Multidisciplinary Research and Management: Fisheries in the Central Delta of the Niger River (Mali)

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Abstract

This contribution gives an overview of the fisheries in the Central Delta of the Niger River (Mali) and highlights the results of a multidisciplinary research and management program conducted in the area to assess the status of the fisheries and improve their management. The importance of multidisciplinary approaches is emphasized to fully elaborate the problems impacting fisheries and the measures for their resolution. Directions for increased decentralization, participation of fishers and ecosystem preservation for improved management of the Central Delta fisheries are briefly discussed.

Introduction

Located in the Sahelian zone, between Djenne and Timbuktu (Fig. 1), the Central Delta is a vast alluvial plain flooded annually by the Niger River, creating temporary water systems known to be particularly productive (Welcomme 1975). The Central Delta has long been particularly suited for agriculture, animal farming and fisheries. Since the 1960s, annual fish production in the region has ranged between 45 000 and 100 000 t, depending on the strength of the flood (Welcomme 1986; Laë 1992a, b, 1994). Currently over 200 000 people depend directly or indirectly on the fisheries (Morand et al. 1991).

Until the 1950s, fisheries were growing at a relatively slow rate. With an estimated production of 45 000 t, the Central Delta ranked higher than Sénégal at 22 000 t, (Lemasson 1952) although its resources remained underexploited. Measures to modernize fisheries, still traditionally managed, were envisaged to 'rationalize' production according to rules and regu-

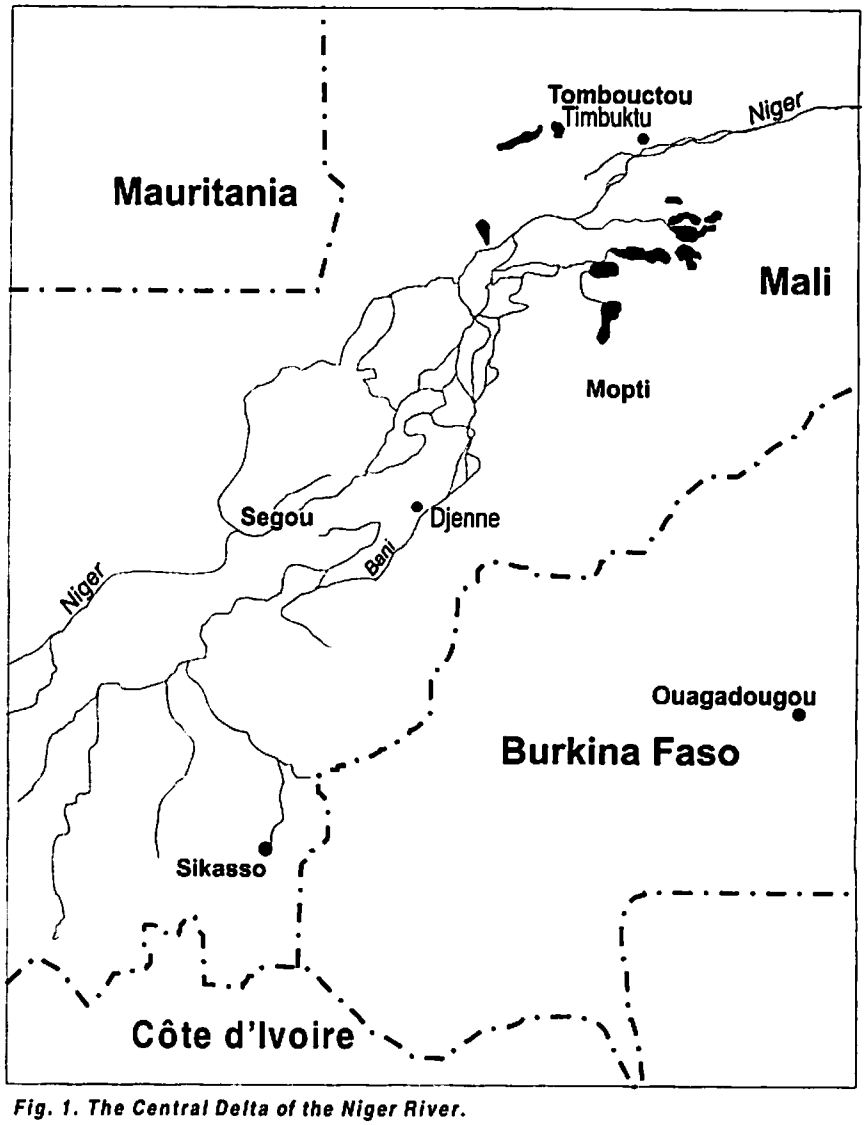

Fig. 1. The Central Delta of the Niger River.

lations established using the bioeconomic management models introduced by Ricker (1948), Gordon (1953) and Schaefer (1954).

However, nothing was implemented to this effect before independence in 1960. In the 1940s, the development of trade led to the massive use of imported materials (lead weights, industrial hooks, yarns, bolt-ropes and ready-made nylon nets), which dramatically strengthened the development of the Delta fisheries. Annual yields doubled between 1945 and 1965, when they reached 100 000 t. This phenomenon became known as the "fishery boom" (Kassibo 1988).

In 1963, the new Malian State deemed 'traditional' fisheries and their management (including their spontaneous development) incompatible with its economic and political objectives. To abolish traditional privileges and to 'rationalize' the management of fisheries resources, new regulations were instituted. All fishing zones were nationalized and an administrative structure was set up to manage fisheries based on the recommended biological and economic standards at the time.

In 1972 the region was affected by drought which worsened by 1984 due to a strong decrease in the annual floods. All sectors of activity in the Central Delta were affected, particularly the fisheries sector. Overexploitation of stocks was deemed by fisheries experts to be at the root of this crisis. Thus, decreasing annual yields, smaller sizes of captured fish, and increasing conflicts were immediately considered to be indicative of the worsening fishing conditions. Moreover, fishers increased in number with a population growth of nearly 3% (Morand et al.1991) and their fishing power, intensified by the use of nylon nets, increased considerably (Laë and Wiegel 1994).

Fishers were therefore considered to be responsible for depletion of resources and the crisis in the fishing sector. Different sets of measures were adopted by the Administration to strengthen regulations to protect the stocks and to encourage fishers to engage in non-fishing activities.

Results from preliminary field studies showed that the root of the problem was not only biological. A multidisciplinary research program was therefore designed which added a "social" aspect *(sensu lato)* to the usual biological studies. This program, developed jointly by the Malian Institute of Rural Economy and ORSTOM, commenced in 1986. The Malian authorities requested that it identify the causes of the crisis experienced in the fisheries sector and propose sustainable fisheries management methods (see Silvestre 1996 for perspectives pertaining to a similar integrated, multidisciplinary approach).

Multidisciplinary Program Highlights

Data collected confirmed the need for such a multidisciplinary approach. Various biological and ecological studies undertaken from 1986 (Laë 1988, 1991; Bénech 1990; Laë and Rattray 1990; Bénech et al 1992; Niaré and Bénech 1993; Quensière 1994a) showed that although the current fishing effort was indeed the highest ever observed, the populations of fish showed no sign of biological overexploitation[1]. No biological overfishing occurred when fishing effort was low and the floods were strong. It is obvious that the crisis could not be explained as a simple case of biological stock depletion.

The major transformations of the Delta fisheries from the 1930s to the 1960s did not result from biological causes but from changes affecting its technical and economic environment during the colonial era, with the result that a fisheries sector was developed and connected to the market economy. These changes also led to the development of new systems of exploitation and to modifications in traditional management (Fay 1989a, b, 1990, 1991, 1993, 1994a, b). Similarly, changes in national policies and regulations after Independence had very important social effects. Modern legislation, ill-adapted to the realities of the fisheries and without adequate technical support for improved resource management, did not replace the traditional organization, but was superimposed on it. This superimposition of regulations became the source of many uncertainties and confusion, magnified by administrative contradictions.

It is through the imposition of a new exploitation regime that the drought triggered the crisis in the fisheries sector, by exacerbating the inconsistencies and misunderstandings of the previous periods. Indeed, analysis of previous development stages of the fisheries shows a logic that is totally incompatible with the assumptions of determinism and equilibrium of biological management models. Various events occur and modify the social, cultural, political, economic or ecological environment of fisheries. They affect the basis

[1] The high catches that the 1994-95 floods permitted and the recurrence in the catches of species that had disappeared for nearly twenty years, like *Arius gigas*, attest to this.

of the sector by creating new constraints and opportunities, which contribute to amplify often pre-existing—albeit marginal—behaviors in fishers.

The pressure created by the new constraints acts as an amplifier of certain individual choices that become better adapted to the new social, economic and ecological context of the fisheries. The wider adoption of these choices further develops this sector of production, whose characteristics then change, inducing in turn new adjustments. Thus, in the 1950s the use of nets made of synthetic fibers (both resistant and light) allowed long fishing trips far from ancestral sectors of operation and their strict regulations. This increased family production, but also contributed to increase young people's aspiration for autonomy. This started a trend towards the 'individualization' of fisheries, to the fragmentation of households and to the weakening of traditional authorities.

Moreover, in the case of Mali, the failure of the Administration to enforce the regulations it wished to impose on fishers and the maladjustment of these regulations to the real conditions of fisheries exploitation led to a situation of free access that had not previously existed. This could have led to the depletion of resources if, paradoxically, traditional rules, although suppressed, had not limited the wider adoption of opportunistic practices, preventing gross inequalities among fishers.

State intervention previously appeared to be indispensable to the economic development of fisheries; particularly in the developing world where it was hoped that the systems of artisanal production, considered inefficient, would tend towards the economic standard of western industrial models. In Mali as in many other countries, many management plans and measures were designed between the 1960s and the 1980s. Their aim was to reform the organization of fisheries production as well as their social and commercial organization, for better consistency with semi-industrial models that were supposed to guarantee the economic efficiency of the sector.

These voluntarist policies, notwithstanding their cost, have only very rarely led anywhere to the expected sustainable development. For a very long time these failures were analyzed by the Administration and by international experts advising public authorities, not as a lack of agreement between the development plans and the local constraints, but as the result of the inertia and conservatism of the populations concerned. A growing number of studies show today the naiveté of such assumptions and the comparative economic and social efficiency of the modes of artisanal organization previously so discredited vis-à-vis industrial practices (Weber 1982; Fontana and Weber 1983; Aubertin 1984; Dème 1988; Berkes 1989). One now tends to consider that in the fisheries sector, as in the other economic sectors, the role of the State is not to be directly involved in the development process but rather to facilitate it by creating a suitable environment for its growth (Campbell 1992).

In institutional terms, intervention by the State can no longer be legitimate because of the authority of hypothetical universal management rules. It is necessary to return to more realism by admitting:

- that the evolution of fisheries can in no way be predicted with certainty; and
- that the Administration cannot alone guarantee the preservation of resources and the economic development of an entire sector.

Realization of the latter should lead to a radical change in attitude on the part of public authorities vis-à-vis the different actors in the fisheries sector. The quest for a hypothetical technical rationalization led to the denial of all possible alternatives to centralized management standards and therefore, most often, to the total exclusion of fishers from decision processes. Noting the sterility of an attitude that condemns the irresponsibility of fishers who were previously prevented from managing the resources that they exploit, it is necessary to consider other forms of relationship based on cooperation, not on authority and exclusion[2].

Conclusion

Thus in Mali, the Department of Environment and Natural Resources has undertaken, with government support, to re-establish local management by fisheries communities. Matters relating to the re-establishment of decentralized regulations are studied in close collaboration with fishers, based on the ex-

[2]A similar openness to dialogue is equally desirable vis-à-vis other actors such as the traders whose role and constraints are often poorly evaluated and considered by the State.

ample of several test areas. Following the recommendations of the multidisciplinary program (Quensière 1994b), new regulations will be based on traditional principles in order to achieve two complementary objectives.

On the one hand, these new regulations will enable fishers to define and apply the conditions of an equitable distribution of catches, thus releasing the State from police work that it cannot fully fulfill and manage. On the other hand, they will have to guarantee, through close collaboration between the Administration and the communities of producers, the maintenance and the preservation of the ecosystem. Species captured in the Central Delta also occur, often at densities too low to be exploited, in the middle course of the vast fluvial parts of the Niger River. Therefore the Delta fisheries alone can neither cause the disappearance of species nor the extinction of stocks. However, the potential of the Delta fisheries can easily be annihilated by permanent changes affecting the ecosystem where water, soil, vegetation and fauna exchange energy, materials and nutrients over space and time to form a highly productive functional system (Amaros and Petts 1993). The Central Delta resource is not the fish but the ecosystem in its totality. Therefore, the management of fisheries resources implies also the management of the aquatic and terrestrial environments that constitute the Central Delta. Fisheries management must be ecosystem-oriented. It should aim at the preservation, even the improvement, of the natural environment.

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