

TRADITIONAL MANAGEMENT OF SOME LAGOONS
OF THE GULF OF GUINEA
(Ivory Coast, Ghana, Togo, Benin)

by

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This document has been prepared as part of FAO's Regular Programme activities, aimed at assisting fisheries administrators and others responsible for the management of fisheries. The attention of the reader is also drawn to a series of technical papers relating to the PRACTICES OF FISHERIES MANAGEMENT. The list of these papers is given at the end of this document.

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ABSTRACT

This paper describes and analyses methods of traditional fisheries management in selected coastal lagoons of the Gulf of Guinea. The author demonstrates that traditional controls have the advantages of being adapted to the specific localities where they are to be applied and of being self-regulated by the fishing communities themselves. Traditional management would seem to be not so much an approach to the rational management of rational fisheries resources, as a defense of the local (and often conflicting) interest of the shore-dwelling communities. While it is more necessary to install modern management schemes, having as their objective rational fisheries management based on considerations as much biological as economic or social, the author recommends, nevertheless, that such schemes be guided by traditional management practices.

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1. INTRODUCTION

It is now recognized that there is a renewed interest in traditional forms of small-scale fisheries management, which may be defined as prudent self-regulation by fishermen or shore-dwellers based, to a greater or lesser extent, on traditional practices. They differ most noticeably from the (frequently resisted) methods of management by official regulations in that the latter are not drawn up by the fishermen themselves and in that their implementation in tropical artisanal fisheries is made very difficult by the diversity and scattered nature of fishing units and landing places.

In contrast, the traditional methods of management have the advantage of being drawn up in relation to the specific constraints affecting the localities where they apply and of being implemented by those who designed them. Their decentralized character seems to suit the problems inherent in West African artisanal fisheries management, specially those of lagoons and estuaries, where the widely scattered fishing units, the variety of gear used and the complexity of the stocks exploited (multi-species, mixed lagoon-marine stocks, etc.) is even more marked than in the case of the artisanal marine fisheries.

Field studies have revealed the current status and extent of traditional management practices in the western part of the Gulf of Guinea (Ivory Coast, Ghana, Togo, Benin, Nigeria). These practices are much more developed in the lagoon and estuary regions than in marine fisheries due to the fact that it is easier to establish property rights and to develop a practical understanding of lagoons and estuary regions. Whereas the wide distribution of these practices alone would justify the preparation of case studies, the nature of the goals at stake make them essential study. These include providing sustained local employment to a large working population, assuring the shore-dwellers' direct access to sufficient protein, releasing a small but valuable surplus for sale on local, and, to a lesser extent, external (shrimp) markets and developing extensive or intensive aquaculture.

Nevertheless, this review and analysis of traditional management practices raises the question of whether, after earlier neglect, there is not now a tendency to overvalue them. A similar conclusion was reached by some authors in a review of traditional maritime institutions in the Western Pacific^{1/}.

In this present study, the description of the management methods reveals a certain uniformity since the same practices seem to prevail from one lagoon to another, although a distinction has to be made between the control of fishing effort present in practically all lagoons; the recent temporary or permanent management of water systems (Lake Nokoué, Keta lagoon, the Togolese lagoon system); and, finally, those measures and practices intended to increase productivity directly, such as the development of brush park fisheries on Lake Nokoué and formerly on Lakes Ahémé and Togo.

The traditional management schemes analysed here show common characteristics, such as their "ad hoc" nature, precariousness, their localized character and even their ambiguity which again leads one to wonder if, having long disregarded traditional management, we are not now over-estimating its value.

In contrast to this relative uniformity of management practices there is a great diversity of contexts, which explains the presentation, in this document, of several groups of lagoon systems. This diversity is a function of, among other things, the state of the resource, demographic pressures, settlement patterns and fishing techniques used, making it difficult to determine in general the performance of any given scheme. Placing each scheme in context does, nevertheless, allow us to identify the conditions which promote the transition of traditional management forms towards a modern type of management able to cope with the consequences of radical technical evolution (Aby Lagoon), as well as the conditions determining the capacity (Lake Nokoué) or an incapacity (Ebrié and Ahémé lagoons) to manage the internal contradiction of a fishery system.

^{1/} See for example Ruddle and Akimiche (1984)

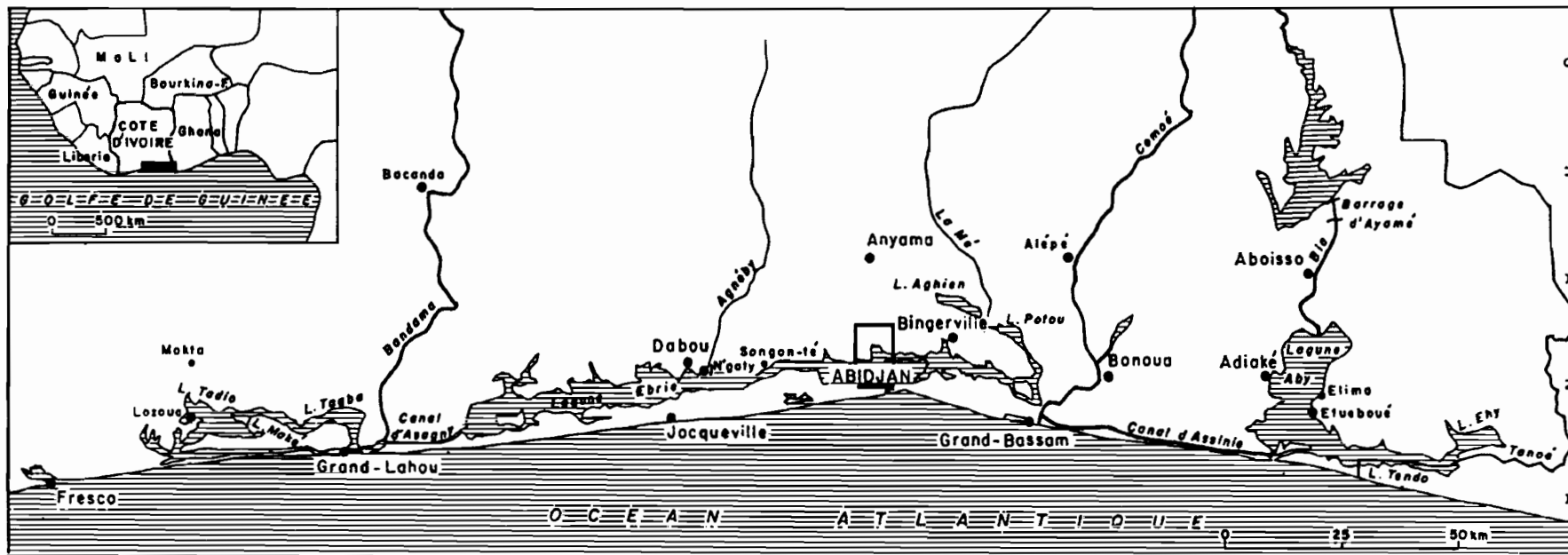


Fig. 1 The lagoon system of the Ivory Coast

Thus, the diversity of contexts in which traditional management is practised and is evolving justifies a presentation by each large lagoon group. Six groups have been considered: the lagoons of Grand Labon, Ebrié and Aby in Ivory Coast; the Togo Lagoon system; the Benin lagoon and lake system; the Ghanaian lagoons. However, recent evolution of traditional management methods has been marked, inter alia, by the evolution, often in situations of conflict, of different types of fishing. Before describing and analysing the traditional methods of management, therefore, it is necessary to distinguish two broad categories of fishing.

Individual fishing, which involves fishing by individuals or small groups using the following techniques: gillnets, lines with multiple hooks, cast nets, fish traps and pots, shrimp nets, hand nets.

Collective fishing, which involves fishing by companies, or permanent or seasonal teams of fishermen using purse-seines, beach seines, syndicate ring nets, brush park fisheries with traps and all forms of acadja.

These two types of fishing are differentiated by fishing effort; the selectivity of gear used; the social organization of the work; the means of control and the accumulation of capital: as well as the duration of occupation of space within the lagoon required. These different types of fishing impinge on one another at several levels (of the resource, markets, capital, labour, lagoon area involved, etc.) and constitute a source of potential conflict which the traditional management is obliged to address. The recent introduction of more efficient fishing techniques and equipment is today upsetting the original context in which the traditional methods evolved and raises the question of to what extent these traditional methods can adapt.

2. THE GRAND-LAHOU LAGOONS

A study of the forms, practice and effects of traditional fishery management should enable us to evaluate its role in controlling resource exploitation and appropriation by local communities. Conditions in the Grand-Lahou fishery are the opposite of those found in the Ebrié Lagoon, where free access, the abandonment of traditional fishing rights and resource appropriation by external interests have resulted in overexploitation. Fishing in the Grand-Lahou lagoon network is regulated by an effective application of traditional territorial use rights which limit access, thus permitting control of fishing effort and assuring resource appropriation by the villagers themselves.

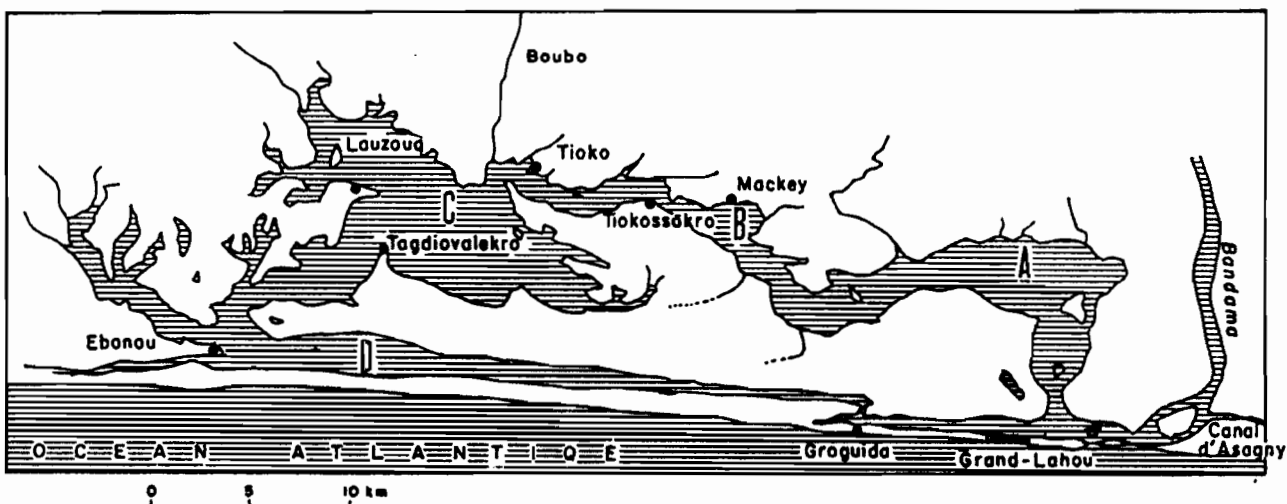


Fig. 2 The Grand-Lahou Lagoons

- A. Tagba Lagoon B. Mackey Lagoon C. Tadio Lagoon D. Niouzomou Lagoon

Three main types of management can be observed in the Tagba, Mackey, Tioko and Niouzoumou lagoons which form the Grand-Lahou complex: control of access to the fishery, some regulation of fishing effort and techniques and the control of some aspects of production and marketing.

- The local inhabitants control access to the fishery by all foreign fishermen, principally the Bozo of Mali and the Hausa of Nigeria, but also Senegalese, Beninoise, Togolese and Ghanians. Control consists of a quota set by village authorities and a user fee also collected by them. (For example, twelve bozo fishermen were authorized to fish in the Bandama by the village of N'zida in exchange for a user fee set at CFA 5 000 francs per month and per fisherman, in May 1982).

- Regulation of fishing effort is accomplished by limiting seine setting (3 gears only as of October, 1984), prohibiting fishing one day per week and prohibit fishing in certain zones altogether. (In the N'zida basin on the Bandama, for example.) The almost total prohibition of seines would seem, in light of the seine-related reduction of pelagic stocks in the Ebrié and Aby Lagoons, to guarantee a reasonable maintenance of catch levels.

- The choice of organized production or marketing schemes, such as the traditional avikam fisheries or the cooperative organization of shrimp fishing indicates a preference for controlled resource exploitation and profit appropriation in all aspects of fisheries activity rather than an unstructured system in which fishermen and marketeers are independent, even if subject to payment of territorial user fees, while their activities remain uncontrolled. The traditional avikam fishery^{1/}, financed by the head of a kinship group or sub-group, consists of family dependents or contractual groups whose work is organized and allocated by the head of the fishery by virtue of his dominance of both work force and catch distribution. It is the head of the fishery who chooses installation locations and determines the intensity of fishing effort and the remuneration of labor. Upstream from the Grand-Lahou Channel, members of the "capitaine avikam" cooperative are given access to shrimp fishing zones: whether they are fishermen themselves or have temporarily transferred their access rights, they determine fishing zones and techniques (size of nets, number of hooks), but they also fix the price of shrimps.

The basis of a traditional practice like the avikam fishery, characterized by a control of the forms of production and marketing, is the control exerted by the head of the kinship group over the labor force. Historically the chief's ability to establish such a practice, his appropriation of a portion of the profits and/or redistribution of them reflected and confirmed his power^{2/}. The break-up of these kinship groups and the loss of authority by the elders as dependents seek emancipation, have made it increasingly difficult to mobilize the labor force and explain the progressive disappearance of these fisheries and the development of individual fishery practices characterized by dispersal of producers and marketeers. In the future, demands for territorial use rights will determine the rent. It is in fact these user rights which, allow their holders to exclude certain techniques, restrict access and appropriate a portion of the rent obtained from non-local fishermen. Territorial control now becomes imperative.

Many kinship groups and sub-groups have assumed territorial user rights over lagoons: in some villages these rights are concentrated in the hands of a single family, while in others, several families make claim to them.

1/ The avikam fishery technique consists of building an axial fence of palm branches and vines, broken by a succession of units composed of an enclosure containing two catch chambers. Each unit is exploited by 3 to 4 men over a period of about 3 months, twice a year. A 15 element fishery has been studied in the past. De Surgy in "Les pêcheurs lagunaires", Volume 2, CNRS, undated; oo. 16 and 17

2/ De Surgy states that the head of the fishery or kinship-group can collect up to one half of the profits for eventual redistribution; op. cit. p. 133

Number of families claiming territorial user rights in some villages of the Grand-Lahou Lagoons^{1/}

Braffédon	1	Beugrédon	1
Gredibéri	1	Alikédon	1
Kokou	1	Ebonou	12
Loukouiri	1	Lauzoua	17
Dibou	1	Tioko	10
Zagbelebe	1	Mackey	1

The example of the Tagba Lagoon, which is shared by three main kinship groups, confirms the existence of territorial user rights. The Braffé group, whose territory is best suited to shrimp fishing and the installation of traditional fisheries, extends from the river mouth to Dakpé Island; the Djiplogbatas' territory covers the central area, favorable to traditional fisheries and that of the Gui-Guins is the zone reaching to the Mackey Lagoon, where most fishing is done with gillnets^{2/}.

The traditional management techniques observed in the Grand-Lahou Lagoons are, a priori, intended to achieve the same ends as any management system a certain degree of control of access, techniques and fishing effort meant to preserve the resource and appropriate the rent for the fishermen themselves^{3/}, and they appear to be more successful than methods observed in the Ebrié Lagoon. In practice, however, numerous conflicts reveal the precariousness of this management system and its 'ad hoc' nature confirmed by its over-localization. Moreover, certain practices adopted by the management scheme have proved very doubtful.

- It is in fact difficult to define and apply the territorial user rights which are used to justify control of exploitation conditions in lagoon waters. The recent history of the Grand-Lahou fishery is one of conflict over territorial boundaries and the enjoyment of rights conferred by territorial dominance. One example is the inter-kinship group conflict between the Braffés of the village of Braffédon and the Grand-Lahou cooperative, dominated by the Kpendas. Another is the conflict between local and outside interests (Haussas at Toukouzou, Bozos at N'zida) over observance of allocated fishing zones and payment of user fees^{4/}

- The empirical nature of these management measures can be seen in the diversity of authorized quotas for foreign fishermen, which are set at low levels upstream from the mouth of the Bandama and at much higher levels in the Tadjovalekro encampment in the Tadio Lagoon, and which are apparently determined by considerations unrelated to the fishery itself, at the discretion of the village authorities (possibilities of lodging, etc.). Another example of this expedience is the varying tolerance of the presence of three purse seines, whose operations are tolerated in the Tagba and Mackey Lagoons but opposed in the Tadio and Miouzoumou Lagoons. Furthermore, certain measures, such as the prohibition of fishing in some zones, may be explained by the zones' importance in fetish practices rather than any effort to safeguard fishery resources, such as the protection of spawning areas. It can be said that the precariousness, ad hoc nature and absence of other measures such as the regulation of gear selectivity, limit the effectiveness of traditional management.

^{1/} According to De Surgy, op. cit. p. 131

^{2/} According to J.P. Hié Daré in "Etude sur l'aménagement des pêches sur la lagune Tagba (Côte d'Ivoire)". CRO Abidjan.

^{3/} In this sense, the enclosed nature of the lagoon associated with an effective population pressure much lighter than that of Ebrié Lagoon favours the indirect exercise of control over the conditions of exploitation. This explains the survival on the Grand Lahou lagoons of the traditional management system

^{4/} The Fishery Center of Grand-Lahou notes at least eight lawsuits in 1982

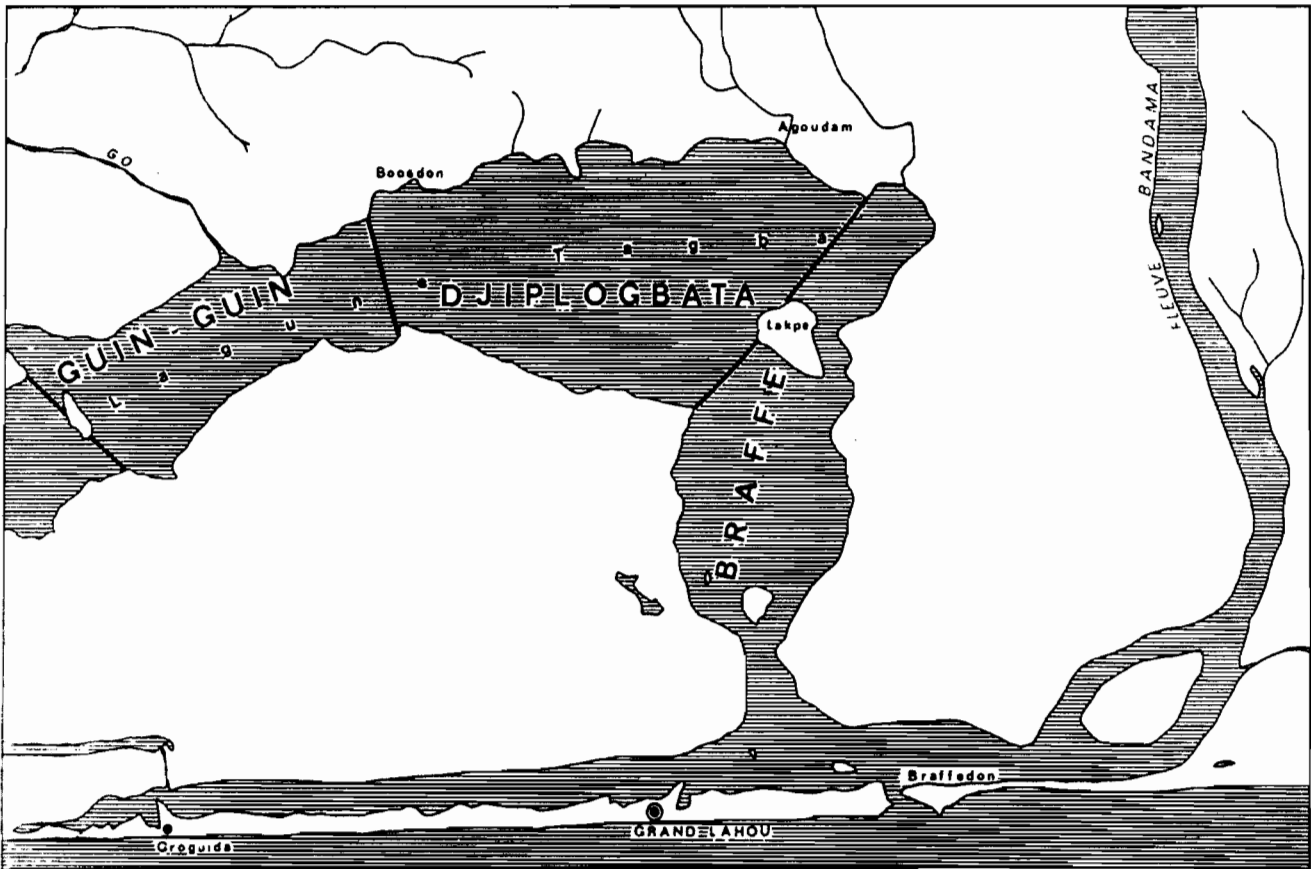


Fig. 3 Traditional territorial rights on the Tagba Lagoon

From J.P. Hié Daré in "Etude sur l'aménagement des pêches sur la lagune Tagba" CRO Abidjan

- Practices such as the collection of user fees based on a claim to territorial rights can prove ineffective in achieving the intended objective of controlling access to the fishery: fee collection may in fact result in an increase of fishing effort on the part of authorized fishing units which must recover the fee before realizing any profit for themselves.

The real objective of traditional management in the Gran-Lahou Lagoons appears to be an accumulation as rapidly as possible of the means of production, under the control of local residents, rather than a rational resource management programme. Three facts confirm this interpretation and demonstrate the fragility of traditional management: first, some data on the state of stock exploitation indicate a serious drop of catch per unit of effort^{1/}; second, vague plans to create a purse-seine fishing cooperative^{2/}; and finally, the refusal of the existing seine and shrimp net fishermen to conform to national

1/ Cf. R. Lae in "Premières observations sur la pêche en lagune de Grand-Lahou", DEA, University of W. Brittany, June 1982. Observations covering 1976-77-78 in the Tadjo Lagoon

2/ Statement of June 4, 1984, addressed to the sub-prefecture by ten villages: Adjador, Alekdon, Beugrédon, Dibon, Ebonou, Essouname, Gréguidéri, Gradon, Loukoufri, and Zagbalegbe. This hope on the part of the villagers explains their opposition to the activities of existent seines

regulations^{1/}. In conclusion it should nevertheless be acknowledged that traditional management has prevented exhaustion of the resource and impoverishment of the fishermen by prohibiting large-mesh nets, because despite Lae's observation that the situation was serious, catch per unit of effort remains three to four times higher than observed in the Ebrié Lagoon.

3. THE EBRIE LAGOON

The violent dispute over the Ebrié lagoon is the sign of traditional management's inability to create a situation in which new fishing techniques—purse and beach seines can operate in harmony with traditional techniques. The question is whether this inability is the consequence of a physical and technical invasion by outside elements, which, as we often hear, have caused the break-down of traditional management, or simply the reflection of contradictions inherent to the overall system of exploitation in the Ebrié Lagoon under the control of the inhabitants themselves?

The problems of fishery management in the Ebrié Lagoon present themselves in a biological and socio-economic context which is radically different from that of Grand-Lahou. The multiplication of purse seines at the end of the 60s and during the 70s led to an over-exploitation of stocks and the confiscation of part of the resource by purse seine owners, to the detriment of individual fishermen. The present situation is one of bitter conflict between collective and individual fisheries, more violent than the conflicts among individual fishermen or between foreign fishermen and village authorities observed in the Grand-Lahou Lagoons. Physical violence has in fact led to an almost total suspension of collective fishing activities.

Collective fishing has developed rapidly since 1964. At that date, De Surgy counted 20 beach seines and 13 purse seines, of which 10 were installed at Vridi^{2/}. In 1979, the number of seines operating on the lagoon, with the exception of Vridi, reached 60 for beach seines, 36 for purse seines (96 seines then using, however, only a third of their effort in the lagoon). That this excessive development has led to stock over-exploitation is confirmed by the pattern of total catches over five years of observation.

Evolution of total annual catch of fish in the Ebrié Lagoon (in tons)^{3/}

	1975	1976	1977	1978	1979
Beach seines	(5 620)	3 970	2 370	2 600	2 620
Purse seines	960	1 715	2 440	1 500	850
Individual fishermen	(3 000)	1 925	1 900	(1 900)	(1 900)
Total	9 220	7 610	6 710	6 000	5 370

This over-exploitation can be seen in the diminution of the average size of fish and the gap between this size and the size at first sexual maturity which affects stock fertility. The significant drop of catch per unit of effort for lagoon species for both purse seines and beach seines would indicate that it is in fact the increase of total fishing effort observed, or the decrease of mesh size, which are responsible for this over-exploitation. Pollution of the lagoon environment near Abidjan has had

^{1/} Although a deadline was set for changing the mesh size of the seine bag from 25 mm to 14 mm, this has not yet been effected

^{2/} A Village located at the entrance to the canal, on the lagoon side, permitting canoes to avoid passing the bar

^{3/} According to J.R. Durand, J.M. Ecoutin, E. Charles Dominique in "Les Ressources halieutiques dans les lagunes ivoiriennes". Oceanologica Acta 1982

a lesser effect on recruitment of certain species^{1/}. Both pelagic and demersal species are affected by stock over-exploitation: pelagic species are harmed by beach seines, which affected 55% of the cichlidae and bagridae catches in 1979, and also by individual fishermen (gillnets, casting nets, lines and baskets). The drop in cpue of beach seines and the low level, for the Grand-Lahou region, of the cpue of individual fishermen^{2/} confirm this state of over-exploitation. At this time, beach seines and individual gears are in direct competition in the western part of the Ebrié lagoon. It is therefore in this zone, where almost all catches by both types of gear originate, that the violent conflict between individual and collective fishermen has broken out. The conflict is all the more bitterly fought since the stakes are high, bearing in mind the high market value of the fish species concerned, which compensates for the poor quantity of catch.

Conflicts latent over several years developed a new intensity between 1981 and 1984. They were subdued by punitive expeditions on the part of individual fishermen rather than by negotiations, although most of the protagonists did respect a 6-month closed season in 1982 even though they had not proposed it^{3/}. As a result, the number of beach seines operating in the lagoon was reduced by almost one half and there was an even more drastic reduction of purse seines^{4/}. These reductions are even more impressive when we learn that in early 1983, only six beach seines, two purse seines and twelve "syndicat" ring nets were operating on the lagoon^{5/}.

The social and economic impact of collective and individual fisheries is radically different. The individual fishery is more accessible to and exploited by foreign^{6/} as well as by local fishermen. It demands only a limited investment which can usually be advanced by close relatives, even though it may vary in scale from one to ten for casting nets or gillnets. This type of fishing entails limited costs and usually guarantees a comfortable income for a large number of fishermen, due to the high value of the species caught and an efficient marketing system^{7/}. Whether consumed by the fishermen or marketed, the products and profits of the individual fishery are distributed within the family and often constitute the fisherman's only source of cash income.

The avikam fisheries, the first forms of collective fishing, led to a cooperative organization of the labor force and redistribution within the kinship group based on a system of relationship and alliance. Although this system reinforces the power of the fishery chief, who controls mobilization of the work force and product redistribution, it does not imply his appropriation of the profits: De Surgy describes a distribution method consisting of a sharing of equal parts of the net profit among all those involved, the chief included^{8/}. A different system is used in large beach seine fisheries, which guarantees owners an important remuneration of capital investment^{9/}, while labourers, usually foreigners, receive a salary comparable to that of agricultural workers. On the other hand, the high catch level of collective fishing creates employment in post-production activity such as smoking and marketing.

^{1/} This development inspired the articles cited above

^{2/} According to R. Lae op cited p. 29

^{3/} There were incidents on 21 Sept. 1981 at Ghomgbo, 18 Oct. 1981 at Songo, 28 Oct. 1982 at Chougbe and 24 May 1984 at N'goyem, sometimes resulting in fatalities

^{4/} Census by J.M. Ecoutin, CRO

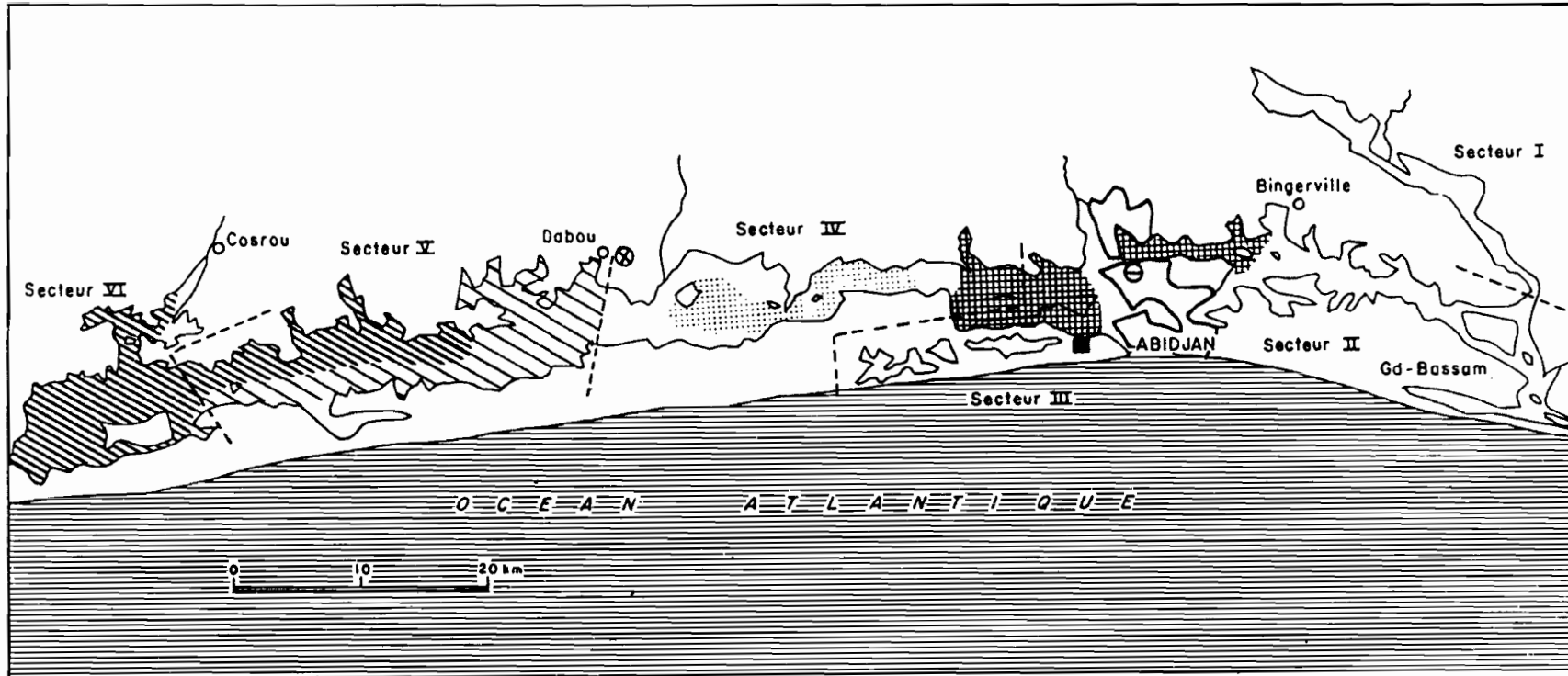
^{5/} Census by J.M. Ecoutin, CRO


^{6/} According to practices in force in the Grand-Lahou Lagoons (payment of user fees, etc.)

^{7/} The former fish marketing circuit, from the west towards Dabou, has been replaced by a new highway circuit via the south shore towards Treichville, the speed of which now permits refrigeration of wholesale products. Cf. "La commercialisation de poisson en zone lagunaire". ORSTOM-DPML, November 1983. J.Y. Weigel

^{8/} According to De Surgy, op. cited p. 132

^{9/} In the village of Abrako, the owner of a beach seine would receive five shares and each laborer one share. Cited by F. Verdeaux in "L'afzi pluriel" ORSTOM, 1981; p.285



-  individual fishing
-  beach seine fishing
-  purse seine fishing
-  shrimp fishing
-  Treichville market
-  Dabou market
-  Vidri

From CRO document 1983

Fig. 4 Principal fishing zones on the Ebrié Lagoon

The current situation, characterized by low returns has caused the withdrawal of purse seines, whose high operating costs (motorization cost of canoes) are not recovered by the low market value of pelagic catches. The latest census of large nets in the Ebrié lagoon confirms this tendency. Due to the composition of their catches and lower operation costs (no motorization), beach seines are better able to survive the crisis. Both beach and purse seines, however, are unable to retain workers once the remuneration offered falls to less than that obtainable in agricultural work and many boat owners, who failed to reinvest the excess profits of earlier years or repay the National Agricultural Development Bank (BNDA), go bankrupt unless they are able to transform their seines for ocean fishing. This over-exploitation obviously does great harm to individual fishermen, for whom fishing is the only source of revenue and who cannot expect any compensation for the drop in catch by a rise in price because of the obstacles created by the concomitant development of fishery zones and marketing networks on Lake Kossou.

When it was simply a question of organizing individual fishing or tolerating the presence of a few seines, traditional management methods, drawing on territorial rights, were able to organize resource exploitation in the Ebrié Lagoon and avoid serious conflict. In the case of individual fishing, this was accomplished by controlling access, regulating effort to some extent and sometimes by controlling exploitation conditions (shrimp fishing in the Jacquerville basin). The coexistence of individual fishing activity and a few seines was managed by dividing territorial waters between the shallow, sandy-bottomed areas, reserved for beach seines and the central, deeper waters, reserved for individual fishing. The increase in the number of seines, however, disturbed this coexistence and there is a definite competition for space in view of the narrowness of the lagoon and the depletion of the resource (drop of catch per unit of effort and total catch). This condition was probably brought about by the damage done by beach seines to the juveniles found in large numbers in the shallow waters in which they operate^{1/}.

Violent conflicts and the disappearance of almost all collective gear attest to the inability of traditional management to reconcile collective and individual fishing activities. For some, it is the local take-over of an unregulated technology and its practice by external interests which brought about such a situation. A local census indicates, however, that 80% of all beach seine owners declare themselves to be fishermen, and 65% are originally from the areas where they have set their seines^{2/}. At least half were originally local fishermen. It is indeed within the entire system of lagoon exploitation, with all its contradictions, that the reason for traditional management's inability to respond to the demands of modern fishery management must be found. The inherent contradictions are as difficult to manage as any technological or demographic invasion. Verdeaux analyzes the present antagonism between the two different types of fishery exploitation, viewing the production system, in the lagoon and on land, as a whole^{3/}. The system's evolution exhibits a tendency to concentrate the means of production - concentration first of land and then of large nets - following the rural exodus which allowed some planters in certain villages to invest in labor^{4/} and also in fishing gear. Some planters were progressively excluded from the plantation economy by the scarcity of land and the high cost of labor. Their only alternative, low-paid agricultural or large-net work excluded, was individual fishing. No longer a means to the end of owning land for plantation, individual fishing became a permanent means of survival, hence the gravity of a drop in productivity for individual fishermen. The antagonism between individual and collective fishing is not a conflict of ethnic groups (Afzi, Alaldian) or of foreign versus indigenous fishermen, but rather a confrontation between on the one hand a minority of important plantation vessel-owners (and sometimes urban management executives who have invested in large nets) and on the other hand a majority composed of individual foreign and indigenous fishermen.

^{1/} Use of purse seines, operating mainly on pelagic lagoons and ocean species in the Abidjan region (depth appropriate to their operations) and which could be reconverted to ocean fishing, would cause less damage than beach seines

^{2/} According to statistics submitted on applications for mandatory fishing licences issued in 1982 and 1983

^{3/} In "L'Afzi pluriel" 1981 ORSTOM Centre de Petit-Bassam (Ivory Coast)

^{4/} Because of its rarity a determinant constraint to development of plantations

4. THE ABY LAGOON

The case of the Aby Lagoon, despite the apparent fragility indicated by inherent difficulties in applying new regulations, confirms the feasibility of a management policy for lagoon fisheries. The Aby Lagoon is indeed the only example in the Gulf of Guinea of a traditional form of lagoon management making a smooth transition to modern management, originating with the fishermen themselves and able to control the consequences of a radical technological evolution.

The commonest forms of traditional management can be found in the Aby Lagoon: control of access through preferential application of territorial rights and a relative regulation of fishing effort by prohibiting fishing on Wednesdays or the existence of a few prohibited zones such as Assongan Island or part of the Bay of Assomlan. One example of the application of territorial use rights is the collection of a monthly user fee of 5 000 CFA francs per set of two poles used to support shrimp nets by the kinship groups of the villages of Etuéboué, Assinie and Assomlan; another is the mandatory payment by fishermen (mostly Beninoise) of two-thirds of their net revenue to the owner of the zone. We could also mention the annual payment of user fees to the village of Nouamou by dependent villages and encampments such as Court, Bobocar, Aulé-Souazou and Ehy or the fees paid by the village of Mama to its mother village, Akounougbe. In the Tendo-Ehy Lagoon, the fishing activities of the Bozo are taxed at the rate of 2 000 F per month per fisherman for each village. Purse seine fishing^{1/} is taxed 20 000 CFA francs per set at Allangouanon and beach seine fishermen established in dependent encampments must give one tenth of their catch to the chief of the village of Assomlan.

Fishermen have applied traditional management measures to new exploitation conditions brought about by the motorization of canoes and the increase of purse seines which followed the launching in 1979 of a new plan for fishery development in Aby Lagoon. Measures affecting seine fishing included: respect of prohibited zones, prohibition of fishing one day per week and collection of user fees. The imposition of access fees, which may cause an increase in the fishing effort of each fishing unit, and other traditional forms of regulation did not prevent the growth of fishing effort which leads to over-exploitation of the primary species, impoverishment of fishermen and financial losses for the Ivory Coast.

With the increasing use of purse seines and the motorization of the fishing fleet, facilitated by the opening between 1979 and 1981 of a line of credit for fishing cooperatives by the BNDA, fishing power was radically altered. The result, after two euphoric years, was a rapid 2/3 drop in production with, in particular, catches of ethmalose, the principal species caught in 1979, 12 times inferior to catches of previous years.

The impoverishment of fishermen as a whole as a result of this over-exploitation becomes evident when we see a breakdown of fishing activities by gear, with purse seine fishermen suffering the most, their annual revenue after the collapse of the ethmalose stocks estimated at 35 000 CFA francs compared to 200 000 francs for a beach seine or gillnet fisherman^{2/}. This is due to the high costs (for fuel, maintenance, financing), borne by purse seine fishermen, which are not compensated by a more valuable product, since purse seines yield only half the amount caught by beach seines; their catches of species of high market value are relatively low.

Overexploitation on Aby Lagoon eventually led to subsidization of purse seine fishing. Because of the loss of revenue due to over exploitation of the principal species, seine fishermen were unable to repay their loans. At the end of 1982, overdue payments totalled 23 million CFA francs, a debt which will be assumed by the country's public finances^{3/}.

^{1/} This seems to apply to villages which own no purse seine. Reciprocity agreements exist between villages owning seines, as in North Aby, and no fees are paid

^{2/} According to "Project de pêche artisanale en lagune Aby", op cited Appendix 2, p. 3

^{3/} Idem Appendix 2



Fig. 5 The Aby Lagoon

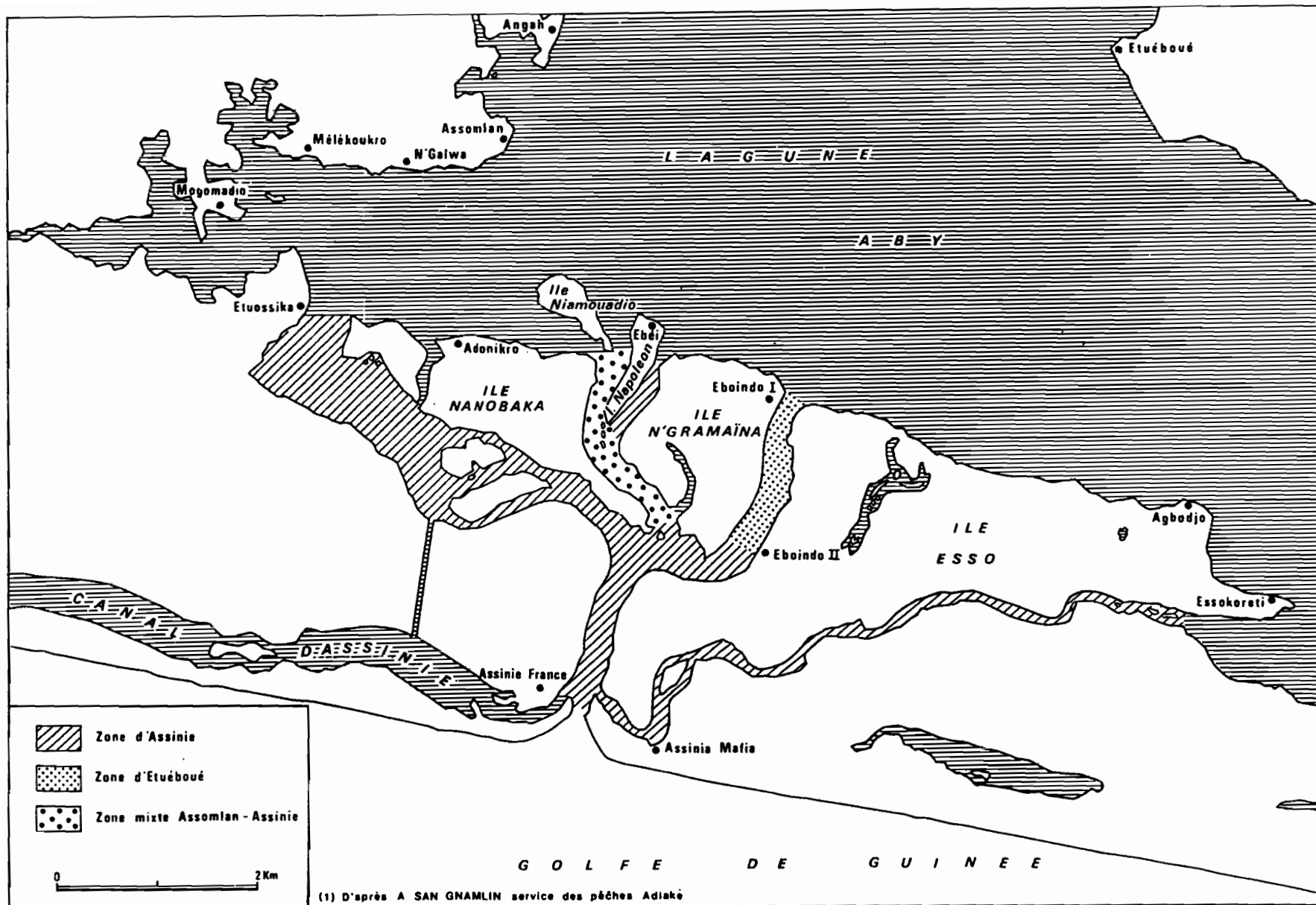


Fig. 6 Appropriation of shrimp fishing zones in the Aby Lagoon

Evaluation of total production (in tons)

		Ethmalose	Chrysichtys	Others	Total
1 9 7 9	Beach seines (1)	3 160	820	560	4 540
	Purse seines (1)	1 830	0	200	2 030
	Gillnets (2)	1 820	150	1 470	3 440
	TOTAL	6 810	970	2 230	10 010
1 9 8 0	Beach seines (1)	1 870	980	50	2 900
	Purse seines (1)	1 030	90	30	1 150
	Gillnets (2)	1 060	150	940	2 150
	TOTAL	3 960	1 220	1 020	6 200
1 9 8 1	Beach seines (1)	290	1 060	170	1 520
	Purse seines (1)	120	490	100	710
	Gillnets (2)	150	150	1 200	1 500
	TOTAL	560	1 700	1 470	3 730

- (1) According to E. Charles Dominique in "Evaluation des ressources et reglementation d'une lagune cotiere en Côte d'Ivoire: la lagune Aby" Doc. CRO undated, p. 29
- (2) From "Projet de pêche artisanale en lagune Aby" Centre d'Investissement - FAO Dec. 1982, Appendix 1

The inability to assimilate modern technology, which led to the crisis in the Aby Lagoon, called for modern management methods which were initiated by the fishermen themselves beginning in 1982. Although their application does not remove all doubt about future efficiency, they have been relatively successful. Because they were introduced by the fishermen themselves they constitute a form of selfmanagement using methods adapted to technological evolution, but whose objective remains that of traditional management - the control of fishery exploitation conditions.

E. Charles Dominique has gathered data on the regulatory measures taken in the Aby Lagoon since early 1982 and evaluated their effectiveness^{1/}. The first measure, decided at a public meeting in January 1982 and endorsed by all parties (fishermen, traditional and national authorities), was a six month ban on all fishing. The second, concerning gear selectivity, made a minimum mesh size of 25 mm obligatory for all seine bags. The third was the introduction of fishing licences for all beach and purse seines. The effectiveness of these measures was mitigated by two factors: despite the licence requirement, some seines left the Ebrié Lagoon, where fishing was prohibited, to operate in Aby Lagoon; and the change in the mesh size of seine bags, a compromise measure which fishermen could afford, did not really alter seine selectivity (obstruction of the bag, wing fishing for purse seines, placing the bag at the extreme end of the net for beach seines).

Traditional management methods proved inadequate in dealing with the radical changes which follow technological evolution. In the Aby Lagoon, however, modern regulations were introduced in response to serious stock over-exploitation and its effects on fishermen. In the Ebrié Lagoon, no such response was made. These new measures are modelled after traditional management measures and meant to control fishing effort and restore profits to all fishing units. Although their application does not dismiss concern about the efficiency of management in the future, their existence confirms the feasibility of a management plan for Aby Lagoon which can integrate and supersede traditional management methods.

^{1/} Charles Dominique, op. cit.

5. TOGO'S LAGOON SYSTEM

In his 1965 comparison of the lagoon systems of Togo and the Ivory Coast, De Surgy had already noted the non-existence of territorial use rights on Lake Togo^{1/}. At present, traditional regulation is reduced to its simplest form: prohibition of fishing zones and gear and control of access have been abandoned. Only the prohibition of purse seines, imperative in preventing a drop in catch totals, remains.

5.1 Abandonment of Prohibited Fishing Zones and Techniques

The Kpove zone, which covers approximately one hectare near Togoville, is the only prohibited fishing zone on the lake. As for fishing techniques, theoretically banned by tradition, such as seines and multi-hook lines, only large seines (whose destructive effect has been observed in the Aby and Ebrié Lagoons) are prohibited, a thorough census of fishing gear indicates the presence of 88 small beach seines and more than 900 multi-hook lines, responsible for a least 10% of the entire catch^{2/}. Only a few local regulations such as the prohibition of fishing lines in the area of Togoville (for the protection of tourists) and of small beach seines in the Togoville Lagoon, remain in force, and they have almost no effect on fishing effort.

5.2 Absence of Limitation of Access to the Fishery

Although village chiefs control access to the fishery of all foreign fishermen who, upon installation, make a symbolic gift to the chief^{3/}, there are no set quotas. Demographic pressure seems high, with 1 800 people grouped in 35 villages or encampments, fishing in the Vogan, Aného, and Togoville Lagoons and on Lake Togo. This pressure was already evident in 1960, when a census counted 700 canoes^{4/} compared to 1 000 at present. While almost 60% of all canoes belonged to foreigners in 1960, less than 30% of the fishing labor force is foreign at present, indicating that there was a process of "togolization" of the fishery during the 60s, related to the return of Togolese emigrants, the destruction of coconut plantations located along the coastal belt^{5/} and heavy demographic pressure on coastal land located to the west of the lake. The labor force is currently composed of a majority of Togolese, followed by semi-sedentary Benionoise, originally from the Lake Ahemé region, Ghanéens, mainly éwé (Ahoulands), and by Hausa seasonal fishermen specializing in multi-hook lines.

Distribution of fishermen by ethnic group and nationality throughout the Togolese Lagoon system

TOGO				BENIN			NIGER	GHANA	
Ewé	Watchi	Mina	Guin	Pedah	Pla	Other	Hausa	Adan	Ahoulan
11,5 %	16,9 %	39,3 %	1,7 %	12,7 %	0,6 %	3,5%	1,4 %	1 %	11,4 %
69.4 %				16,8 %			1,4 %	12,4%	

^{1/} From De Surgy in "Le littoral éwé et mina" CNRS. Undated

^{2/} From R. Lae-D.J. and E. Faggianelli in "La pêche artisanale individuelle sur le système lagunaire togolais". ORSTOM, October 1984, p. 14

^{3/} At Agbodrafo, Benionoise fishermen pay 2 000 CFA francs and presents (a gift) to the village chief upon their establishment

^{4/} Census conducted by H.K. Ahignon, cited by the Surgy, op. cit. p. 28

^{5/} According to S.S. Agboton

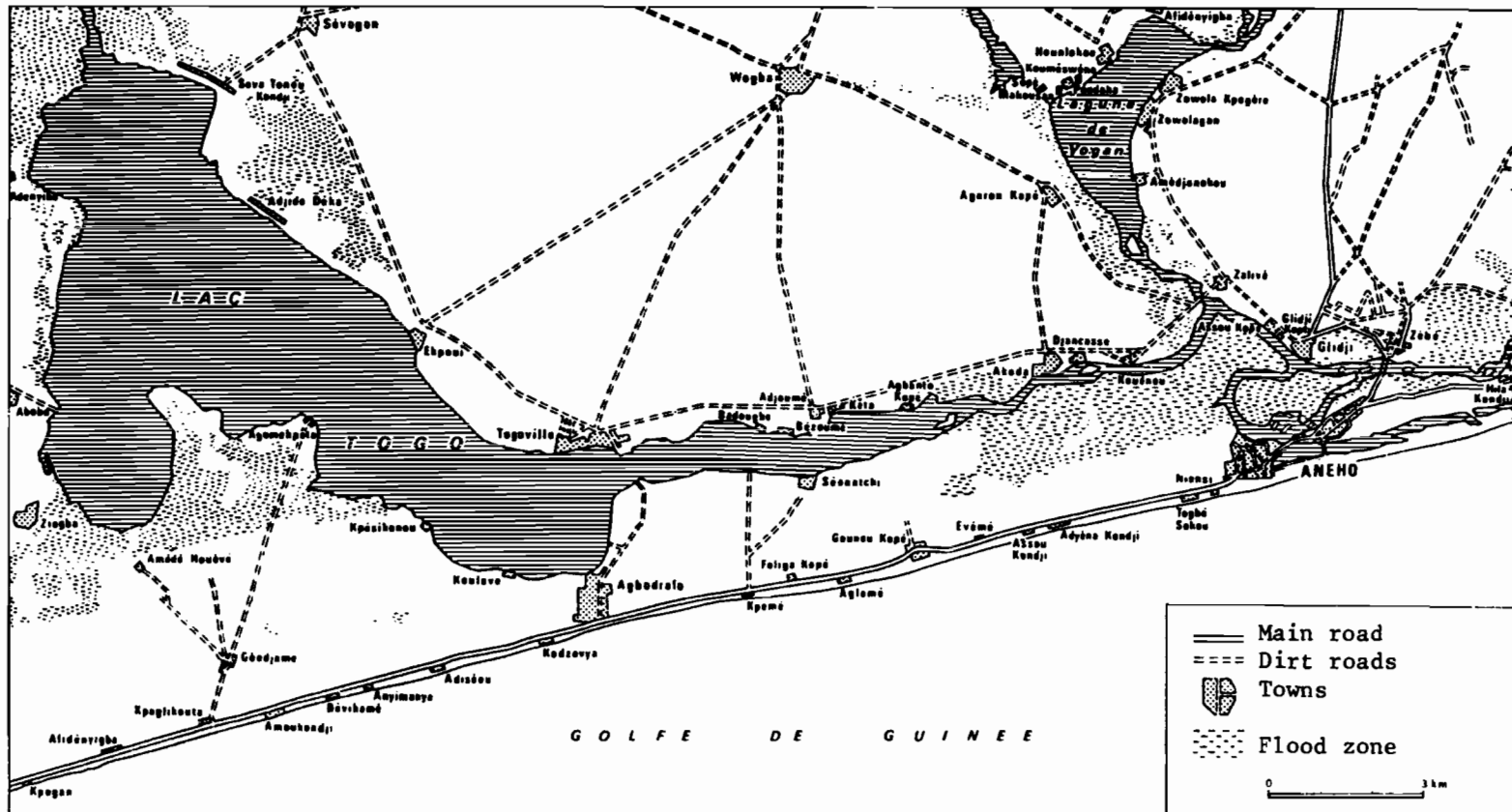


Fig. 7 Togo's Lagoon System

With the exception of the prohibition of beach and purse seines, traditional regulation is almost non-existent in the Togolese lagoon system. We cannot speak of management since there is no direct or indirect control of fishing effort. It is true that this is an individual fishery, more difficult to control or manage than a collective fishery, due to the heterogeneity of techniques and the dispersion of fishermen and fish traders which make formulating and enforcing regulation difficult. On the other hand, however, due to the small amount of capital invested, these fishermen have a mobility which permits self-regulation in response to the state of the resource. This explains the coming and going of semi-sedentary Beninoise or seasonal Hausa fishermen, in response to the fishery's potential.

However, fishing is the result of this absence of regulation and the use of individual fishing techniques - casting nets, small-mesh gillnets - which are responsible for at least 75% of the catch, especially of sarothéron, melanothéron and chrysichtys^{1/}. This situation is completely different from that prevalent in the Aby and Ebrié Lagoons, since individual fishermen are responsible for this over-exploitation. The prohibition of purse seines, however, permits a certain analogy between the Togolese and Grand-Lahou Lagoon systems, even though demographic pressure on the latter has not created such serious resource depletion. Faggianelli and Lae have in fact observed an over-fishing problem, revealed by the disappearance of large-mesh gillnets since the last time the lake was opened to the sea in 1980 and by examination of average catch size of the principal species, which indicate that these are inferior to the maturation stage for casting net catches (51% of the total) and of barely acceptable size for small-mesh gillnets (23% of the total), and that therefore stock fertility has been affected.

Here, unlike in the Ebrié or Aby Lagoons, there is no heavy concentration of the means of production, and resource distribution is more equitable. It would, in fact, be a subsistence fishery, like those co-existing with agricultural activity, if the proximity of the markets of Lomé did not allow fishermen to sell lagoon species at a certain profit^{2/}.

Although there are no traditional or modern regulations of fishing effort in force in the Togolese Lagoon system, two management projects do exist, or existed in the past: a water management project, the digging of a channel to link lagoon and sea, and the Beninoise aquaculture system known as the acadja.

- When floods are high enough, especially those of the Mono which affect the water level of the lagoons, an artificial opening is made to the east of Aného. The opening closes naturally after four or five months. (The canal was last opened in 1980.) Even when the canal is closed, there is some exchange between the lagoons and the sea, as proven by the presence of small tidal waves originating in Benin ("bouches du Roy") or the presence in the lagoons of species like the élops psenaeum shrimp or liza, which must reproduce in sea water. The canal at Aného permits an increased recruitment of large-sized individuals (polydactylus, trachynotus, liza) or post-larval shrimp, after eggs are laid at sea. If it remains seasonal, the increased salinity has little effect on species already found in the lagoons, since euryhaline species (sarothéron, tilapia guineensis) reproduce in a mixohalin environment, and species such as chrysichtys and hemichromis, which must reproduce in fresh or only slightly saline water, can tolerate wide variations of salinity. Lae and Faggianelli find this traditional system of alternate opening preferable to a permanent system which might result in too great an increase in salinity, discouraging the entry of continental species and seasonal fishing in flooded zones and inviting the development of worms which damage the acadjas.

^{1/} Idem p. 51

^{2/} A current analysis of a socio-economic survey of Togo's lagoon and Ocean fisheries, effected by ORSTOM, should provide more detailed knowledge of exploitation conditions. (J.Y. Weigel)

- The acadja, an aquaculture technique originating in Benin, was developed throughout the lagoons of Togo between 1964 and 1974. On Lake Togo, the technique consisted of creating an artificial network of chambers with branches 3/4 submerged vertically in deep water, and supported by the sediment in which they stand. In order to encourage adoption of the new technique, the Fishery Service built the first acadjas at Agbodrafo, Kpota, Amindji and Amedehoeve. Their success encouraged fishermen to form a cooperative in order to take advantage of the loans offered by the CNCA (Caisse Nationale de Credit Agricole). The project was intended to check the decrease in catch due to overexploitation which followed the massive arrival of new fishermen (returning migrants and farmers ruined by the disease affecting coconut plantations along the coast). Between 1969 and 1972, no fewer than 36 loans were made to cooperatives of acadja fishermen involving, according to Agboton, more than 300 fishermen. These fishermen built as many as 133 acadjas, each producing 5 t per 0.7 hectares, until the prohibition of acadjas in 1975.

Census of acadjas in the Togolese lagoon system (1974)

Village	Surface area m ²	Village	Surface area m ²
Degbeunou	6 875	Agome-Kpota	160 000
Abatikope	10 000	Amedehoeve	72 500
Seouatchikope	160 000	Abobo	25 000
Djasseme	60 000	Kpoguede	22 500
Agbodrafo	78 750	Ekpui	70 000
Kulevo	60 000	Adidodeke	50 000
Amindji	70 000	Agovoudou	20 000
		Togokome	36 875
Total surface area: 902 500 m ²			

On the positive side, acadjas eventually repopulate the lake or lagoon, save the fisherman/farmer's time and are profitable. Their disadvantages are the relative deforestation they cause, the hard labour involved and, initially, a certain competitiveness with traditional fishermen. It has not been possible to manage this competition: the growing inequality between acadja fishermen, many of whom were functionaries in Lomé and therefore had access to credit, and traditional fishermen, led to conflicts which caused acadjas to be banned. This inability to manage the acadja, similar to the situation prevailing on Lake Ahemé, makes it difficult to identify the management system best suited to Togo's lagoon system.

6. THE LAGOON AND LACUSTRINE SYSTEM OF BENIN

The Lake Ahemé and Nokoué fisheries have been in operation for a very long time and local residents are therefore extremely sensitive to efforts intended to control fishing effort or even to measures meant to increase productivity through the development of the acadja, a type of aquaculture native to Benin. Traditional authorities have created an arsenal of regulations and sanctions covering Benin's entire lagoon network, prohibiting certain techniques and gear, identifying prohibited zones and obligatory rest days, and in some areas, appropriating lagoon or lake plots for the installation of trap fisheries, fish holes (huedos), or brush park fisheries (acadjas).

In some places (Lake Nokoué and the coastal lagoons), the permanent nature of traditional structures has been able to contain the conflicts inherent to resource exploitation. In others, where traditional authority is failing, modern structures are ineffective, demographic pressure heavy, and conflict is bitter (Lake Ahemé).

6.1 Traditional Regulation

While traditional regulation on Lake Nokoué and Lower Ouémé is primarily concerned with the long-standing practice of techniques such as the acadja and huedo fishing, on Lake Ahemé and the coastal lagoons they apply principally to capture fishing.

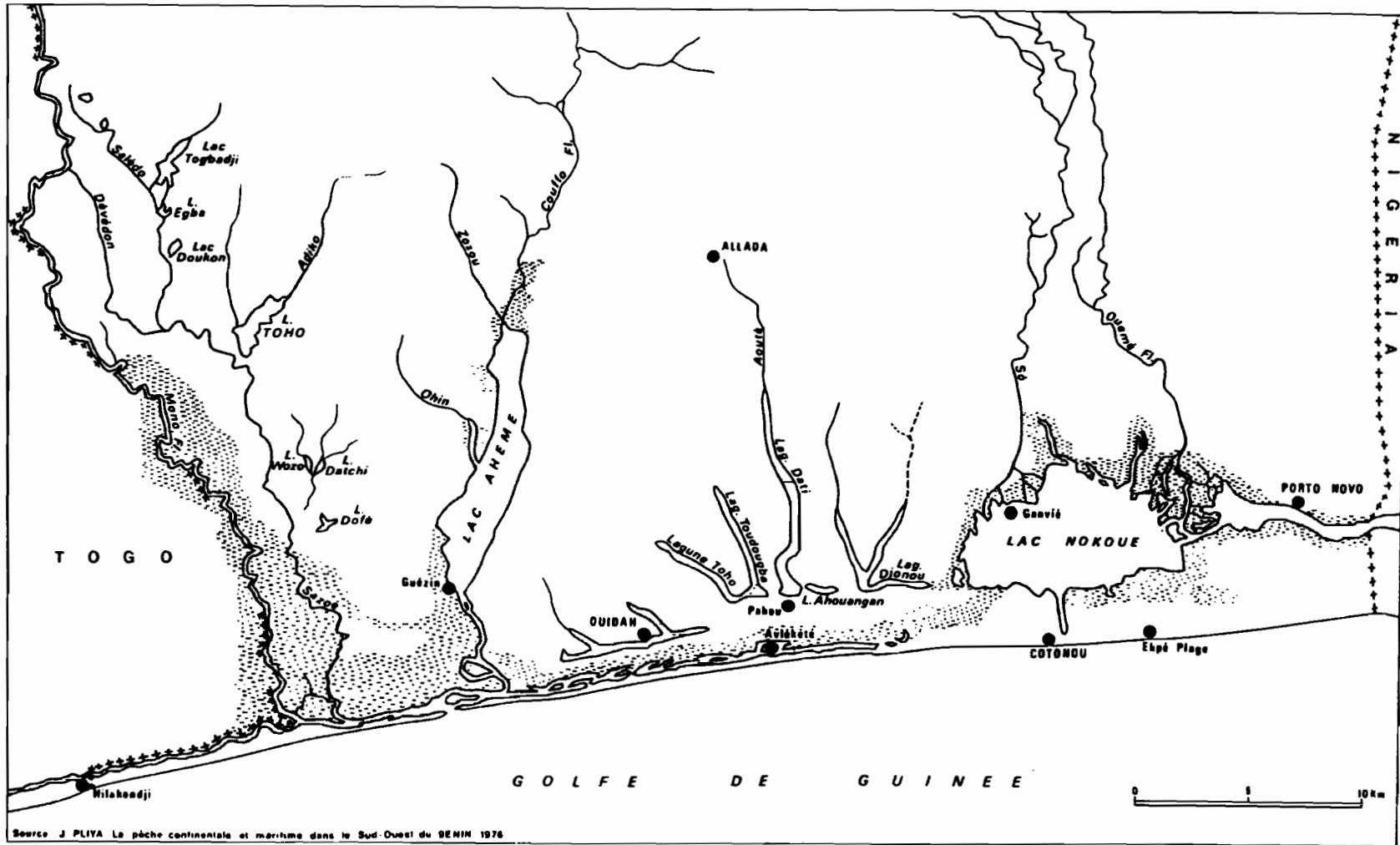


Fig. 8 The Lagoons of Benin

- Bourgoignie^{1/} attempts to synthesize traditional codification of fishery exploitation on Lake Nokoué. Among measures affecting capture fishing activities he cites the prohibition of small-mesh nets and the existence of prohibited fishing zones, which he lists (Zahunhuémé, Danhodji, Lanwanmé, Hungboghato, Daleji, Gbadomé, Doyikpémé, Ongongonkmé, Drinzumé near the village of Gbessou and Vodunviji near the village of Dékanmé) and whose existence is often due to the importance of those locations to the practice of voodoo rather than to an effort at resource preservation. Regulation of acadja and huedo fishing practice is described in greater detail. Zones on Lake Togo and Lake Ouémé are exploited as the result of government decree on 20 April 1966, which conceded fishing rights to individuals and local communities. These concessions may be either sold or rented. Although brush park fisheries can be erected on any water location in principle, in practice, the individual or kinship group which has appropriated that plot must agree. The principal rules for exploitation are maintenance of a certain distance between one settlement and another, so that canoes may pass unhindered, and the prohibition of fishing by third parties within the acadja or just outside it after causing fish inside to exit. Huedos, found in Lower Ouémé in particular, may only be set in areas which belong to no kinship group. The user must not impede the flow of the waters of the delta or of his plot, must not drain water from any contiguous plot and must cede passage and drawing rights.

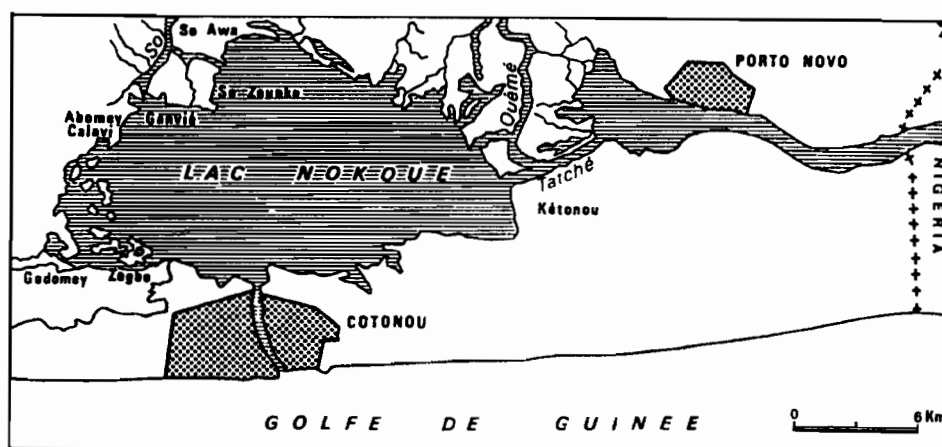


Fig. 9 Lake Nokoué and the Port Novo Lagoon

Pliya^{2/} lists many prohibitions and regulations relative to fisheries on Lakes Ahemé and Toho and the lagoon region. Prohibited fishing techniques are djetowle (debarking from a canoe while in water), doubou-douboui, which consists of surrounding a school of fish with several canoes, and amedjrotin, which may be described as a construction of palm branches, originally a small version of the acadja. Prohibited gear are the djohoun (a multi-hook longline), the assabou (a cast net forbidden on Lake Toho, and general prohibition of the gletto (a small purse-seine used in the deepest waters). Measures which affect fishing effort are the prohibition of fishing two days per week on Lake Ahemé and the suspension of all fishing activity for one week, every two or three years during ceremonies in honor of the fetish Adihpo of Honedjro. Also for religious reasons, which indirectly contribute to resource preservation, prohibited zones have been created on Lake Ahemé (the Island of Mitoghodji southwest of the lake) and on the Ouidah Lagoon. (The "yéhouéto" an arm of water almost one kilometer long, separated by two dams).

1/ G.E. Bourgoignie in "Les hommes de l'eau - Ethno-écologie du Dahomey lacustre" Editions Universitaires, 1972; pp. 225 to 238

2/ J. Pliya in "La pêche dans le sud-ouest du Bénin". A.C.C.T. 1981; pp. 116 to 119

6.2 Current Practice of Traditional Management

With the exception of the prohibition of seine fishing, the exercise of territorial use rights is the only form of fishing effort regulation now applied. Although their effect on fishing effort is difficult to ascertain, they do control access to the resource in the case of acadja implantation on Lake Nokoué, and of huedos in the Ouémé Delta, and regulate fishery construction throughout the lagoon network^{1/}. Other methods of fishing effort regulation, such as prohibition of certain zones^{2/} or of certain practices or gear, have generally disappeared with the increase of effort linked to demographic pressure, particularly heavy in the southwest. Given the relatively peaceful coexistence of individual and acadja fishermen despite some isolated conflicts, it would seem that Lake Nokoué residents are better able to manage resource exploitation than those of Lake Ahémé, who, like the inhabitants of the Lake Togo area, are unable to manage the acadja fishery or the effects of heavy demographic pressure.

Although it is an ancient practice which regroups many types of installations, (godokpono, amedjrotin, adokpo, ava, hanou, hanoumecadja), the acadja, whose productivity has been analysed by Welcomme^{3/}, continues to develop side by side with the individual fisheries on Lake Nokoué. Conflicts have arisen which reveal the difficulty but not the impossibility of such coexistence. An example is the conflict between the fishermen of Ganvié and those of Zogbo over the appropriation for acadja construction of the first lagoon plots abandoned by shrimp fishermen following the gradual closure of the lagoon^{4/}. Again the conflict between the same groups in early 1982 over oyster exploitation by Ganvié fishermen may be cited, or the conflict at Aguégué in 1981 between line fishermen and acadja fishermen, which led to the creation of a separate zone for each type of fishing. The possibility of coexistence has led to the development of private and cooperative acadja fisheries. One project has been responsible, since 1978, for an acadja fishery covering 80 hectares, and involving 17 cooperatives composed of about 300 fishermen^{5/}.

In 1970 and 1971, a serious conflict between individual and acadja fishermen on Lake Ahémé resulted in the dismantling by the military of all the acadjas on the lake. This conflict had been developing since acadjas were popularized in 1957, and its eruption demonstrates the inability of social measures to manage a technique so productive as to be able, if properly exploited, to yield 5 t per hectare and repopulate the entire lake. Pliya places responsibility for the crisis situation upon the breakdown of traditional structures, especially the loss of authority of the Zennos of Guezin (southern part of lake) and the ineffectiveness of new structures, which are almost absent here. The anarchy which characterized acadja implantation and exploitation can be seen in their multiplication. They covered 162 hectares in 1970^{6/} with an excessive fishing frequency of as many as six harvests per year rather than two as generally recommended. Individual fishermen, especially those on the southern and western banks, protested that the acadja monopolized space and impoverished traditional fishing zones (due to frequency of exploitation, the acadjas were functioning as traps rather than as places for repopulation). Despite the undeniable drawbacks associated with acadja fishing - deforestation and increased sedimentation - previous yields as high as a five ton average for acadjas on Lake Ahémé^{7/}, compared to current yields of 150 kg per hectare for individual fishing on Lake Togo, indicate that the present exploitation scheme on Lake Ahémé is not efficient.

1/ An example of the consequences of appropriation is a confirmed case of the rental at Hio of a lagoon plot on the coastal lagoon near Avlekete for construction of a trap fishery, for a fee of 2 000 CFA francs per year. There is also a case of a definitive sale of another plot for 25 000 CFA francs

2/ At Ganvié, fishermen informed us that the prohibition of certain zones mentioned by Bourgoignie is not respected

3/ R.L. Welcomme in "An evaluation of the Acadja Method of Fishing as Practised in the coastal lagoons of Dahomey (W. Africa) " J. Fish Biology 1972, No. 4, pp. 39 to 55

4/ According to G. Agon of the Department of Fisheries

5/ According to M. Assicome Kodjo, Head of acadja cooperatives of the So Awa lacustrine district

6/ and 7/ According to J. Pliya, op. cit. p. 145 (observations of R.L. Welcomme)

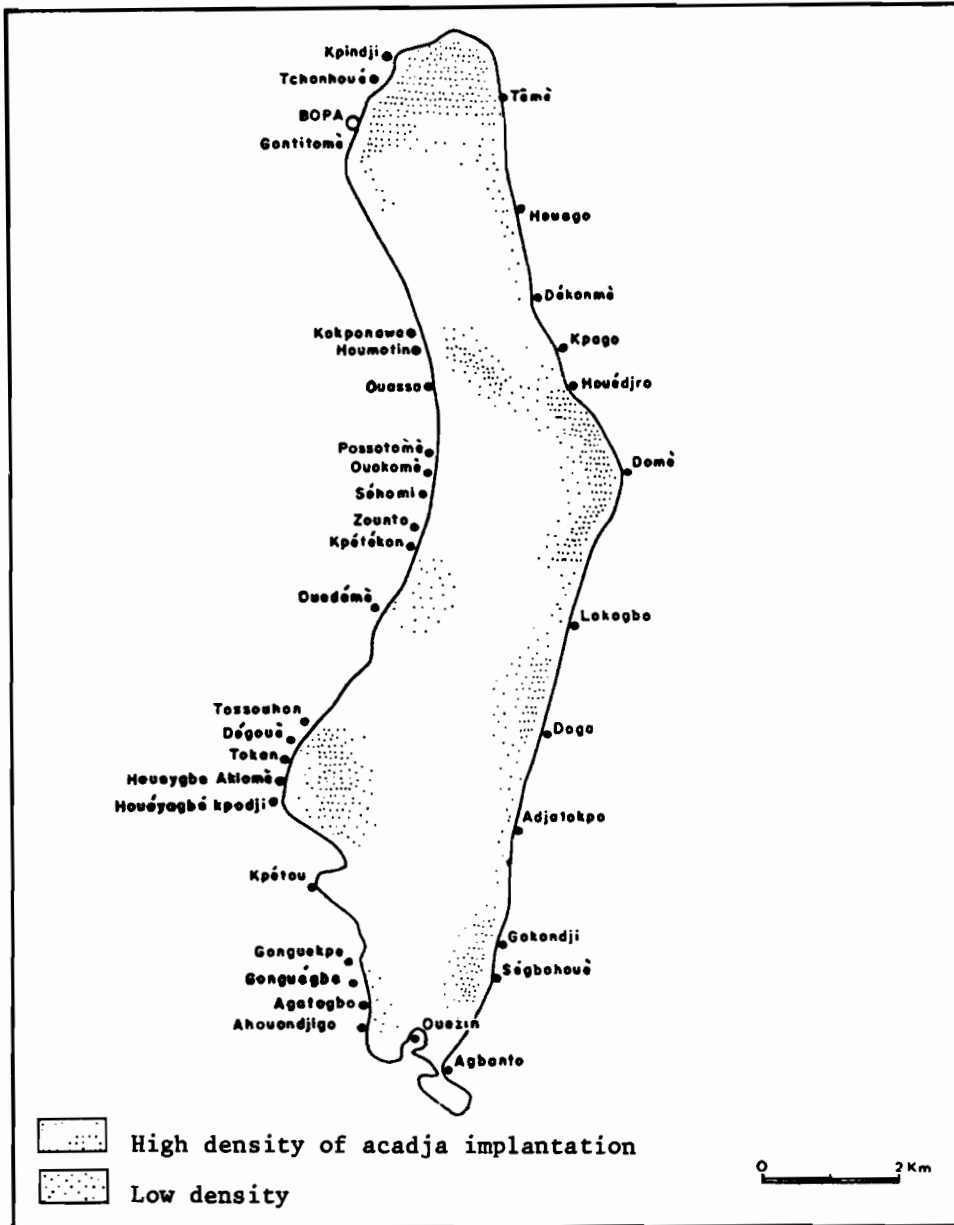


Fig. 10 Acadja distribution on Lake Ahémé in 1970

7. THE LAGOONS OF GHANA

The Lack of data about Ghana's lagoon network, concerning fishery statistics as well as the biological and socio-economic conditions of resource exploitation, also extends to traditional management methods. Nevertheless, a study effected by De Surgy on the lagoons of Keta, the observations of M.A. Mensah covering the entire lagoon system and those of D. Pauly on the Sakumo II Lagoon do yield some information.

7.1 General Situation of Ghana's Lagoon fisheries

The differentiation proposed by A.S. Boughey^{1/} distinguishes "closed" lagoons, situated for the most part in eastern Ghana, where rainfall is light, beginning just beyond a temporarily open sand belt and not fed by major rivers, from the "open" lagoons

1/ A.S. Boughey in "Ecological Studies of Tropical Coastlines". 1. The Gold Coast-West Africa. J. Ecol. 45. 1957

of eastern Ghana which encompass the Keta lagoons as well and are constantly fed by major rivers. The Keta Lagoon and the border Lagoon of Aby may be distinguished by their size from the 48 other lagoons of much smaller size^{1/}, of which the most important are Amansuri Brenu, Benya, Fesus, Amisa, Nakwa, Sakumo I, Kpeshie, Sakumo II and Songaw.

Data on fishing effort is quite scarce. M.A. Mensah notes a considerable drop in fish catches in the Keta Lagoons since 1975 and the construction of a bridge at Strogboe which considerably reduced water exchange between the Volta estuary and the Keta Lagoons^{2/}. D. Pauly estimates catches in the Sakumo II Lagoon (almost exclusively composed of tilapia melanotheron) at 150 kg per hectare^{3/}. De Surgy differentiates and localizes the various fishing techniques in the Keta Lagoons. While casting nets and gillnets are used throughout the network, long lines and shrimp nets are used in deep waters (Atiteti, Fuveme, Dzita, Strogboe, Whuti, Kedzi, Blekusus, Agbasome and Aflao). Dam fisheries (hatsi) made of earth are found in zones which are dry during part of the year (Kodzi, Tegbi, Atorkor, Aflao, Adina), traps are found in shallows or at river mouths, and acadjas are localized at Agbasome, Afiadenyigba, Alakple, and Atorkor.

7.2 Some Data on Traditional Management

In the Benya, Nakwa, Sakumo, Laiwa and Jenge Lagoons, according to M.A. Mensah^{4/}, closed periods of six and even ten months were instituted by religious leaders. These measures were intended to limit annual fishing effort, but at present it seems that these seasonal prohibitions either no longer exist or have been replaced by much less drastic measures such as the prohibition of fishing one morning per week in the Sakumo II Lagoon^{5/}.

Two regulations seem to be applied throughout the Keta Lagoon network: the prohibition of destructive gear such as beach and purse seines and free access for other gear, except for hatsis and shrimp nets. A certain control of access to the fishery is in fact exerted by the villages or kinship groups which control occupation of the lagoons or the dependent work forces which exploit the fisheries. For example, no one may construct a hatsi without making an agreement with the owner of the lagoon plot in question, whether it is a kinship or subkinship group chief, as in the Kodzi, Fiahor and Alakple region, or a village chief as in Agbosome. Exploitation of a hatsi is carried out by relatives or by contractors, as in certain villages like Anloga, where the right to participate in exploitation may be sold or pleased.

8. CONCLUSION

The example of the lagoons of the Gulf of Guinea demonstrates that traditional regulations show both a recognition of the need to preserve the resource, as proven by the prohibition of purse seines in most lagoons or the reaction of Aby or Ebrié Lagoon fishermen to the destruction caused by seines, and also the expression of a desire to profit as quickly as possible within a system of direct or indirect control by local residents of the means of production, which usually results in over-exploitation of the resource and financial hardship to fishermen.

The objective of traditional management rarely appears to be a rational resource management throughout the lagoon network. On the contrary, by their localized character, ad hoc nature, precariousness and inconsistency, traditional regulations often demonstrate that their objective is the defense of the frequently contradictory

1/ The surface area of Sakumo II, for example, is 1 km²

2/ According to M.A. Mensah in "The Hydrology and Fisheries of the Lagoons and Estuaries of Ghana" Fishery Research Unit. Tema. Dec. 1979

3/ According to D. Pauly in "The Biology, Fishery and Potential for Aquaculture of Tilapia Melantheron in a Small West African Lagoon", published in Aquaculture No. 7, 1976

4/ Op. cit.

5/ Personal observations, November 1984

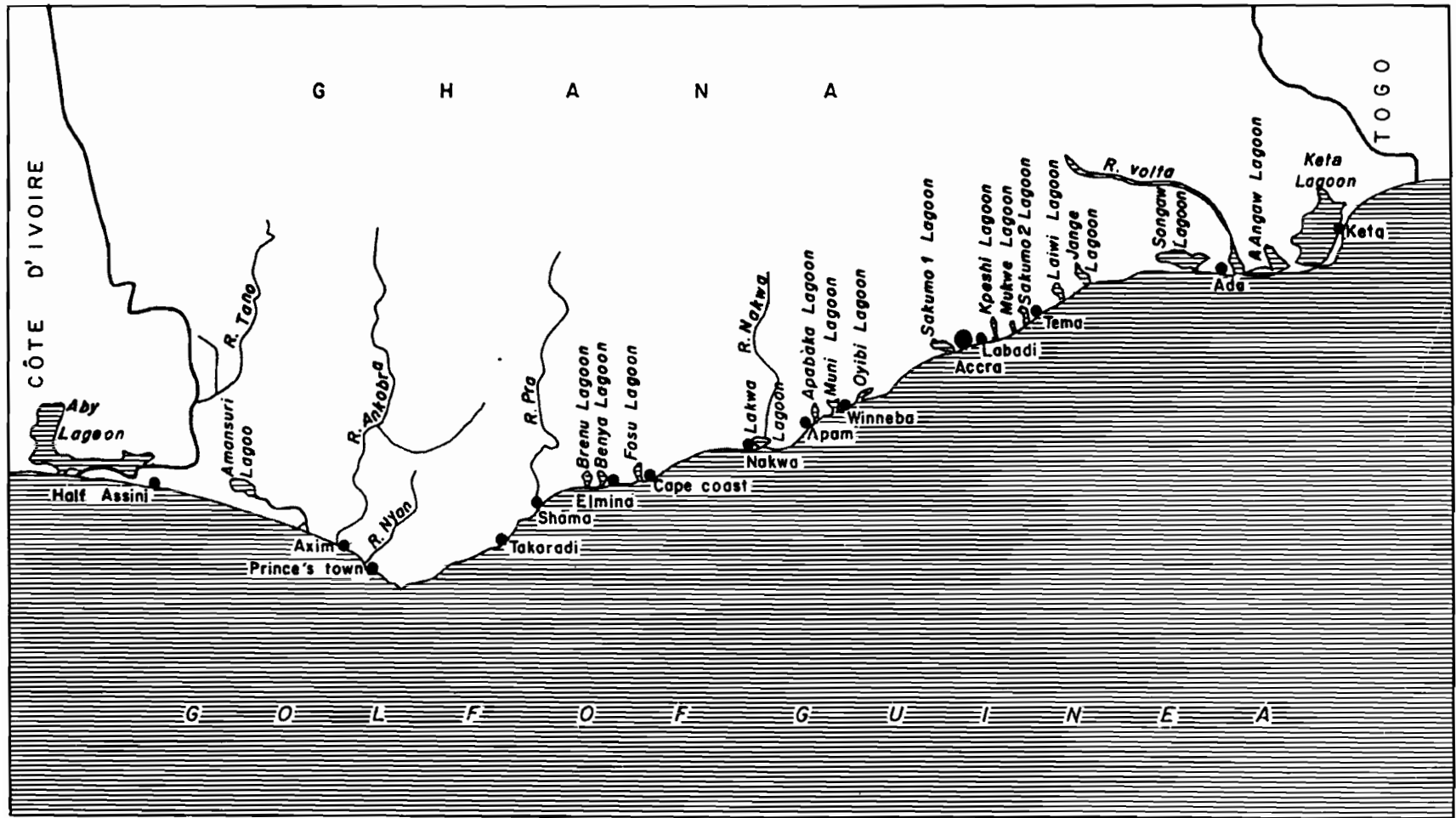


Fig. 11 The principal lagoons of Ghana^{1/}

^{1/} From M.A. Mensah

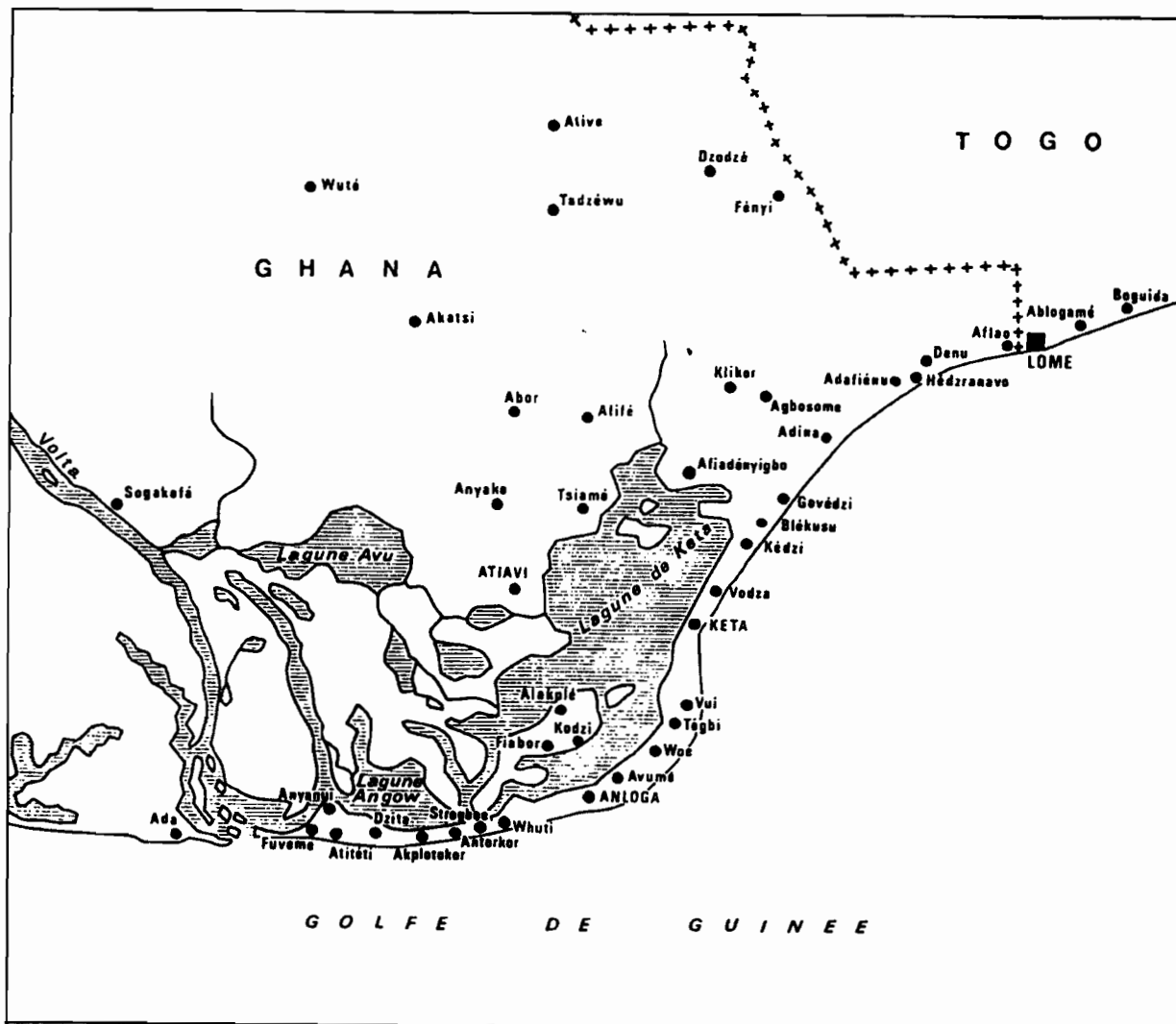


Fig. 12 The Keta Lagoons

interests of local residents. Two examples of the limitations of traditional management are first its inability to manage migratory stocks, since there is usually no cohesive regulation for any given lagoon system, and second the ineffectiveness which characterizes the collection of user fees - one aspect of the exercise of territorial use rights, which is often presented as a form of management because it is meant to limit access, and permit the extraction of rent. However, the perceived level of user fees is often insufficient to limit new entrants to the fishery and can, in addition, bring about an increase of fishing effort deployed by each fishing unit. In order for the perceived level of user fees to be really effective, it would be necessary for them to have as their objective the control of fishing effort with the aim of improving or maintaining the social and economic rent of the fishery.

Traditional regulation has known both success and failure. In some cases, it has been unable to limit access (Lake Togo), control the consequences of technological innovations (Aby and Ebrié Lagoons) or promote the coexistence of different types of fishing activity and fishermen's communities (Lake Ahémé, Ebrié Lagoon). In other cases, however, traditional management has succeeded in promoting this coexistence (Lake Nokoué) and been able to absorb new techniques (Aby Lagoon). Traditional management is most successful where there are both strong traditional authority and long-practiced fishery techniques, where demographic pressure is low or where there are few conflicts due to the introduction of new technologies.

Traditional kinship groups or village authorities attempt to manage the lagoons: official administrative services are often absent or handicapped by the absence of legislation and are unable to supplant them, although these services may still claim free access in the name of state ownership of the waterways (Ivory Coast, Benin).

Low demographic pressure (Grand-Lahou Lagoons), unless it is compensated by an unregulated development of high-yield, low-selectivity techniques (Aby Lagoon), favor control of fishing effort. However, even using low-yield gear, a large population can exert excessive fishing effort resulting in over-exploitation (Lake Togo).

Population pressures which affect the lagoon shares are linked to employment opportunities in sectors other than fisheries. Thus one might think that, in the absence of employment possibilities at the regional level, the local pressures would increase (as in the case of Lake Togo) and vice versa. But the mobility of the labour force and the ease of movement across fisheries tends to equalize these pressures as is confirmed by the large number of migrant fishermen in Ivory Coast who apparently benefit from greater employment opportunities than their neighbours.

Unless controlled by specific regulations, new technologies can lead to stock reduction and a crisis situation often marked by violent conflict, as a result of which the new technology is either simply rejected (Ebrié Lagoon) or becomes the object of new regulations based on the old which are difficult to enforce (Aby Lagoon).

Traditional regulations are valuable in that they exert some control (however imperfect) over fishing activities, which the state is unable to provide. Their decentralization is a point in their favor inasmuch as they adapt themselves to the specific constraints of each overall lagoon system. They might serve as models for regulation at the national level, in which case the diverse nature of each lagoon system should be taken into account. Fishermen's cooperatives, experienced in self-management, could assume responsibility for modern regulation enforcement should traditional authorities fail. Modern regulation should correct the faults of traditional regulation, taking modern techniques into account as well as proposing others. It would of course require the knowledge of biological and socio-economic conditions now sadly lacking.

The acadja technique, of much interest to management planners, appears to be the most promising form of traditional management. Successful acadja fishing requires good management: a sufficient density of branches and not too frequent fishing. Its disadvantages are deforestation and initial competition with other fishing activities. The growth of the acadja fishery on Lake Nokoué proves that conflicts can be mediated; its prohibition and disappearance from Lake Ahémé and the Togolese lagoon system prove the difficulty of such mediation. In view of the constraints involved in intensive aquaculture (high operating costs, prerequisite knowledge of the breeding cycles of certain species) which is still in the experimental stage in Benin and the Ivory Coast, the extensive Beninoise aquaculture is of great interest. Given past failures, however, it should be carefully studied prior to popularization and the methods of social and economic organization best suited to (and compatible with) those of traditional fisheries should be chosen.

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