and nutritionally. In fact for the majority of these households, small-scale fishing, processing and/or trading represent only part-time activities that complements (or are complemented by) other activities, as part of a diversified livelihood strategy that aims at minimising individual household risks in a economic, political and climatic uncertain environment.

In this respect, a key question is the identification of the economic and socio-institutional conditions under which it would become advisable to promote a shift from a poverty prevention situation – where fishing activities sustain a large number of poor, but result in relatively low productivity rates- to a situation of poverty reduction where wealth and economic rent would be extracted – essentially through higher capital-intensive technology and restricted access. This is key policy-issue which deserves much more attention that it has received so far. In that respect, an increasing number of

researchers, based on their field experience, strongly doubt about this possibility and warn us against the social and economic impacts of such a policy orientation (e.g. Jul-Larsen *et al*., 2004). They argue that small-scale fisheries in developing countries are much more crucially needed to mitigate economic uncertainty and prevent negative poverty impacts than to support or generate economic growth. In their view, stressing the safety net role of the sector should remain central if one wishes to focus on the very poor.

6.2 Last few words

Overall, the review shows that the poor quality of the statistical data prevents us from drawing any general (and widely applicable) conclusions. Using the very few case-studies or data that are available would be inappropriate and may generate unrealistic expectations. We need more data to be able to build a more accurate picture and get more rigorous and convincing arguments about the crucial role that small-scale fisheries can play for resource-poor households along the coastlines and in inland areas where these activities take place. However at the present time this hard-core data is lacking. For illustration the estimate of the number of people who depend directly or indirectly on fish for their livelihood in the world is still unknown and the few figures which are proposed in the literature are probably largely under-estimating the exact number. In this respect, we would like also to recall the initial comment made in the very first part of this document, namely that the (large) number of poor and unskilled people engaged in a given economic activity does not necessarily induce that this activity has strong poverty alleviation capacities. In fact as this review has highlighted, there is an urgent need, not only to enhance our knowledge about the correct extent to which small-scale fisheries are important, but also to improve our (conceptual and empirical) understanding of the various mechanisms through which small-scale fisheries do participate to poverty alleviation and to the general socio-economic advancement of developing countries. Very little has been done for instance on how small-scale fisheries institutions can indirectly impact upon rural (political) development by strengthening, for instance, local communities' empowerment and gender equity (through women economic empowerment). Likewise, on a more economic side, the multiplier effects of fishing activities in rural economies – and the undeniable role that the sector is subsequently playing as an engine for rural development in many regions of the world through these multipliers effects are still not quantified.

In the absence of such information it will remain extremely difficult to raise the profile of small-scale fisheries and to attract the attention and support of the decision-makers and donors.

REFERENCES

Aarnink, N. & Van Zwieten, P. 2003. *Lake Mweru is our Bank*. LEISA Magazine, 19(3): 10-12.

Agarwal, B. 1985. Work participation of rural women in the Third World: Some data and conceptual biases. Economic and Political weekly, 20(51-52): A155-A164.

Agrawal, A. & Gibson, C. 1999. Enchantment and disenchantment: the role of community in natural resource conservation. World Development, 27(4): 629-649.

Ahmed, M., Navy, H., Vuthy, L. & Tiongco, M. 1998. *Socio-economic assessment of freshwater capture fisheries in Cambodia.* Report No.185. Phnom Penh, Cambodia. Mekong River Commission, Department of Fisheries and DANIDA.

Allison, E. 2004. *The fisheries sector, livelihoods and poverty reduction in Eastern and Southern Africa.* In: Ellis, F. & Freeman, A. (eds.). Rural livelihoods and poverty reduction policies. London: Routledge, forthcoming.

Allison, E. & Ellis, F. 2001. The livelihoods approach and management of small-scale fisheries. Marine Policy 25: 377-388.

Anon. 2000. Communication from the Commission to the Council and the European Parliament. COM(2000) 724. Brussels: European Commission, 20 p.

Asesina, A. & Rodrik, D. 1994. *Distributive policies and economic growth*. Quarterly Journal of Economics, 109: 465-490.

Ayeni, J. & Mdaihli, M. 1998. *Conservation and management of Kainji Lake Fisheries: a community-based approach*. In: Gauler, M (ed.) Strategies for wise of wetlands: Best practices in participatory management. Dakar, Senegal: November 1998. Proceedings of the 2nd International Conference on Wetland and Development.

Bailey, C. & Jentoft, S. 1990. *Hard choices in fisheries development*. Marine Policy July: 333-344.

Baland, J-M. & Platteau, J-P. 1996. Halting degradation of natural resources - Is there a role for rural communities? Oxford. Clarendon Press.

Baulch, B. 1996. *The new poverty agenda: a disputed consensus*. IDS Bulletin 27(1). Brighton, University of Sussex: Institute of Development Studies, 1-10 p.

Beck, T. & Nesmith, C. 2001. Building on poor people's capacities: the case of common property resources in India and West Africa. World Development 29(1): 119-133.

Béné, C. 2003. When fishery rhymes with poverty, a first step beyond the old paradigm on poverty in small-scale fisheries. World Development 36(1): 945-975

Béné, C., Neiland, A., Jolley, T., Ladu, B., Ovie, S., Sule, O., Baba, O., Belal, E., Mindjimba, K., Tiotsop, F., Dara, L., Zakara, A. & Quensiere, J. 2003. *Inland fisheries, poverty and rural livelihoods in the Lake Chad Basin*. Journal of Asian and African Studies. 38(1): 17-51.

Berkes, F., Feeny, D., McCay, B. & Acheson, J. 1989. *The benefits of the commons*. Nature 340: 91-93.

Berkes, F., Mahon, R., McConney, P., Pollnac, R., & Pomeroy, R. 2001. *Managing small-scale fisheries, alternative directions and methods.* Ottawa: International Development Research Center.

Broca, S. 2002. *Food insecurity, poverty and agriculture: a concept paper*. Rome: Food and Agriculture Organization - Agriculture and Economic Development Analysis Division.

Carley, M. & Christie, I. 1992. *Managing sustainable development.* London: Earthscan Publications Ltd.

Carney, D. 1999. *Livelihoods approaches compared*. London: Department for International Development.

Chambers, R. 1983. Rural development: putting the last first. London: Longman.

Chambers, R. 1989. *Editorial introduction - Vulnerability: how the poor cope*. IDS Bulletin 20(2), Brighton: Institute of Development Studies, University of Sussex.

Chauveau, J-P. & Jul-Larsen, E. 2000. *Du paradigme halieutique à l'anthropologie des dynamiques institutionelles*. In: Chauveau, J-P., Jul-Larsen, E. & Chaboud, C. (eds.) Les pêches piroguières en Afrique de l'ouest: Pouvoirs, mobilités, marchés. Paris: Editions Karthala, IRD, CMI, pp.9-85.

Coates, D. 2002. *Inland capture fishery statistics of Southeast Asia: Current status and information needs*. FAO, Regional Office for Asia and the Pacific, Bangkok, Thailand. Food and Agriculture Organization.

Cochrane, K. 2004. *To help the world troubled oceans, deeper problem must be addressed*. FAO NewsRoom, 5 May 2004, Food and Agriculture Organization (available at www.fao.org/newsroom/en/news/2004/41389/).

Coleman, D. & Nixon, F. 1985. *Economics of change in less developing countries.* Oxford. Philip Allen.

Copes, P. 1989. *Why are fishing incomes often low?* A critical review of the conventional wisdom. Discussion Paper 21/89-1, Burnaby, Canada:, Institute of Fisheries Analysis, Simon Fraser University.

Couty, P. & Duran, P. 1968. *Le commerce du poisson au Tchad*. Paris. Office de la Recherche Scientifique et Technique Outre-Mer (ORSTOM), 249 p.

Deininger, K. & Squire, L. 1998. *New perspectives on old issues: inequality and growth*. Journal of Development Economics 57(2): 259-287.

De Janvry, A. 1994. *Farm non-farm synergies in Africa: discussion*. American Journal of Agricultural Economics 76: 1183-1185.

Delgado, C., Hazell, P., Hopkins, J. & Kelly, V. 1994. *Promoting intersectoral growth linkages in rural Africa through agricultural technology and policy reform*. American Journal of Agricultural Economics 76: 1166-1171.

Delgado, C., Hopkins, J. & Kelly, V. 1998. *Agricultural growth linkages in sub-Sahara Africa*. IFPRI Research Report No.107, Washington DC: International Food and Policy Research Institute.

Delgado, C., Wada, N., Rosegrant, M., Meijer, S. & Ahmed, M. 2003. *Fish to 2020: Supply and demand in changing global markets.* Washington DC: International Food Policy Research Institute.

Durand, J.R., Lemoalle, J. & Weber, J. 1991. *Research and Small-Scale Fisheries.* Symposium International ORSTOM-IFREMER. Montpellier, 3-7 July 1989: 2 vol.

Eldin, M. & Milleville, P. 1989. *Le risque en agriculture.* Paris: Edition de l'ORSTOM.

FAO. 1997. *Number of fishers*. FAO Fisheries Circular No. 929. Rome, FAO.

FAO. 1999a. *Guidelines for the routine collection of capture fisheries data*. FAO Fisheries Technical Paper No. 382. Rome, FAO.

FAO. 1999b. *World fisheries trade and some emerging issues*. Trade Issues FAO Fact Sheets. Rome, FAO.

FAO. 2001. *Annual Production Statistics*. Rome, FAO Fisheries Department (available at www.fao.org/fi/statist/statist.asp).

FAO. 2002. *The State of World Fisheries and Aquaculture - Fisheries resources: trends in production, utilization and trade*. Rome, FAO.

FAO. 2003. *Strategies for increasing the sustainable contribution of small-scale fisheries to food security and poverty alleviation.* Committee on Fisheries, 25th Session, Rome, FAO. 12 p.

FAO. 2004. *Fisheries country profiles*. Rome, FAO. (available at www.fao.org/fi/fcp/fcp.asp,).

FAO. 2005. *Increasing the contribution of small-scale fisheries to poverty alleviation and food security*. FAO Technical Guidelines for Responsible Fisheries No. 10. Rome, FAO. 79 p.

FAO/Advisory Committee on Fisheries Research. 2004. Working Party on Small-scale Fisheries. Bangkok, 18-21 November 2003. FAO Fisheries Report No. 735. Rome, FAO. 21 p.

FAO-DFID. 2003. *Report of the Consultation on Integrating Small-Scale Fisheries in Poverty Reduction Planning in West Africa*. GCP/INT/735/UK, Cotonou, 12-14 November 2002. (available at http://www.sflp.org/eng/003/ongoingact4.htm).

FAO Fisheries Policy and Planning Service. 1974. *Directory of subsidiary bodies of the FAO regional fishery councils, commissions and committees.* FAO Fisheries Circular No. 316. Rome, FAO. 49p.

FAO-SOFIA. 2003. *The state of food insecurity in the World (SOFIA 2003).* Rome, FAO. 36 p.

Feeny, D., Berkes, F., McCay, B. & Acheson, J. 1990. *The Tragedy of the Commons: twenty years later*. Human Ecology 18 (1): 1-19.

Friedmann, J. 1992. Empowerment: the politics of alternative development. Oxford: Blackwell.

Gill, G., Farrington, J., Anderson, E., Luttrell, C., Conway, T., Saxena, N.C. & Slater, R. 2003. *Food Security and the Millennium Development Goal on Hunger in Asia*. ODI Working Paper 231, London: Overseas Development Institute.

Gnimadi, C. 2004. Gender and Organisational Development. Practical guide of the SFLP for the creation of the gender strategy to help community organisations in the fishing community of Agbodjedo in Benin. In: Bennett, E., Rey Valette, H., Yacouba Mäiga, K., & Medard, M. (eds.). Room to manoeuvre: gender and coping strategies in the fisheries sector. European Commission Contract No. ICA4-2002-50034.

Gordon, D. 2003. *Technical change and economies of scale in the history of Mweru-Luapula's fishery* (Zambia and Democratic Republic of Congo). In: Jul Larsen, E., Kolding, J., Overa, R., Nielsen, J.R. & Van Zwieten, P. (eds.) Management, co-management or no management? Major dilemmas in Southern African freshwater fisheries. Food and Agriculture Organization, pp. 164-178.

Hardin, G. 1968. *The tragedy of the commons*. Science 162: 1243-1248.

Hoggarth, D.D., Cowan, V.J., Halls, A.S., Aeron-Thomas, M., McGregor, J.A., Garaway, C.A., Payne, A.I. & Welcome, R.L. 1999. *Management guidelines for Asian floodplain river fisheries.* Part 1. A spatial, hierarchical and integrated strategy for adaptive co-management. 384/1, Rome: FAO, DFID, and MRAG.

Horemans, B.W. & Jallow, A.M. 1997. *Report of the Workshop on Gender Roles and Issues in Artisanal Fisheries in West Africa*. DAF/WP/97, Lomé, Togo, 11-13 December 1996: Programme for the Integrated Development of Artisanal Fisheries in West Africa. 47 p.

ICLARM. 1999. *ICLARM's Strategic Plan 2000-2020*. Draft, Manilla, Philippines: International Center for Living Aquatic Resources Management.

Jarairy, I., Alamgir, M. & Panuccio, T. 1992. *The state of world rural poverty: an enquiry into its causes and consequences*. New-York: International Fund for Agriculture Development (IFAD).

Jere, J. & Béné, C. 2004. *Assessing the potential for a fishery component in the Zambia Initiative*. Report of the Evaluation Mission on the Zambia Initiative (Government of Zambia - UNHCR) in Western Province. Cairo: WorldFish Center, 45 p.

Jul Larsen, E. 2003. *Analysis of effort dynamics in the Zambian inshore fisheries of Lake Kariba.* In: Jul Larsen, E., Kolding, J., Overa, R., Nielsen, J.R. & Van Zwieten, P. (eds.) Management, co-management or no management? Major dilemmas in Southern African freshwater fisheries. Food and Agriculture Organization, pp. 232-251.

Kassibo, B. 1996. Etude des pêcheurs migrants maliens des retenues agro-pastorales de Côte d'Ivoire. multigr.

Klasen, S. 2001. *In search of the Holy Grail: how to achieve pro-poor growth?* Paper commissioned by GTZ for the "growth and Equity" Task team of the Strategic Partnership with Africa, Munich: University of Munich, 30 p.

Kurien, J. 2004. *Fish trade for the People*. Draft report on the impact of international trade on fisheries products on food security, Rome: Food and Agriculture Organization and Royal Norwegian Ministry of Foreign Affairs.

Lawson, R. 1977. New direction in developing small-scale fisheries. Marine Policy 1(1): 45-51.

Lipton, M. 1997. *Editorial: Poverty - Are they holes in the consensus?* World Development 25(7): 1003-1007.

Lipton, M. 2001. Challenges to meet: food and nutrition security in the new millennium. Proceedings of the Nutrition Society 60: 203-214.

Macfadyen, G. & Aeron-Thomas, T. 2001. *The costs and benefits of Bagda shrimp farming in Bangladesh*. BCAS Report, DFID IV Fisheries Project.

Maxwell, S. 2001. *WDR 2000: is there a new "new poverty agenda"?* Development Policy Review 19(1): 143-149.

McGoodwin, J. 2001. *Understanding the cultures of fishing communities - a key to fisheries management and food security*. FAO Fisheries Technical Paper No.401, Rome: Food and Agriculture Organization, 287 p.

Neiland, A. & Béné, C. (eds.). 2004. *Poverty and small-scale fisheries in West-Africa.* Dordrecht: Kluwer Academic Publishers and the Food and Agricultural Organization.

Ninnes, C. 2004. *Improving the collection, analysis and dissemination of information in small-scale fisheries.* Bangkok, Thailand 18-21 November 2003: Food and Agriculture Organization, Advisory Committee on Fisheries Research - Working Party on small-scale fisheries.

OECD. 2001. *Development Action Committee's Guidelines on poverty reduction.* Paris: Organisation for Economic Cooperation and Development.

Ostrom, E. 1990. Governing the Commons: the evolution of institutions for collective actions. Cambridge: Cambridge University Press.

Pittaluga, F. 2002. Preliminary identification of target beneficiaries among communities of full-time or part-time artisanal fishers residing on Ivory Coast's coastal areas and inland water bodies. Rome: Food and Agriculture Organization, Sustainable Fisheries Livelihoods Programme in West Africa, 11p.

Pollnac, R., Pomeroy, R. & Harkes, I. 2001. *Fishery policy and job satisfaction in three southeast Asian fisheries*. Ocean and Coastal Management 44: 532-544.

Pomeroy, R. & Williams, M. 1994. *Fisheries co-management and small-scale fisheries: a policy brief*. 15, Metro Manilla, Philippines: ICLARM.

Ravaillon, M. & Datt, G. 2000. *When is growth pro-poor?* mimeo., Washington DC: World Bank

Ray, D. 1998. *Development Economics.* Princeton: Princeton University Press.

RGC. 2002. *Cambodia: National Poverty Reduction Strategy*. (draft) Phnom Penh: Royal Government of Cambodia.

Rubinoff, J. 1999. *Fishing for status*. Women's Studies International Forum 22(6): 631-644.

SADC. 2003. Report on the importance of marine fisheries to coastal community livelihoods in SADC countries. Final report, Southern Africa Development Community, 12 p.

Safina, C. 1995. *The world's imperiled fish*. Scientific American November: 46-53.

Sana, B. 2000. *Systèmes d'aménagement traditionnels des pêches et leur impact dans le cadre de la lutte contre la pauvreté sur les petites pêcheries lacustres du sud-ouest du Burkina Faso*. (Report of the Seminar on livelihoods and inland fisheries management in the Sahelian zone), Ouagadougou, Burkina Faso, 03-05 July 2000: 115-128 p.

Sen, A. 1981. *Poverty and famines: an essay on entitlement and deprivation.* Oxford: Clarendon Press.

Sen, A. 1996. *Economic interdependence and the World Food Summit*. Development 4: 5-10.

Shaffer, P. 1996. *Beneath the poverty debate, some issues. Understanding poverty*. IDS Bulletin 27(1), Brighton, University of Sussex: Institute of Development Studies, 23-35 p.

Smith, I. 1979. *A research framework for traditional fisheries*. 2, ICLARM Studies and Reviews, Manila: ICLARM.

Thomas, D. & Adams, W. 1999. *Adapting to dams: agrarian change downstream of the Tiga dam*, Northearn Nigeria. World Development 27(6): 919-935.

Thompson, P.M. & Hossain, M. 1998. *Social and distributional issues in open water fisheries management in Bangladesh.* In: Petr T (ed.) Inland fishery enhancements. FAO Fisheries Technical Paper 374, Food and Agriculture Organization and UK Department for International Development, pp. 351-370.

Thomson, D. 1980. *Conflict within the fishing industry*. NAGA, ICLARM Quarterly July: 3-4.

Thorpe, A. 2004. *Fishery sector incorporation in National Development and Poverty Reduction Strategies, policies and programmes: current situation and opportunities.* Draft report, Rome, FAO.

Tieze, U., Groenewold, G. & Marcoux, A. 2000. *Demographic change in coastal fishing communities and its implications for the coastal environment*. FAO Fisheries Technical Paper No. **403. Rome, FAO. 151p.**

Turpie, J., Smith, B., Emerton, L. & Barnes, B. 1999. *Economic value of the Zambezi Basin Wetlands. Cape Town.* IUCN Regional Office in Southern Africa, 346p.

Van der Wall, B. 2000. Fish as a resource in a rural river catchment in the Northern Province, South Africa. African Journal of Aquatic Science 25: 56-70.

Williams, M.J., Chao, N.H., Choo, P.S., Matics, K., Nandeesha, M.C., Shariff, M., Siason, I., Tech, E. & Wong, J.M.C. 2002. *Global Symposium on Women in Fisheries*. 29 November 2001. Kaohsiung, Taiwan. Sixth Asian Fisheries Forum. 209p.

Williams, S. & Awoyomi, B. 1998. *Fish as a prime-mover of economic life of women in a fishing community*. Tromso, Norway. 8-11 July 1998. Proceedings of the IIFET Conference.

Wilson, J., Muchave, P. & Garrett, A. 2002. *Reef livelihoods assessment Mozambique case study.* unpubl. draft, Maputo. Kusi Lda, 64p.

World Bank. 2001. *A revised forest strategy for the World Bank group*. Draft. 30 July 2001, pp.14-15, Washington DC: World Bank.

World Bank. 2004. *Millennium Development Goals* (available at http://www.developmentgoals.org/, Washington DC: World Bank.

World Bank. 2004. *One World, One Ocean. It's time to save it*. Media Center 4. June 2004 release, Washington DC: World Bank (available at http://web.worldbank.org/website/external/devnews).

World Bank. 2004. *Saving Fish and Fishers: towards sustainable and equitable governance of the global fishing sector*. Report No. 29090-GLB, Washington DC: World Bank, Agriculture and rural development Department, 93 p.