

Local management works

Amidst the great changes in the commercial fisheries of the Amazonian floodplains, the system of lake reserves offers hope

Even as global attention increasingly focuses on deforestation on terra firma, another great tropical frontier, the Amazon floodplain, is also undergoing major changes. Although it comprises only three per cent of the basin, the Amazonian floodplain extends over a total area of approximately 150,000 sq km.

Since pre-Columbian times, the fertile soils and abundant aquatic resources of the floodplain have supported some of the highest population densities in the basin. Throughout this period, the seemingly inexhaustible fisheries of the floodplain have played an important role in local subsistence and, to a more limited extent, regional trade.

Over the last three decades, however, Amazonian commercial fisheries have developed rapidly. As has happened elsewhere, development of the commercial fisheries is transforming the floodplain economy and environment. Simultaneously, conflicts between individual floodplain communities and commercial fishermen from other areas have proliferated throughout the basin.

This is an important time in the evolution of Amazonian commercial fisheries. If fisheries development follows the path taken in other areas, then present trends will lead to the eventual overexploitation of fish stocks and the progressive marginalization of much of the floodplain population (*ribeirinho*).

However, some *ribeirinho* communities are taking control of floodplain lakes and attempting to regulate local fisheries. These fragile efforts to manage local fisheries represent a potentially important alternative to the conventional government-based fisheries management, which has proven totally ineffective.

The Amazonian commercial fisheries have developed largely due to three sets of factors:

- technological innovations in fishing gear (synthetic fibre for gill-nets), transport (diesel engines) and storage (ice and styrofoam), which have made it possible to greatly increase fishing effort, capturing more fish and exploiting ever more distant areas
- a dramatic increase in demand for fish products in regional as well as export markets, which has driven the growth in production
- a massive shift of *ribeirinho* labour from fanning to fishing due to the decline of jute, the main cash crop on the floodplain

Today, the Amazonian commercial fisheries involve around 230,000 fishermen, most of whom are smallholders living on the floodplain. There are four major fisheries, each focused on a specific environment, namely, the estuary, river channel, lake and reservoir.

Estuary fishery

The estuary fishery includes both artisanal and industrial fishing operations using trawls, longlines and gill-nets to capture several species of large catfish.

The river fishery focuses on two main groups of migratory species. The first consists of large catfish, which undertake long-distance migrations of up to 3,500 km. They are caught with gill-nets and longlines as they travel upstream. The second group consists of species such as characins, which spend part of their life cycle in floodplain lakes and also

undertake reproductive and dispersal migrations. They are caught with seines and gill-nets in the river channel.

The lake fishery involves both this second group of migratory species as well as sedentary species which reproduce in the lakes. The gear employed is quite diverse and includes gill-nets, fishing poles, harpoons, and bows and arrows.

The reservoir fisheries have developed as a result of major hydroelectric projects. In this type of fishery, gill-nets are used to capture mostly species such as cichlids.

Despite the great diversity of Amazonian fisheries, estimated to contain up to 2,000 species, the commercial fisheries are based on a relatively small number of species. In major urban centres like Manaus, Santarem and Porto Velho, for instance, 10 species typically account for 70 to 90 per cent of the catch.

This emphasis on a limited number of species is reflected in the annual catch, estimated at 200,000 tonnes. This is well below the productive potential of 900,000 tonnes for the basin as a whole. Only three species show signs of overfishing.

The limiting factor for artisanal fishermen is catch per unit of effort, since they are less able to increase their fishing effort to compensate for the decline in catch, as

pressure on local fisheries intensifies. Thus, while the fisheries are not yet over exploited, increased pressure on regional fisheries has significantly reduced the productivity of *ribeirinho* fishing especially in areas surrounding urban centres.

As this productivity drops, conflict proliferated between *ribeirinho* communities and commercial fishermen outside the area. This has sometimes led to the destruction of boats and equipment and even caused deaths.

So far, the Brazilian Institute for Environment and Renewable Resources (IBAMA) the government agency responsible fisheries policy, has proved incapable of effectively monitoring and regulating regional fisheries or mediating conflicts.

Open access

As a result, apart from the industrial trawl fishery in the estuary, Amazon fisheries have open access. This encourages fishermen to exploit the fisheries with concern for maintaining long-term productivity.

The open-access approach to fisheries management clashes with community notions of territoriality. Communities throughout the Amazon are asserting control over local lake systems, excluding outsiders and establishing informal

community lake reserves. Typically, these lake reserves involve the members of one or more communities and are based on a formal document signed by the majority of local landowners and fishermen. They usually limit the lake access to local fishermen and may specify informal rules for controlling fishing effort. These rules are based on the traditional knowledge of fisheries ecology.

Preliminary comparative studies of lake management suggest that well-organized lake reserves can increase the productivity of fishing effort. However, more work needs to be done to obtain conclusive evidence.

Since virtually all *ribeirinhos* are directly involved in commercial fisheries, many attempts to regulate local fishing activity fail for lack of support from community members. For this reason, the lake reserve has functioned more to exclude outsiders than to regulate fishing effort.

The problem is exacerbated by the fact that Brazilian fisheries policy is based on free access to lake fisheries. Since lake reserves are technically illegal, they can receive little formal support from IBAMA.

In recent years, a variety of organizations have begun to address the technical and organizational problems of community-based fisheries management.

In many areas throughout the Brazilian Amazon, municipal fishermen's unions (Colonel des Pescadores), whose membership is often dominated by *ribeirinho* fishermen, are taking an increasingly active role in organizing communities to manage local fisheries.

At the same time, national fishermen's organizations like MONAPE (Movimento Nacional da Pesca) and church-related groups like the CPP (Comissado Pectoral Pesca) and CPT (Comissado Pastoral da Terra) are working with the Colonias to co-ordinate and support these local efforts at the state and regional levels.

In the Santarem area, Project Ituqui is working with the Colonia and floodplain unities to develop effective management modules for community reserves and to strengthen the Colonia's ability to

support these efforts at the municipal level.

Also in Santarem, Project IARA of IBAMA involves both research on the biological and human dimensions of regional fisheries and an extensive programme of environmental education in floodplain communities. The project aims to strengthen IBAMA'S ability to work with communities and grass-roots organizations in co-management.

Project Mamirauta represents a third approach to the problem of integrating local populations into programmes for conserving floodplain resources. This combines research with community development to produce and implement a management plan for the Mamiraua Lake Ecological Station, where reserve communities have a substantial legal role in managing the fisheries.

Management model

Without doubt, the development of the Amazonian commercial fisheries and the resulting competition for resources is transforming the economy, ecology and society of the area. Lake reserves represent a management model which has the potential to address the problems of social justice and ecological sustainability that are central to fisheries development.

The direct involvement of the *ribeirinho* population ensures that traditional knowledge and resource use are incorporated into models of floodplain resource management, and that the resulting programmes address local interests.

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