Successful Small-scale Fisheries, Some Global Lessons of Experience, Past and Present

Introduction

ICLARM has estimated that some 51 million people are involved in the catching and processing of fish around the world. Over 95% of those people are involved in small-scale fisheries; catching or processing fish in developing countries, and some 80% work in Asia. It has been estimated that small-scale fisheries produce about 40% of the world’s marine and inland fish-catches. However, decision makers and political interests with responsibilities for the sector in most countries, or academia for that matter, hardly give small scale fisheries the attention or commitment it deserves. As a result, we know much less about what makes small-scale fisheries effective and sustainable compared to industrial fisheries in temperate waters.

Although FAO and some international projects and research programs - the Bay of Bengal Program and the World Fish Center, the former ICLARM, come to mind – have produced a lot of specialist technical literature about small-scale fisheries in South and East Asia and Africa, the obvious importance and critical source of income, protein and employment of small-scale fisheries in rural coastal areas around the world does not become apparent when one reviews fisheries literature and research in general. Governance of small-scale fisheries and restructuring over-committed fisheries are subjects about which very little has been published. Most fisheries libraries still overwhelmingly focus on industrial fisheries, fisheries management issues and fish stocks mostly in temperate water. Few institutions provide global or regional information about the current status of many coastal fish resources, the health of most small-scale fisheries, or assess their future. There is only a modest literature analyzing the successes and failures of small-scale fisheries, and the critical factors that may explain long-term success.

The unfortunate state of affairs in libraries applies equally to the attitude of most politicians and fisheries administrators. Their interest in and willingness to deal with small-scale fisheries is often limited, in large part because of a lack of knowledge and a ‘gut feeling’ that small-scale fisheries are even more difficult to deal with than industrial fisheries. Political considerations, and a realization that ‘adjusting’ the small-scale fishery sector is a long-term and potentially politically charged affair make fisheries administrators in developing country particularly reluctant to do something about badly managed coastal fisheries. Others believe the market will determine the future of the sector, and there is no need to substantially interfere.

This presentation essentially tries to explain, through examples from all around the world and from different periods in history, what critical attributes enabled small-scale fisheries to thrive for long periods of time, and what may cause their destruction. I will argue that about 10 attributes play a critical role as conditions for ensuring such long-term sustainability; small-scale fisheries become increasingly unstable when these conditions are no longer being satisfied. Eventually they may collapse.

Secondly, I will imply, but not discuss in detail, that the prevailing economic religion that particularly has been promoted around the world by the US, the IMF, the World Bank and some
of their Reaganesque supporters – a fundamentalist laissez-faire environment, open markets, market determined pricing, unregulated trade and investment flows, open access to resources and unregulated labor - will destabilize and eventually destroy most small-scale fisheries. Hence, successful small-scale fishery governance would require a sector policy, sector strategy and regulatory environment to enable the sector to function with most of the 10 attributes supporting the stability and sustainability of the sector. Effective management of small-scale fisheries requires a close interplay between the private sector and the Government at the local and national level and careful planning of their roles. Not a Marxist mechanical plan, but a carefully designed set of actions to nudge the sector in the right direction, involving all policy, tax, institutional, legal and even public relation tools available. Although I will not address this subject in this presentation – it is a nice subject for another presentation - it is of critical importance for the future of all small-scale fisheries in the world to realize that fisheries needs to be governed carefully, and that the public sector needs to play a critical guiding, supporting and protecting role. Any belief that small scale fisheries can function in an environment of benign neglect, as is happening all over the world, may be politically and administratively convenient, but is intellectually dishonest, morally wrong, and very dangerous for the future of the sector and the fishermen involved in it.

What are the 10 key attributes that condition the long-term success of a small-scale fishery:

- Static exploitation levels of local stocks, at levels well below biologically optimal levels;
- A carefully analyzed selection of technology, and of its improvements;
- Controlled investment;
- Controlled entry and exit of labor, and careful organization of fishermen at the local, and at the regional and national level;
- Effective Governance that provides:
  1. Protection of local small-scale fisheries, and control of all other fisheries activities that operate in its vicinity;
  2. Support functions (research, extension) at the local, regional and national level;
  3. Local leadership, with sufficient background and experience – or access to externally available knowledge - to handle the political, cultural, financial, scientific and technical aspects of governance activities, conflict management, and sector planning;
- A direct, stable link between production of fish and processing/marketing, with preferably negotiated transfer prices; and (desirable)
- A global system identifying fish produced by sustainable small-scale fisheries, and providing premium prices for such products to producers.

Disclaimer

History is a very funny science – a Dutch author once suggested historians actually engage in a science that examines a frozen over, snowed under, lake. They remove the snow from a few square feet, gaze at the opaque ice, and are often not even able to assess the thickness of the ice, let alone what happens beneath it. Too much of what happened in the past in fisheries is also colored by our perception of what ought to have happened, or our own selective interpretation of
what we remember from the past. We have struggled at least since the early 1950s to determine
whether the theory of a purely biological or - a decade later – economic approach to fisheries
management was supported by reality, notably in small-scale fisheries. Many of us got carried
away by the elegance of theories, and interpreted the signs below the ice as we deemed fit. The
validity of these traditional dogmas started to be questioned in the late 1970s, but it appears
much of it came too little and too late. Countless fishery administrators and politicians world-
wide still believe in some of the ‘old’ production optimizing religion.

Even events that we are directly involved in – I personally observed some of the examples that
follow – may have created a very different impression in somebody else. So the following
sample of examples is neither scientific nor complete, the first example was added just for fun,
and the interpretations are all mine.

A Brief History of Small-scale Fisheries

The Rift Valley
This first example is a bit of a teaser, but I thought it may be less far fetched that some of you
may think. During the time that Homo sapiens did not exist yet, other types of hominids already
inhabited the Rift Valley in Africa. According to scientific analysis of bones and sculls
remaining from that period, a relatively rapid development of the brain mass of these hominids
occurred – it may have taken a couple of hundred thousand years. According to British
nutritionists this brain development was probably based on the consumption of fish, particularly
by pregnant and lactating mothers and by small children. Obviously, around lake Victoria and
lake Malawi these early hominids developed a small-scale fishery that was sufficiently effective
to have lasted several hundred thousand years. This must have been the earliest small-scale
fishery in the world, and it effectively lasted until 50 years ago, when modern equipment
introduced by colonial authorities – with the best intentions – lead to rapid decline of local fish
resources and the virtual collapse of some stocks in parts of the lake. What may have been the
characteristics of that fishery? Obviously a rather primitive technology, possibly with log based
rafts or originally probably limited to shore based fishing. Some of the key conditions I
mentioned earlier may also have existed: limited production directly linked to obviously very
modest local market, and some form of governance that enabled those in need to consume fish.
But now I am trying to look through snow covered ice, and there is not much to see.

Egypt
Egypt’s river based small-scale fishery is about 6,000 years old. It is also unusually well
documented; if you visit the large Egyptian Museum on Midan elTahrir in Cairo, you can see
pictures, statutes, and models of boats and fishing gear employed since some 4,000 years BC,
mostly on the Nile. What struck me when I looked at the contemporary Nile river fisheries about
5 years ago was that this small-scale fishery has demonstrated very modest technical innovation
over the past thousands of years; currently applied technologies use different materials – steel
hooks and monofilament nets – but the basic catching technology of hook and line, gillnets and
traps has changed surprisingly little. The Nile is not a particularly small river, but since fish and
wildlife must have been the main sources of protein during much of the past 60 centuries, it is
more than pure conjecture to assume some kind on governance system linking production and marketing must have existed in the past to ensure adequate and regular supplies of fish. Biologists may point to the large marshes in Sudan that may have provided the Nile with what may have been perceived as inexhaustible fish resources, but I believe the catching and marketing of mainly fresh fish must have been well organized to avoid large losses in the intense heat in the summer. Similarly, like much else in the public sector dominated economy of Egypt, prices of fish (like those of basic staples like rice) have been controlled for a very long time, even during the ottoman Turks and some have only recently have been ‘liberated’.

The future looks rather bleak for this fishery; chemical pollution has reduced the fish resources in the Nile and vast network of irrigation canals, to the point that eating locally produced freshwater fish is a proven health hazard.

**The Netherlands**

**Middle Ages**

Before Holland acquired the shape it has right now, it was basically a water-logged delta, with innumerable lakes, rivers, water connections and marsh areas. During the early middle ages the area was already quite heavily populated, notably the sandy ridges that would not flood as part of tidal movements; most areas were not yet protected by dykes. The area was ruled by Dukes and assorted other rulers, while some cities were having some independence and city privileges. The river mouths and shallow lakes were ideal for fish spawning, and the few descriptions of fish resources from that period suggest Holland’s coastal areas may well have been one of the richest fishing grounds in the area. Fishing was common everywhere, mostly limited to coastal areas, and carried out by small sailing boats and gear of which the principles did not change much over the next 5-600 years.

Fishing was subject to al kinds of restrictions and licenses. Rulers and cities discovered the advantages of rent ‘sharing’ quickly, and fishing became a long-term source of public revenue and – for the rulers - private benefits. The number of fishermen was not only limited through licenses and permits; many cities issued more detailed restrictions to limit fishing during certain spawning periods, but mainly to limit the supply of fish and assure its quality at any one time on local markets. The Dutch climate is so wet that fish drying is out of the question during most of the year. Salt was in very short supply, so, most fish had to be handled fresh, smaller quantities were smoked, and storage was virtually impossible.

All this changed when in the early fifteen century fellow called Willem Beukelsz of a small fishing village called Biervliet found a way to preserve gutted herring in wooden casks on salt for up to a year. That eventually led to the creation of an entirely different ‘industrial’ fishery covering most of the North Sea, producing ever-increasing amounts of salted herring. This fishery in turn provided the Netherlands with its earliest and most effective trading advantage. It enabled the country to start bartering salted herring – and some other agricultural products, like butter - for wood and grain from the Baltic, and wine and salt from France. Fish catching, processing and trade fuelled the early phases of the country’s ascendancy as the prime economic power in Europe during the 17th century. Fisheries during this Dutch ‘Golden Century’ was one of the key engines of economic growth and wealth, and provided the pool of trained labor for its
dominant merchant marine fleet. In addition, salted herring provided the critical protein source that enabled Dutch vessels to eventually sail to the Dutch East Indies, but that is another story. Most small-scale fisheries remained coastal and traditional, though, and focused on local markets employing traditional technology. In fact most technology changes involved improvements in vessels, safety and fish preservation; few improvements in efficiency took place. Local communities often developed their own type of vessel and gear, but such differentiation did not lead to major differences in efficiency.

The trade in fish and herring – the Dutch still differentiate between fish and herring – was tightly controlled during the middle ages, and even during the golden age; quality, quantities that could be caught and landed and most prices were determined locally. The number of licenses was restricted, and technology and crew were tightly defined by key cities. These fisheries basically survived until the Zuider Zee was closed off during the 1930s, and became the IJssel Lake. Until that time, coastal fisheries around the Zuider Zee supplied most of what is now the Eastern part of the Netherlands with fish, mainly through weekly markets and a highly traditional marketing system run by a limited number of fish merchants, mostly based in coastal towns with a coastal fishery.

Herring and Flatfish Fisheries Today
Fast forward to 2003. This example does not involve small-scale fisheries, but the two examples of modern Dutch industrial fisheries illustrate a key aspect of what I consider successful fishery management: the critical link between production and marketing. Since the 1970s the four major Dutch herring companies developed – with substantial subsidies from the EU and tax concessions from the Dutch Treasury – the largest fleet of super pelagic trawlers in the world. That fleet started out fishing for herring, but when herring stocks declined - a sign of the destructive impact of subsidy-enhanced production oriented EU and local policies - they soon switched to the large stocks of blue whiting and mackerel for export to Africa. The capacity of the remaining Dutch vessels fishing for herring declined, and eventually most herring for the Dutch market was caught by Danish, Swedish and Norwegian vessels.

The Dutch market for herring is unique. Since the late Middle Ages the Dutch have eaten salted herring, a slightly fermented product of fatty 2 year old –not yet mature – herring caught from May to September, notably in the sea area between Denmark and Norway, and between Norway and Scotland. The Dutch eat herring all year, mainly as a snack or as part of lunch. Demand for herring is very well documented, and fluctuates mainly with temperature and rainfall. When freezing became the preferred type of preservation in the 1960s, the practices of processing herring on board changed. Herring was now caught, frozen at sea, landed, thawed-out, gutted – leaving the pancreas in the belly cavity for fermentation – re-frozen and then distributed to the 2000 Dutch herring retailers. The four major herring firms largely withdrew from catching herring in the 1980s, but remained involved in the more profitable processing and distribution. In the mid-1990s the four companies made a deal with Norwegian, Swedish and Danish fishermen to catch herring for them, and with Danish processors to handle the gutting. Since then these fishermen have caught specific amounts of herring for the Dutch wholesalers; these amounts are determined weekly at a Friday morning ‘coffee’ meetings, where the companies meet with the representatives of the fishermen. This way the Dutch market gets just enough herring to satisfy demand, while avoiding the costs of big buffer stocks and losses. Transfer prices are mutually
agreed, the four companies have an incentive to slightly undersuply the Dutch market to let retail prices inch upward without unduly worrying the Dutch and EU competition authorities. Holland has also become the premier producer of flatfish from the North Sea after the Second World War. Its fleet of beam trawlers is the most modern and most powerful in the world. This fleet operates mainly from about 4 traditional fishing villages with a population with mostly rather fundamentalist Christian religious beliefs. Using local ‘producer organizations’ that regulate participation in the fishery – and since the 1980s introduction of EU quota arrangements, the distribution of quota – after some initial mistakes the Dutch have been able to avoid some of the excesses of over-investment over the past 20 years, despite rather questionable tax and subsidy arrangements that until recently continued to encourage over-investment and over-capacity. The fleet has been declining since the early 1980s, forced in part by the EU’s policies to reduce overall fishing efforts, and facilitated by a growing market for second hand Dutch beam trawlers in Ireland and the UK.

The decline of the Dutch fleet helped to keep the Dutch caught flatfish being the most profitable product of the sector, with a European wide market. But the main reason is that 80% of the transport and marketing of flatfish in Europe is handled by Dutch wholesale and transport companies, many of whom originate from or have family linkages with the same four fishing villages that are home much of the Dutch beam trawler fleet. These fish wholesale companies also dominate the auctions where flatfish is being auctioned, and hence control prices – which have substantially increased over the past decades. This informal linkage between production and marketing appears the key reasons why this fishery, despite initial over-investment, is still relatively healthy. The other reason is that fishermen producer organizations have been relatively well organized, and increasingly effective in influencing fishery policy at the national and EU level.

**Indonesia /Philippines**

Now back to real small-scale fisheries. Indonesia and the Philippines have some of the most intensive and well-studied small-scale fisheries in the world. The Dutch colonial administration prepared dozens of studies of specific fisheries even during the early 1900s. ICLARM has studied small-scale fisheries in the Philippines for decades. Three groups of small-scale fisheries can be identified in these countries: those that have been least effected by external pressures, those that are being destroyed by external pressures, and those that have managed to survive by changing the parameters of their governance and management system.

Examples of the first group can still be found, notably in the eastern and northern part of Indonesia and in a few of the outlying islands of the Philippines. Examples for the second group are common, and can be found in most coastal waters, while the third group has only a few successful examples.

I have had an 80year old book describing a small-pelagics fishery from Bawean Island, north of Java in the Java Sea, issued by the colonial fisheries administration. It describes in minute detail the crew share and ownership arrangements, technology, catches, processing, marketing and pricing arrangements. The fishery is simple; during the season fishermen swimming in the water are guiding small schools of small-pelagics towards a stationary net using palm leaves. After the
fish is caught it is cooked in tin cans with salt, and sold on the mainland as ‘pindang’ a product that can be kept for several months. Local Chinese merchants buy the product and arrange for its transportation by sailing vessel and further distribution in Java. This happened 80 years ago and still happened in 1975, when I visited the island; the product was still being shipped, be it by motorized transport boat and not by sailing prahu.

Indonesia and Philippines still have some coastal small-scale fisheries where fishermen use a traditional technology to supply a traditional market through a traditional set of intermediaries who handle the marketing and provide credit. The system has been destroyed or is falling apart in many places, and has a bad name in some quarters. It is considered exploitative, and few agree without reservation a ‘middle-man’ system always works. I believe the system has worked well in those cases where distance, isolation, and small local markets for fish made a local fishery essentially a source of subsistence, but unsustainable as a source of income. The marketing/credit link with the outside world created a viable fishery, which, if left alone, has often succeeded in providing a (admittedly meager) living to thousands of fishermen. Indirectly middlemen did some other things right: they often indirectly limited fishing pressure on local stocks by controlling credit for new boats and gear, ensuring the long-term sustainability of the fishery. In addition, the middle-men played a role in solving local disagreements between fishermen. They created markets for surplus fish production, at prices that ensured sufficient demand at the consumption side. They also assumed risks of transport and distribution.

This vision is a bit too optimistic though. Rapidly growing international markets (Tokyo, Hong Kong) and more regularly available sea and air transport to these markets, in combination with newly introduced technologies have been instrumental in creating increased fishing efforts and over-fishing almost everywhere. Cyanide fishing has spread throughout these countries and most of the Pacific, with traders from Hong Kong paying ever-higher incentive payments for local fishermen and traders to supply the Chinese market with live fish, in the process destroying many local fisheries. Greater demand in Indonesia and Philippines itself has also lead to much increased fishing effort. New technology is allowing many more fishermen to move to adjacent areas, disturbing local fisheries, and exceeding the limited ability of local management systems to protect local fisheries.

This process has been going on since the late 1960s, when these small-scale fisheries started being destroyed by a combination of changes in technology, efforts to increase production to satisfy increasing demand, external encroachment – trawlers, cyanide fishing, pollution, unemployed agricultural labor etc. – and the destruction of the prevailing governance system based on fishermen having long-term relations with middlemen. As a result most fisheries currently provide an ever-smaller income to ever growing numbers of small-scale fishermen – many of whom originally started out as agricultural laborers – at ever-lower prices. Coastal fish resources are being depleted and sometimes destroyed, despite the fact that the Java Sea, the Sulu Sea and related areas could be some of the most productive in the world.

One of the many reasons for this sad state of affairs is the replacement of the traditional single middle-man arrangements by alternatives, for example by auctions, the operations of ‘foreign’ traders seeking live fish or multi-trader arrangements in areas where competition for the landed catch is often limited. Most traders are able to control these auctions and market places and
fishermen are generally not well organized to handle the preservation and distribution themselves. The traditional marketing linked credit arrangements are often replaced by a different system of *ad-hoc* loans for boats and gear from suppliers or public credit sources, or from private moneylenders with few linkages to fisheries.

In a few cases have small-scale fisheries been successfully transformed. In what started out as a small long-line tuna fishery from Bali, based on imported Taiwanese technology, Indonesian interests have now developed a large local tuna fishery based on locally developed technology. Owned by Chinese interests, but crewed by local small-scale fishermen, the fishery targets yellow-fin and skipjack tuna, which are still relatively abundant in this part of the Indian Ocean. It is interesting to note that the linkage with a stable Japanese market has stabilized this fishery and created substantial employment.

In a number of locations in the Philippines successful co-management experiments have been setup, often with the support of NGOs and the public sector, that handle fisheries in specific areas. Some of these co-management experiments have been well documented, and their experience suggests that creating sustainable co-management systems takes a long time, as some of the 10 key conditions for sustainable small-scale fisheries that I mentioned above can not be satisfied or take a long time to arrange.

**The Pacific**

**Small Island Fisheries**

Small island fisheries targeting reef fish have been well documented; these fisheries have historically often been carefully governed by local leaders, notably when fish used to be single basic protein staple in the diet of the island community. The governance of these fisheries applied a variety of management measures. Some focused on protecting the reef environment and controlling catches, others use selected closed fishing areas, and many dealt with the distribution of the catch among the island population. Finally, most islands used to have a specific process to deal with conflicts among fishermen and infractions of the rules, often using a well respected elder to make and enforce decisions.

Most of these regulations and arrangements have been destroyed by a combination of external pressures (population growth, interference of foreign and industrial fisheries) and the gradual reduction of the absolute dependence on locally caught fish by imports, notably of canned fish. Many reef fisheries are no longer in good shape, cyanide reef fishing is one of them, spreading ever further in the Pacific.

**Japan**

**Coastal Fisheries**

Japan has had a well-managed, successful and stable small-scale fishery covering most of its coast for most of the past century. Based on an idea developed by a single individual, the creation of local cooperatives responsible for the management of all fishing, marketing and fish culture activities in a specific area has led to a highly sustainable, quite profitable and stable
small-scale fishing sector. The system enabled the country to develop extremely high quality standards, avoid excessive exploitation of marine resources and the coastal environment, and created several generations of fishermen and cooperative managers with an intricate knowledge of local fisheries and fish culture activities, and the necessary political and management skills to handle increasingly complex cooperative activities. Linked to national markets through an intricate system of several levels of wholesalers and retailers, most cooperatives operate on the basis of virtually fixed quantities of fish being supplied to specific wholesale operators during the year. Cooperatives thus have every incentive to maintain local fish stocks at their most productive level, and achieve income growth through quality improvement and value-added processing. While fishing technology has changed over the years, it is remarkable that these changes have been broadly adopted by virtually all fishermen and not by a lucky few. Similarly to other successful small-scale fisheries, improvements are particularly focusing on the seaworthiness, safety and speed of fishing vessels, reducing operating costs, and improving product quality. There is much more to say about this fishery – IIFET will organize a whole conference on the subject in June 2004 in Tokyo. Let me only mention that one of the biggest problems of this fishery currently is finding sufficient people willing to replace the aging fishermen population; several studies have demonstrated the restructuring of the sector to address critical labor shortages.

I am not suggesting through this example that the world should embrace the Japanese approach to small-scale fisheries governance. The system is based on purely Japanese concepts of corporatism, group loyalty and mutual obligation, capital formation and national and international trade that do not exist anywhere else. However, the Japanese example does show how effective and powerful small-scale fisheries can be if the right dose of governance is being applied. Designing that governance package in other countries is going to be a difficult, but not impossible task once one realizes the purpose of the exercise, and the 10 critical points governance should address.

Other Fisheries

Japan manages its fishing sector on three levels: coastal, provincial and national. Provincial management focuses on small-pelagics and other species that do not remain stationary during most of the year. National management efforts focus on international fisheries, like tuna long-lining. I mention these to highlight the intricate governance system in Japan, which successfully separates different fisheries from each other, ensures research and MCS at all three levels, and in general has institutions and regulations well tuned to local, provincial and national requirements. Japan also has made the decision early on that the costs of this governance system, and the costs of managing the marine environment in a highly responsible way, should in part be paid by the consumer and the State. Hence fish prices are sufficiently high to pay for the intricate marketing system and provide fishermen with a decent income. Much infrastructure and development costs are borne by the state – at various levels. Quality control and research costs are shared between the public and private sector.

Maldives

My last example of a successful small-scale fishery is the tuna fishery in Maldives. I present this example with quite mixed emotions; I was partly responsible for the fishery’s rapid technological development in the 1980s. However, that technological development was not accompanied by
necessary complementary changes in sector management and governance to maintain a stable fishery – my efforts in that direction were thwarted by politics in the World Bank and other donors, including the IMF. So my personal record in Maldives is decidedly mixed.

Maldivian fishermen have caught tuna using pole and line techniques and baitfish for hundreds of years. The fishery was sustainable because skipjack tuna resources were plentiful, the 100,000 or so local inhabitants of the islands provided a reasonably stable local market – they consume tuna with every meal – and Maldives created a market in Ceylon for its surplus catches by processing tuna in a boiled, smoked and sun-dried product called Maldives Fish, which is used as a much sought after condiment in what is now Sri Lanka.

About 200 of the 2000 islands in the Maldives archipelago are inhabited; most island populations only engage in subsistence fishing – the island’s agricultural potential is meager. Some islands are close to areas where skipjack congregate during part of the year, providing splendid opportunities to catch relatively large amounts of fish with limited effort. These islands particularly produced the Maldives Fish, which used to be bought at fixed prices and then collected and transported to Ceylon, during past centuries by representatives of the local ruler, more recently by a single state owned company. In Ceylon the product was sold to a cartel of several local traders. The money earned from this trade was used to buy rice, cooking oil and other necessities to supply the local home market.

This fishery and trading arrangement survived intact for hundreds of years until the Second World War, when war movements caused the country to temporary lose its trading contacts with Ceylon; mass starvation was the result. The second time the system collapsed was when Sri Lanka stopped imports of Maldives Fish during the 1970s for political reasons. After that experience Maldives policy makers decided that the country should not remain dependent on a single export commodity and a single market. They invited Japanese and Korean interests to collect fresh tuna in Maldives from the local fleet, and start a tuna canning operation. In addition they decided to develop a tourism industry.

To adjust the local catching technology to the requirements of a fresh tuna collection system, Maldives started to mechanize its sailing vessels, and developed ‘improved’ designs of the traditional vessel that could be mass produced in a shipbuilding yard. Both actions were highly successful, and ever since the basic problem has been that the fishing fleet out-produced the collection system and the local freezing and storage capacity, despite the expansion of the collection system and the construction of several shore based freezing plants and cold storages. Maldives has successfully prohibited the introduction of modern seine technologies in its EEZ, arguing that small-scale pole and line technology is more efficient and cost-effective than modern seine technology, while providing far more local value added and local employment, while preserving the fishing culture of many outlying islands with few alternative employment opportunities. Population growth, the poor employment outlook and poorly executed economic policies to maintain essential public services in all islands have since the 1970s created a growing migration of families with children to the capital, Male. This migration is costing the country fortunes in creating the space and services to provide an exploding capital population. Policies that would replace the small-scale fishery with modern seine technology would further exacerbate the country’s migration problems.
Maldives has always used a fixed price concept for Maldive fish and the transfer of fresh tuna to foreign collectors, the local canning industry and local freezing plants. There are many reasons for this approach, which, with few exceptions, is still applied today. Similarly, the country decided, after some bad experiences with the foreign collectors, to handle all collection and local freezing/canning by a single, state owned company. Equity, efficiency as well as political – migration - considerations supported this approach, which functioned reasonably well for some 15 years during which Maldives fish production and exports tripled in size.

Maldivian fisheries mainly suffered from inadequate and badly organized collection arrangements, processing capacity constraints, and political interference in the company running the fishery plants. These problems have not been solved, and underline the need for dependable links between fish production and marketing in small-scale fisheries at every stage of development, and the equally important need for transparent governance. Similarly, the political pressure inside and outside the country to open-up the fishery and processing to foreign parties and investors demonstrates the political risks of creating a profitable and effective ‘closed’ small-scale fishery. Even the reasonably effective governance of local small-scale fishery prevailing in Maldives during the 1970s-1990s has been pressured to introduce a policy framework favoring *laissez-faire* policies that support free investment, whereby the country’s evaluation of the social, economic and cultural implications of such investment would no longer influence investment decisions, even if they would destroy entire island communities.

Foreign and local industrial interests would love to get into the sector in Maldives, claiming the benefits of the ‘efficiency’ of the private sector, and insisting on ‘free’ entry. Free entry policies would quickly lead to a concentration of fishing near the best fishing grounds, the introduction of modern tuna seiners to avoid the constraints of the current fish collection system, and essentially destroy the economic base of the local small-scale fishery, particularly in less productive areas. To avoid a further intensification of migration from outlying islands, the public sector would be forced to heavily subsidize non-economic fish collection from those areas, or accept having to invest even more heavily in public services and housing in the capital. Finally, Private parties would use their monopoly power to force down fish prices, reducing the net domestic benefits and employment that the current system neatly distributes to many communities with virtually no alternative employment opportunities. This danger of tempting offers of outsiders wishing to exploit a well managed fish resource will affect every well managed small-scale fishery in the future.

Ten Attributes that Condition the Success and Sustainability of Small-scale Fisheries

So what do all these examples suggest? I believe they fairly support each of the conditions I listed in the beginning of this paper:

- **Static resource exploitation**, at levels well below biologically optimal levels – the examples of Indonesia, Philippines, Pacific islands, Japan and the Netherlands al
support direct or indirect controls on production, and the benefits of static production levels;

- A carefully analyzed selection of technology, and of its improvements - **static rather than changing technology** are hallmarks of most examples I have described;

- **Controlled investment** - Maldives, Japan, many ‘primitive’ small-scale fisheries suggest that uncontrolled investment creates more problems than it solves;

- **Controlled entry and exit of labor**, and careful organization of fishermen at the local, and at the regional and national level – this condition essentially reflects the destructive impact of free labor entry in the fishery demonstrated in South and East Asia, and more recently in Africa. Well organized fishermen groups in the Netherlands, Philippines, Japan did support stable governance practices.

- Effective Governance that provides:
  1. **Protection of local small-scale fisheries**, and control of all other fisheries activities that operate in its vicinity - the examples of the Zuyder Zee fisheries, Maldives, Japan, and isolated fisheries in East Asia all underline the essential need to protect small-scale fisheries from encroaching competing fisheries, be they industrial or small-scale. Maldives demonstrates the danger of private sector investors *cashing in* on profitable fisheries, and public sector policy makers facilitating the destruction of necessary protection arrangements.
  2. **Support functions** (research, extension, management) particularly designed to operate at the local, regional and national level - Japan is the best example of this requirement, recent examples in Philippines also suggest the need to organize public functions at local and regional level. My experience in Africa suggests that such organization takes time and sometimes will create a strong resistance from research and other public services staff. Reorganizing Ministries of Fisheries is pretty hard in most places.
  3. **Local leadership**, with sufficient background and experience – or access to externally available knowledge - to handle the political, cultural, financial, scientific and technical aspects of governance activities, conflict management, and sector planning – this is the least understood but an absolutely vital condition. Without effective local leadership restructuring a existing fishery and transforming it into something that is sustainable and effective is virtually impossible. This means that in many communities one needs to introduce such leadership from outside, or to support local leadership with external technical assistance. The latter option is often the most difficult, but politically the only feasible option.

- A **direct, stable link between production of fish and processing/marketing**, with preferably negotiated transfer prices- I believe most of my examples have demonstrated the key role of the production-marketing linkage, and the need to have ‘negotiated’ price arrangements. This may mean public interference in the pricing system if local private marketing parties exploit their monopoly position in pricing negotiations.

- A **global system identifying fish produced by sustainable small-scale fisheries**, and providing premium prices for such products to producers. This point is not supported by examples; it does not exist yet. Efforts have been made to create a certification program for fish from certified sustainably managed fish resources, but
they are currently largely limited to industrially caught fish from temperate waters. I believe the system should be expanded to support effectively governed small-scale fisheries. Why? I believe coastal communities creating sustainable small-scale fisheries contribute substantially to the global protection of the marine environment and bio-diversity, and the creation of local employment. Small-scale fishery governance is costly, in terms of administration. I believe all people, and not only those living in coastal areas in developing countries, should carry the financial burden of sustainably managing those global resources, and well-off consumers in developed markets, buying high valued products from developing countries, are in an excellent position to pay a little extra for their products. Now if you ask me how such system should be organized, I need another hour, so let us leave that for another meeting.

Conclusion, Creating Successful Small-scale Fisheries

In my examples I have not described some of the ongoing efforts in West Africa to create sustainable small-scale fisheries. I have also omitted successful examples in some Caribbean islands and Latin American countries. These examples also prove it is possible to successfully restructure small-scale fisheries, and in some examples – St. Lucia comes to mind – demonstrate long-term sustainability. It requires a lot of effort and much else, but it is possible and has been done before. Therefore, my conclusion is that we should not write off small-scale fisheries as an historic anomaly, but pursue the concept of maintaining and even expanding the role of small-scale fisheries at the global level, as a critical solution for the management of the earth coastal environment and to create a more equitable and livable world. Politicians and administrators should learn about the possibilities, and receive assistance when they want to take action. The academic community can also help, please give small-scale fisheries the attention it deserves.

Bethesda, 12 August, 2003