



**International  
Institute for  
Environment and  
Development**

**Drylands Programme**

**Pastoral Land Tenure Series Monograph 3**

**Structural Chaos:  
Community and  
State Management  
of Common Property  
in Mali**

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Richard Moorehead  
1997

**Structural Chaos: Community and  
State Management of Common  
Property in Mali**

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September 1991**

**Doctor of Philosophy in Development Studies  
Thesis  
University of Sussex**

## ACKNOWLEDGEMENTS

I should like to thank the International Union for the Conservation of Nature and Natural Resources for permission to use some of the data presented in this thesis. I am also grateful to the Ministry of Natural Resources, the Ministry of Education, the National Directorates of Water and Forests, and of Higher Education and Scientific Research of the Republic of Mali for facilitating and authorising the research in the field.

The farmers, fishermen and herders who put up with my incessant questions over many years are too many to mention, but I should like especially to thank the late Oumarou Oumarou, and Koumbéré Konta of Garceye, Abba Gallo and Guimba Bâ of the Yaalalbé, and the late Ngada Kourenzo of Banaji. I hope that Mamadou Bangaly, Moussa Dao, Arsiké Coulibaly, Amadou Touré, Almami Traoré and Nouhoun Baalo find the arguments presented in this thesis reflect the work we shared in the field, and in some measure give a true account of what is happening in the Inland Niger Delta.

In particular I should like to thank Jeremy Swift for his supervision of this work, Stephen Cobb for his encouragement, Jamie Skinner for teaching me much about the principles of ecology, and Patrick Dugan for his constant support. Charles Lane showed me how to avoid many of the pitfalls involved in writing up this thesis and I am grateful to him for many perceptive comments. Without the support, and critical appraisal of Susanna Davies, and her help in compiling and proof reading the text, this work would never have seen the light of day.

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DPhil DEVELOPMENT STUDIES

STRUCTURAL CHAOS: COMMUNITY AND STATE MANAGEMENT OF  
COMMON PROPERTY IN MALI

SUMMARY

This thesis examines the conditions in which common property institutions are created and destroyed in the Inland Niger Delta of Mali, West Africa, an area of great natural and production system diversity, and one which has suffered from periods of drought over the last twenty five years. The work demonstrates how the progressive destruction of local producers' ability to manage access to resources they customarily controlled is creating conditions in which 'Tragedy of the Commons' outcomes are made likely. A synergy between drought conditions and the rural development policies of the post-colonial state is creating a situation of 'structural chaos' in which the natural resources of the zone are being mismanaged and the rural poor marginalised.

Using an adapted version of the Oakerson (1986) framework to analyse data to household level, the thesis demonstrates how historically, fishermen, farmers and herders of the Delta had evolved an effective system of natural resource management which was compatible with the physical attributes of the resources, as well as mitigating against environmental risk. The advent of drought in the Delta in the 1970s and again in the 1980s has coincided with: an increasingly extractive fiscal policy in the area, imposed by the post-colonial state; the monetisation of the Delta's economy; and the nationalisation of its natural resources. Whilst rural producers have become increasingly dependent on the market for the provision of basic necessities, and the Delta's resources have come to provide a safety net for neighbouring producers, state policies and practice have been used to open out former communal resources to provide access to those Malian citizens with preferential links to various structures of the post-colonial state.

Drawing on case studies, the thesis shows how, in this process, the linkages between knowledge of the resources, dependence on their sustainable production and responsibility for their management, have been broken; thereby leaving the door open to outsiders with short term interests to 'mine' the area's most marketable assets, and to 'free-ride' upon local management systems.

The thesis concludes with a set of policy options for empowering local communities to manage the assets they depend upon for their livelihoods, in the context of the emerging policy of the Malian state to incorporate local people into rural development planning.

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LIST OF ABBREVIATIONS

AOF	Afrique Occidentale Française
BNDA	Banque Nationale de Développement Agricole
BPN	Bureau Politique Nationale
CEA	Commission Economique pour L'Afrique
CIPEA	Centre International pour l'Elevage en Afrique
ENDA	Environnement et Développement du Tiers Monde
FAO	Food and Agriculture Organisation of the United Nations
FCFA	Franc Communauté Financière Africaine
FNUAP	Fond des Nations Unies pour les Activités en Matière de Population
GRPSM	Groupeement Rural de Production et de Secours Mutuel
IIED	International Institute for Environment and Development
IFAN	Institut Fondamental d'Afrique Noir, Dakar (formerly Institut Française d'Afrique Noir)
INRZFH	Institut Malien de Recherche Zootéchnique, Forestière et Hydrobiologique
IUCN	International Union for the Conservation of Nature and Natural Resources
MRNE	Ministère des Ressources Naturelles et de l'Elevage
NOAA	National Oceanic and Atmospheric Administration
NORAD	Norwegian Agency for International Development
ODEM	Opération de Développement de l'Elevage dans la Région de Mopti
ODI	Overseas Development Institute, London
ODR	Opération de Développement Rurale
OMM	Opération de Développement du Mil dans la Région de Mopti
OPM	Opération de Développement de la Pêche dans la Région de Mopti
ORM	Opération de Développement du Riz dans la Région de Mopti
ORSTOM	Institut Française de Recherche Scientifique pour le Développement en Coopération (formerly Office de Recherche Scientifique et Technique d'Outre Mer)
PIRT	Projet d'Inventaire des Ressources Terrestres
PNUD	Programme des Nations Unies pour le Développement
PSP	Parti Progressiste Soudanais or Parti Soudanais du Progrès
RIM	Resource Inventory and Management Limited (St. Helier)
SOMIEX	Société Malienne d'Importation et d'Exportation
SSA	Sub-Saharan Africa
TLU	Tropical Livestock Unit(s)
UDPM	Union Démocratique du Peuple Malien
USAID	United States Agency for International Development
USRDA	Union Soudanaise - Rassemblement Démocratique Africain
WCED	World Commission on Environment and Development
WHO	World Health Organisation

GLOSSARY OF TERMS**FULFULDE**

(second word is the plural form of the noun)

Ardo, Ardubé	Master of the Pasture
Bal-mal(-húti)	Pleiades (constellation of stars)
Beit-el	State property under the Dina
Bendi	Milk herd
Bourgou	Echinochloa stagnina
Dá	Hibiscus asper
Débaré, Débadi	Deep pools, where Feya grow
Dengwel, Dalé	Bank of rivulet
Degai, Degge	Cattle crossing
Dialloubé	Fulani clan of the Delta
Dina	Fulani Theocratic State (nineteenth century)
Dioum-oro (Dioro)	Master of the Pastures
Eggirgol, Eggirdé	Pasturing territory (sub-division of Leyde)
Fakala	Area to the south east of the Delta
Fama	Bambara king
Ferobé	Fulani clan of the Delta
Feya	Flooded pasture (medium depth)
Fittobé	Fulani clan of the Delta
Fonio	Digitaria exilis
Guimballa	Erg of Niafunké
Hamdallahi	Capital of the Dina
Harrima	Village pasturing territory (formerly reserved pasture for Bendi)
Imam	Priest
Kayama	Founding lineage
Kitangal	Famine of 1912-13
Kobé	Variety of rice from Indo-China
Kounari	Area to the east of the Delta
Leydi, Leyde	Traditional natural resource management unit, pasturing territory (comprising Togguéré, Roundé, Dengwel, Feya, Débaré and Naval)
Lu	Bambara lineage
Marabout	Holy man
Namu-tuu	Sacrificer
Naval, Navé	Permanent dry season water point
Ouro, Guré	Fulani village
Ourobé	Fulani clan of the Delta
Ouronké	Villagers (inhabitants of Ouro)
Roundé, Doude	Island, or highest part of the floodplains
Togguéré, Toggué	Island in Delta which does not flood and where villages are built
Ton	Bambara association



## FRENCH

Arrondissement	(Administrative) sub-district (sub-division of Cercle)
Bourgoutière(s)	Deep water pasture (see Fulfulde Bourgou above)
Cantons, Cantonnements	Colonial administrative district
Cercle	(Administrative) district
Commandement Indigène	Indigenous administration
Concession(s) Rurale(s)	Legal term for holding for which title can be sought
Corvée	Labour tax
Livret Foncier	Land deed
Office du Niger	Irrigated rice scheme to the south west of the Delta
Pinasse	Motorised canoe
Service (or Bureau) des Eaux et Forêts	(Government) Water and Forestry Agency
Section	(Political) constituency
Sous-section	(Political) sub-constituency
Sous Tutelle	(District) under direct administrative control of central Government

## CHAPTER ONE

## 1. INTRODUCTION

## 1.1 The General Context

This thesis compares the value of different resources - agricultural land, fisheries, pasture and forests - to a range of production systems exploiting an area of great seasonal and annual variability in climatic conditions in Sub-Saharan Africa (SSA), between a pre- and post-drought period using household data collected in 1979/81 and 1984/85. The focus of the work is on 1) the ability of rural producers to manage access to resources of different value to them at different moments in the year, 2) how some resources have become increasingly valuable as dry conditions persist, and 3) how rural producers have been able to regulate entry to those resources as they have become strategic to their livelihoods.

The work demonstrates how the progressive destruction of local producers' ability to manage access to resources they customarily controlled is creating conditions in which 'Tragedy of the Commons' outcomes are made likely. A synergy between drought conditions and rural development policies of the post-colonial state is creating a situation of "structural chaos", in which the natural resources of the zone are being mismanaged and the rural poor further marginalised. The implications for policy at both the local and national level, and the linkages between the two, are explored with a view to proposing practical measures that need to be taken if resources in this area of great environmental value are to be conserved and regenerated.

In particular, this thesis examines the conditions in which common property institutions are created and destroyed and suggests ways in which the dominant 'free-rider' strategies being pursued in the area today can be converted to cooperative and coordinated strategies in the future. It argues that common property management is efficient in allocating access to and managing the environment where the distribution of natural resources is random, but only if the communities concerned are given the power and responsibility to

exclude outsiders and allocate resources among themselves. Indigenous communal institutions for coordinating production decisions exist in rural communities which can be adapted and improved in line with modern political, economic and environmental conditions very different to those that created them in the past. These institutions can provide a framework within which initiatives can be promoted aimed at linking an improvement in rural livelihoods to measures that protect and enhance the productivity of the environment.

The hypotheses this thesis examines are:

- 1) Where prolonged drought has reduced the productivity of natural resources, rural subsistence producers re-orient their activities towards the market. In this process, natural resources used for market production come under increasing pressure.
- 2) Rural producers can generate successful forms of resource management in conditions of increasing scarcity. Their ability to do so however, depends crucially on the support of wider political and economic structures in upholding increasingly restrictive communal rules of access.
- 3) Where the state seeks to transform the way natural resources are owned and managed, unmindful of the local characteristics of those resources or the conditions under which they are managed by local producers, there is an increasing likelihood mismanagement will ensue. This weakens the linkages between knowledge, dependence and responsibility for management upon which wise use depends, and promotes "Tragedy of the Commons" outcomes.

The general unit of analysis used in this thesis is the communal management system, made up of a set of households arranged in lineages. Management systems are compared between production systems, exploiting an array of natural resources through the seasons of the year. Their linkages to wider, extra-communal structures are examined in order to show how groups of actors with

competing claims to resources coalesce around political and economic structures empowered to manage access to them.

A change in the relationship between wider political and economic structures with local management systems can in this manner be examined in the light of equitable and efficient outcomes, both in terms of the natural resources themselves and those who depend upon them. The approach used here is that of Oakerson (1986), who argues a fundamental "congruence" needs to exist between the physical and technical characteristics of a resource, how it is managed, and the relationship of the management system to the wider political and economic constituency in which it is embedded.

This work is therefore part of the wider debate between planners, governments, and social and natural scientists on how to incorporate environmental issues into rural development initiatives. Over the last ten years there has been a qualitative shift in perception of environmental problems: whereas formerly concern was focused on the damage development initiatives did to ecosystems, nowadays it is increasingly realised that environmental degradation is threatening Third World countries' potential for economic development. The ability of developing countries to sustain and expand their environmental resource base is nowadays accepted as being the *sine qua non* of their future sustainable development. It is now understood that environmental issues inform all other aspects of the rural economy: whereas before the planet was large enough to contain human activities, and the effects of those activities were compartmentalised within nations and within sectors, nowadays the growing pace and intensification of use of the environment has led to a cumulative interdependence of ecological, economic and political factors at all levels from the local to the global (World Commission on Environment and Development - WCED - 1987).

It is broadly accepted by social scientists and some environmentalists that the people most concerned by the increasing scarcity of natural resources - rural producers and in particular the rural poor in developing countries - commonly lack alternative employment opportunities outside the pastoral or agricultural sector which oblige

them to increasingly exploit their natural resources. Driven by rising population levels, the growth of cash needs and sharp variations in climatic conditions, it is argued that they are obliged to destroy their environment in order to subsist. They cut down forests to bring new land into production, exhaust the land they already use by shortening fallow periods, and over-graze grasslands by investing in ever-increasing numbers of livestock. The environmental degradation that ensues forces large numbers to crowd into urban centres, or to move onto more marginal land unsuited to their productive activities, where the process of degradation takes place at an even faster rate (WCED 1987).

This thesis explores these issues at a local level and is concerned with the debate as to how local producers are to be drawn into the process of managing the environment as part of meeting urgent needs of local livelihood security (Chambers 1988). In the debate over how local people can be brought to manage their natural resources there is a wide divergence of opinion as to whether rural producers would be able to achieve this given the means to do so, and the measures that need to be taken. The most influential set of arguments in the past has argued that rural producers are unable to manage the exploitation of their natural resources in a sustainable manner because of an inherent incapacity of rural communities to cooperate in their productive strategies, linked directly to the nature of the tenure systems under which they operate. This argument, which stems from Hardin's (1968) formulation of the 'Tragedy of the Commons', contends that rural people are locked into a process of environmental destruction because the resources they depend upon are held as 'commons', while they are exploited by individuals. In this situation, rural communities will be unable to develop institutions to manage their environment because of the dominance of a 'free-rider strategy' whereby individuals shirk responsibility to the community or group through narrow self interest, which leaves the whole group worse off. Individuals will always break agreements to cooperate and manage a resource if there is a likelihood that others will 'defect', in the absence, in other words, of effective sanctions against such actions. Such sanctions are impossible to create where land is held in common, but is

exploited individually because, by definition, it is in everybody's interest to seek their own benefit, even if it leads to collective harm (Runge 1986).

It follows from this that solutions aimed at environmental protection and regeneration, even, by extension, remedies to poverty and rural development, can only come about through the actions of outside agencies. It further argues that one of the more effective remedies is to promote private property as the tenure system so that former 'external' costs to individuals become 'internalised', so that producers will have to take account of the damage they do to their environment in the productive strategies they pursue (Behnke 1985).

Over the last twenty years in SSA, development policy aimed at environmental protection has sought to impose solutions on rural people. On the one hand international and national, often parastatal, agencies have endeavoured to change the ways rural producers exploit their environment by technical initiatives: the introduction of wood burning stoves; reforestation; improved agricultural practices and inputs; soil conservation measures etc., accompanied by the elaboration of a penal system of control seeking to discourage abusive practice (live wood cutting, hunting etc.). On the other hand, they have taken resources out of producers hands in order to manage them better themselves: forestry projects growing exotic species; irrigation systems; and protected areas where local people are excluded and where the full range of technical expertise - often exclusively western - can be brought to bear to regenerate valuable environmental areas.

Many of these attempts have failed for simple technical reasons: the innovation was unsuited to the ecological conditions it was introduced into (exotic forests); or because those managing the intervention did not understand the wider significance of why rural producers were acting the way they did (intensive livestock raising in marginal areas); or it was simply impossible to achieve what they set out to do (stop encroachment on game reserves and national parks). More importantly, however, there is a growing awareness that piecemeal and technical solutions imposed from outside are too narrow in scope,

and too small in scale to achieve the necessary change from a conservative and protective attitude towards the environment, to its day to day management and regeneration by the people most directly dependent upon it. It has also been demonstrated clearly that the privatisation of resources can directly lead to degradation (for instance, see Jodha 1985, 1990 on India).

Development thinking at both an international and national level now recognises that without the willing cooperation of rural communities the natural resources upon which they depend are unlikely to be conserved, let alone regenerated. Rural populations exploiting a shrinking resource base face interlocking economic and ecological problems linking environmental stresses, development policy and practice and political ideology. Their solution calls for institutions that cross economic sectors, scientific and technical fields and which coordinate interests at all levels, from local to international. Indigenous institutions often recognise the interdependence of resource use in one area affecting another and, being embedded in the local social and economic system, they link the management of the resource base to the needs of local people in the enforcement of community control over traditional rights to water and land. In order to survive, many rural communities have depended on ecological awareness of their locality to adapt to new conditions and, it is argued, the outside world could learn very considerably from their traditional skills in managing the exploitation of complex ecological systems (WCED 1987).

In line with this reasoning, an increasingly influential set of arguments is now being advanced which contend that rural producers in many parts of the world had effective ways of managing access to their resources in the past, but that these management regimes have been undermined, often by the policies of the post-colonial state which has been unable to replace them with an alternative system which works. In many SSA countries resources became the property of the state (Kenya, Francophone West Africa) leading to their expropriation from rural producers and the suborning of local institutions to powerful interest groups linked to the national administration (Gutto-1981 on Kenya, Gupta 1986 on Rajasthan,

Kisangani 1986 on Zaïre). Often this process helped influential and richer groups within communities to take over control of better resources, so marginalising poorer groups into exploiting more fragile resources that are more easily degraded (Behnke 1985, Jodha 1985).

Further, it is now argued that the common property system which often characterised customary regimes is an efficient form of land tenure under some conditions. Runge (1984, 1986) has argued that common forms of ownership are a cost effective and efficient way of managing the environment in conditions of relative poverty, where rural producers are critically dependent on a local agricultural and natural resource base, and where there is a high degree of uncertainty with respect to income streams. In these circumstances, he suggests the key variable as to whether rural producers will develop or maintain common institutions to manage resources sustainably is the coordination of rural people's expectations in relation to the decisions fellow members of the community and outsiders will make.

Lastly, these arguments contend that rural communities can internally generate sustainable means of managing their resources if they are provided with the conditions to do so. This line of reasoning, known as the 'Assurance Problem' approach, disputes the inevitable spiral of environmental destruction asserted in the 'Tragedy of the Commons' thesis and argues that it is because the institutions that coordinated rural producers expectations have been destroyed that they are pushed into 'free-rider' strategies. If a 'critical mass' of individuals within a community becomes aware of the benefits, and agrees to cooperate, then local institutions can be a cost effective way of managing the environment (Runge 1986).

Thus there are three approaches that seek to explain how common property systems work, which are not incompatible. Firstly, historical and economic arguments explain how and why local institutions are disabled, and secondly, the logic of the 'Tragedy of the Commons' shows how, once these institutions have been weakened, there is a likelihood that environmental degradation will



set in. Thirdly, by concentrating on the nature and workings of institutions, 'Assurance Problem' arguments suggest ways in which indigenous management systems might be reanimated.

The policy challenge facing development planners now is whether and how to work with local institutions so that they can manage their means of livelihood. The three approaches mentioned above, however, imply quite different policy options.

The 'Tragedy of the Commons' thesis advocates the introduction of private property as a means of 'internalising' the costs of destructive use of the environment, and the imposition of development initiatives from outside the community, as the community will have no incentive and will be unable to act on its own. Historical and economic arguments contend, in many senses, the reverse: the empowerment of local communities institutions so they can make collective use of their resources without impositions from outside agencies. 'Assurance Problem' arguments imply working with local institutions if they already exist to effectively manage the environment, otherwise to build institutions that coordinate producers' expectations of how resources will be exploited in the future.

## 1.2 The Area of Study: The Inland Niger Delta

This thesis studies the production systems and management institutions of an area of international environmental importance in the Sahel - the Inland Niger Delta of Mali, West Africa - including fisheries, pastures, agricultural land and forests, which is under considerable threat from twenty years of lower than average rainfall, and probably from abusive human practice. In recent years, dry conditions have forced rural producers to increase exploitation of fisheries, pastures, forests and wild food resources as production systems have diversified their activities as a strategic response to drought, and as outsiders have moved into this relatively rich area in the Northern Sahel, which acts as a safety net for producers in surrounding marginal millet producing zones, dryland pastures and forests.

*These natural resources are customarily held by rural communities as 'common property', where individuals gained access to a resource through their membership of or linkages to a community. The property of the community was inalienable, that is, individual producers did not have the right to dispose of resources for their own benefit, but merely had a right to usufruct.*

By the end of the pre-colonial era (1900) most rural communities customarily had political and economic structures whose representatives acted as resource managers as part of their functions. Crucial to their ability to manage their ecosystems - and fundamental to any environmental policy - was their capacity to elaborate and enforce rules of access to resources. These managers were members of founding lineages of rural communities. They had the power to allocate entry rights between members of the community, arbitrate disputes, and grant or refuse access to strangers wishing to exploit the group's area of influence. Often their power was reinforced by the supernatural belief that they had an especial relationship with the earth or water spirit of the zone.

The nationalisation of natural resources by the post-colonial state, the establishment of technical services and parastatal agencies

responsible for improving agricultural productivity and for managing the environment, manned by outsiders to the area, and often with vested interests in extracting revenue from the region, accompanied by fifteen years of drier than average flood and rainfall levels, have provided in latter years the institutional and economic conditions for both local producers and outsiders to the Delta to pursue 'free rider' strategies, with probable 'Tragedy of the Commons' outcomes.

The Malian state, through claiming ownership of natural resources, has set up parallel management structures to customary common property institutions which have opened access to producers who never had an unqualified right to exploit the area before. These new users are often either urban based (civil servants, merchants) or have strong debt linkages to urban interests (transhumant fishermen in need of credit for nets), whose interests (or lack of choice) are to mine the area's resources rather than sustain them for future production.

At the same time as undermining indigenous management systems, the state has penalised local producers through the administration of a system of fines, taxes and permits. This raises the cash needs of rural people already dependent on the market for the provision of basic necessities. To raise cash they are obliged to turn to the resources with the most ready market value, and to market products that customarily were used for direct consumption. Many of these products were subject to common rules of access previously; now rural producers are 'free riding' on the old institutions in order to gain access to basic necessities, and to pay state fees.

In these conditions neither the state, nor rural communities can sustainably manage the environment of the area. On the one side the state services do not have the means, in line with their ostensible objectives as set out in service documents such as forestry and fishery codes, to police the exploitation of the natural resources they are charged to protect. Their staff are not sufficiently trained to understand the complexity of the ecosystems they are dealing with, nor are senior members of the services posted to areas for long enough to find out. Late payment of salaries by central

government, and the connected over-riding need of the administration to raise taxes have meant that disputes over access to resources in the Delta have been used as a means of raising revenue for both formal and informal purposes - with scant attention paid to traditional users' rights to exploit the areas they customarily owned, or the health of the resources they exploit.

On the other side, customary authorities in the Delta now lack the crucial ability to enforce rules of access to their resources. Outsiders coming into the zone refer themselves to the administration and the technical services for rights of access in return for informal payments to officials and through acquiring, for example, fishing and wood cutting permits that any Malian citizen is eligible for, on payment of the fee. Within rural communities, increasing stratification based upon status, access to the administration (the ability to pay informal fees, knowledge of French, the official language), and the differentiation of productive and consumptive units increasingly into nuclear families with different economic interests, undermines the communities' ability to provide a collective claim to resources that customarily belonged to them.

This thesis will argue that the 'structural chaos' that presently characterises the access of people to resources in the Delta, should be understood as an efficient system firstly for the extraction of revenue from the area for powerful interest groups in present-day Mali, and secondly for the rapid extension of the administrative and political power of the post-colonial state. This is in contrast to the pervasive view of temporary confusion and disarray in the aftermath of drought.

It is a highly inefficient system on the other hand for the sustainable management of the area's resources in times of stress (both demographic and climatic), which augurs ill for the future of the Delta. The diminishing quality and quantity of common property resources, and the current ways in which they are being managed are reducing the flexibility with which rural producers can respond to extreme variability in climate, both between years and between seasons. Even in good years the majority of households, faced with

rising cash needs, are finding it harder to accumulate enough stocks to carry them through the bad ones. In these conditions the ability of rural inhabitants in general to cope, particularly among the growing numbers of poor, are being threatened. Poor households are being pushed onto marginal resources in conditions where they cannot evolve the institutions which would enable them to conserve or regenerate their environment, upon which their livelihood depends. Unable to choose how they use their natural resources, and often obliged to abuse them, they are becoming progressively more vulnerable to climatic risk.

Rural development policy in the area has been characterised by sectoral organisation (fisheries, livestock, forest and water agencies), centralised control and the imposition of initiatives from outside, widely recognised to have been a failure both directly in terms of raising productivity and preventing abusive use by coercive methods, and indirectly in addressing the underlying problems of providing employment or raising the standard of living of rural inhabitants. There exists nowadays a profound scepticism on the part of rural communities living in the area as to the avowed intention of the parastatal development agencies, the administration and the technical services responsible for environmental conservation which, as this thesis demonstrates, is soundly based on the fact that the region has been an area of net disinvestment over the last twenty years. Conversely, administration and technical service staff share a widely held belief that rural producers are ignorant of how to use their resources rationally, and are dishonest.

By the late 1980s, after successive years of drought and the failure of the government and parastatal agencies to raise productivity, it became evident to the Malian administration that urgent measures were needed to integrate environmental management into national planning, and to make rural people part of this process, through the re-animation of political structures that had originally been put in place in the late 1970s.

On the ground administrators and technical service staff were becoming increasingly aware that in conditions of environmental

stress not only were present state revenues falling off, but the ability of rural producers to pay in the future was also threatened. This led to the elaboration of a national plan to fight desertification in which the support of local people was given a central role (République du Mali 1987a). At the same time forestry, fishing and hunting codes - almost exclusively coercive in nature before - were reviewed, as well as land tenure codes, to allow, on paper, for a measure of local management and ownership.

The strategic question overhanging future rural development policy in Mali today is what form these local management and ownership systems will take. Evidence so far indicates that both government initiatives and foreign funded projects favour the promotion of private property and the sedentarisation of rural producers as a means of 'internalising' the costs of abusive exploitation of the environment, and so bringing 'free rider' strategies to an end.

It is the argument of this thesis that in the case of the Inland Niger Delta - and more generally where production systems operate in marginal conditions and are dependent on mobility and flexibility for their survival - such a solution would be wrong. The effective sedentarisation of some communities - or elements of them - around the better resources, accompanied by the degradation of the more marginal lands, as outsiders or less privileged groups lost access to better resources, would result in the degradation of those marginal areas and the expulsion of significant numbers of producers from the rural sector of the economy. This is particularly problematic in Mali, where few off-farm employment opportunities exist.

Importantly, it would threaten the tried and tested means local inhabitants have for coping with a high risk environment, the chief element of which is the ability to move between and within ecosystems as conditions change season by season and year on year, and which rely on the availability of a wide variety of natural resources, many of which would be threatened by the privatisation of the commons.

This thesis provides evidence at household level of the range of resources rural producers in different production systems depend upon for their livelihood, the strategies they pursue to gain access to them, and the economic significance of resources customarily managed as common property. It will also show how, though debilitated, indigenous common property institutions are still of considerable importance today, as well as offering the best opportunity for providing workable natural resource management systems for the future. In conclusion, it will set out policy options for integrating such institutions into national development structures.

### 1.3. The Presentation of the Argument

The arguments of the thesis will be set out in the following manner. In Chapter 2, some basic definitions will be proposed by which communal property can be differentiated from state and private property. Particular attention will be paid to the relationship between state and communal regimes, for it is through an understanding of the synergy that exists between these two systems in the Delta that the promotion of the 'Tragedy of the Commons' outcomes are seen in their clearest light. A review of the arguments in the common property debate which contend that management of access at the communal level is inimitable or conducive to the management of natural resources follows. The review focuses on the relationship between communal property regimes and external factors, such as the post-colonial state and the commercialisation of the rural economy, in accounting for the persistence or disappearance of communal systems. It concludes by examining the circumstances under which common property systems of allocation can be promoted as they have been identified in the literature to date, and with a review of the Oakerson (1986) framework which is used throughout the thesis to analyse communal management systems.

Chapter 3 presents the background to the Inland Niger Delta in terms of the rainfall and flood-regimes that govern the area's productivity, the ethnic groups that inhabit the area, a brief account of the Delta's history, and a description of the production

systems that exploit the zone. The emphasis in this chapter is on showing how climatic conditions have changed significantly over the last twenty years, and how this has changed the nature and productivity of the key resources held under different management regimes that rural inhabitants depend upon in different seasons.

Chapter 4 analyses the effect of these changes in detail on the household economy of the production systems exploiting the Cercle of Youvarou, in the northern sector of the Delta. Data are presented to show how households have switched their production strategies between resources and within seasons, comparing a 'pre-drought' period when conditions were relatively good, and a 'post-drought' period following four years of intensifying drought. This chapter identifies the resources that form the 'safety net' for rural producers exploiting the Cercle of Youvarou, and sets the stage for the discussion for how property rights and access rules have been unable to limit user rights over a diminishing resource base, being exploited by growing numbers of people.

Chapter 5 sets customary systems for managing access to resources in an historical framework, and traces the evolution of communal management systems up until the advent of independence in 1960. Its basic premise is that fishing, farming and herding systems had workable means of controlling access to resources both year on year and by season, based upon a widely accepted principle of the right of the first comer to manage the exploitation of resources within a bounded terrain, reinforced by reciprocal rights of access to resources in other parts of the Delta held by management groups with the same organisational principle. This system reached its apogee in the last century, when the area was ruled as a theocratic state by the Fulani, who administered the area in their herding interest, but who sought to perpetuate a system by which access to resources was managed through founding members of communities.

Nonetheless, the seeds of the later dismemberment of this system were already sown by this time inasmuch as producers could gain access to land, pasture and water rights both through the traditional system, or through political alliance with the rulers of the area.



Access to resources through political alliance accelerated under the French colonial regime (1898-1960) when for the first time the Delta came under the control of outsiders who had no previous knowledge of the area, who were not reliant on the area's resources for their livelihoods, and who were imbued by the notion that they had a civilising mission in their administration of the Delta. This allowed people who had better linkages with the colonial administration (who had received a French education, who lived in urban centres etc.) to gain access to resources they had never traditionally had before. At the same time the colonial period saw the opening out of the Delta to a commercial, monetized system based upon extraction of wealth from the area, which set the agenda for the post-colonial state.

Chapter 6 examines the progressive debilitation of management systems in the area from independence down to the present day, culminating in the present situation of 'structural chaos'. It demonstrates how the first post-colonial regime (1960-68) endeavoured to impose a 'socialist' revolution on rural communities through the progressive nationalisation of natural resources and restructuring of rural political and economic structures, informed mainly by a western (Marxist) notion of economic development that was both unpopular and to a large extent unsuccessful. Paradoxically, in the manner in which it sought to extract wealth from the area it reproduced the policies of the colonial administration.

The second post-colonial regime (1968 to 1991) has seen the formal nationalisation of all natural resources, and the explicit banning of many customary authorities that formerly managed access to resources. Parallel structures have been set up to customary management systems and forestry, fishing, hunting and pasturing rules have been defined either in law or through administrative practice. While these rules on paper may amount to a program of resource conservation, in practice the administration of these rules has seen the destruction of customary ways of managing access without their replacement by a system that can control when, where, or how resources might be rationally exploited. Indeed, the logic of the state regime is much better understood in wider terms of the

state's need for revenue, and to expand to reach out to all rural inhabitants. Much like the colonial and first post-colonial administrations, the fundamentally extractive policy with regard to the Delta has been perpetuated. What investment has been made in the Delta is overwhelmingly in infrastructure and provision of services, the bulk of which have made little or no impact on the majority of the Delta's rural inhabitants.

Rural producers who inhabit the Cercle of Youvarou today are confronted by an administration that allocates rights of access to resources by criteria fundamentally different from customary rules of entry. The rights of founders to manage access through linkages of kinship, consanguinity and residence rules are confronted by the rights of all Malian citizens to entry backed up by the administration. This has meant that strangers coming into the area - particularly in the recent run of dry years - have been able to appeal to the post-colonial state for access. At the same time, the Malian administration confers upon rural producers an ambiguous right to continue exploiting resources they customarily use: this has resulted in a set of contradictory judgements in the resolution of disputes that have broken out into open conflict in the Cercle of Youvarou. Frequently different arms of the state structure - policemen, foresters, civil servants, the political party etc. - arrive at contradictory judgements in the resolution of these disputes, and different levels of the administration (arrondissement, Cercle, Regional Governors, Ministers) are brought into their resolution according to the kinship or personal linkages they have with the protagonists, rather than in an ordered process as set out in formal administration procedures.

The inconsistent and contradictory manner in which access rights are being allocated in the Cercle of Youvarou today are discussed in Chapter 7, which provides evidence from a set of case studies to show 'structural chaos' in operation. This reveals that rural producers operate in a set of possible coalitions involving combinations of 'strangers' and local founding, consanguine and resident outsider groups who negotiate, frequently on the basis of considerable informal payments to the different elements of the state

structure, for access rights to the more valuable resources the Delta contains.

Chapter 8 concludes with a discussion of how this situation - both from the efficiency and equity point of view - promotes 'Tragedy of the Commons' outcomes in which a major factor influencing rural producers' production strategies is the notion that if they do not exploit a resource someone else will. It reviews the contribution this work makes to common property theory to the extent that it demonstrates that the 'Tragedy of the Commons' thesis is possible, but that essentially it is an artificially created situation, in this particular case, supported by the ambiguous policies of the post-colonial state. It shows how costs that were 'internal' to communal systems in the past have become 'externalised' contrary to the widely held notion that as resources become more valuable so they will be captured by more powerful groups within rural communities.

In conclusion, it argues that the original rights of founders to manage access to their resources is still widely understood and often observed by rural producers, and that local people are well aware of which resources belong to whom and when. It demonstrates that coalitions of interest groups in different resources can be fairly easily identified within rural communities. On this basis, it suggests that the work presented in this thesis can be used to develop a methodology by which the interests different rural producers have to different resources (and in which season) can be identified. These interests, once defined, be used as the foundation for the creation of local management committees based upon a customary system of entry rights.

Empowered to allocate resources between co-owners and to exclude outsiders, and with secure title to the resources they manage, community level committees will be able to promote 'virtuous circles' of resource management by which initiatives aimed at alleviating the pressing short-term needs of rural producers can be linked to longer term measures for regenerating natural resources. The 'assurance' resulting from the success of these initiatives might induce local

producers to cooperate in sustainably managing the resources they will depend upon in the future.

## CHAPTER TWO

## 2. THE THEORY OF COMMON PROPERTY

## 2.1. Definitions

Why is it particularly important to look at common property systems in relation to the management of natural resources? The argument here is for three reasons, principally. Firstly, at the most general level, an understanding of tenure systems is self-evidently fundamental to the management and conservation of the environment because they control which and how rural producers manage access to natural resources. Secondly, most natural resources under severe threat today are found in areas where ecosystems are particularly fragile, or where the climate is highly variable - especially in Africa, where almost half the continent is composed of arid or semi-arid lands. Common forms of tenure characterise the management systems of these areas. Third, common forms of property probably represent the most hopeful management option for the fugitive and ephemeral resources found in these areas and promise better outcomes in terms of raising the standard of living of rural communities on a sustainable resource base than private property, or 'open access' regimes.

Before pursuing these issues it is necessary to define what 'common property' is. There can be few terms in the development debate that are more misused or ill-defined as the terms 'common property resource', 'common pool resource', 'common property regime' etc. The usage of 'commons' is especially loose, and is often conventionally described as something that is not owned by anyone. For example, marine resources are defined legally by western countries as 'owned by no-one and belonging to everyone' (NOAA in Berkes 1989). Commons can further exist at almost any scale, from a small area of pasture - as it is often referred to in the enclosure debate in European history - to the oceans of the world, or parts of space. This all-embracing notion of the commons needs to be narrowed if it is to become an analytical tool for examining the common property regimes of rural communities and assessing their

ability to manage resources in at-risk areas. To do this it is useful to look at the concepts of 'commons', 'property' and 'resources'.

From an economic point of view a 'common good' is located somewhere between a 'pure private good' and 'pure public good', which are differentiated according to the concepts of 'jointness' and 'exclusion'. A 'pure private good' is conceived as a good which is wholly exclusive, where the consumption of that good by one individual entirely takes away from the ability of another to consume it as well. A private good can be disposed of as the owner wishes and is exclusive in the sense that the owner can deny all access to the good. Conversely a 'pure public good' has as a primary characteristic the ability to be consumed 'jointly' with others, and therefore is non-exclusive, and its consumption subtracts in no way from the ability of others to benefit as well, as, for instance, in the case of sunlight.

A 'common good' in these terms shares aspects of private and public goods in that it has 'partial subtractability' and 'partial excludability'. The consumption of a common good by an individual takes away something of another's ability to consume the same good but, within limits, enables others to benefit jointly as long as it is possible to exclude others from its use.

Property is a social convention that defines the relationship of people to things backed up by the sanctions and administrative structure of the society under study, and has been defined by Bromley (1986: Page 596) as:

'... a secure expectation over some benefit stream, with the security arising from collective sanctions and enforcement. Property represents the "owners" and the things owned, against all others with an interest in the thing(s). Property is the social convention that precludes all others from converting their interest in the asset (or income stream) into a claim. These others have duties to observe the rights of the owners.'

For the purposes of this thesis the 'things' referred to here and the benefit streams that flow from them are the natural resources rural communities exploit. Resources have been defined in the literature as '.....a natural or man-made facility that produces a flow of use units per unit of time' (Ostrom 1986: Page 604), and '.....those components of an ecosystem which provide goods and services useful to man' (Gibbs and Bromley 1989: Page 22).

A distinction needs to be made here between the nature of a resource and the rules that govern its use. It is clear from the definitions presented above that for a resource to become 'property' it needs to have the legitimation of the society in which it is found. Public resources in being entirely joint and non-exclusive require no collective sanctions or administration: they are 'free' and hence are not property at all; they belong to no-one, and are 'open-access'. Private property, conversely, is wholly exclusive and wholly subtractive, where the individual owner of a good has the right to consume or dispose of the good as he or she wishes, and therefore requires the sanctions and administration of the society that surrounds it, that converts a resource that is private in its attributes into private property: it is a 'controlled access' asset. Common resources in being partly joint and partly exclusive need some measure of legitimation from the society in which they are found in order to become 'common property'.

This legitimation for resources that are partially joint and partially exclusive can come from three levels, which in an ideal world would provide the right degree of sanction and enforcement over assets in line with the particular attributes of jointness and exclusivity of the resource in question. At the highest level these are global or international commons: those resources of value to the planet and which are owned internationally. They are subtractive inasmuch as their use by one agent takes away from other agent's ability to do so and exclusive in that there exist arrangements for limiting - or at least identifying - who has a right of access to them. Examples of such resources are those whose use is governed by international agreement, such as Antarctica where entry is accorded only to states with treaty rights, or the oceans, a larger part of the surface of which is now controlled by the Law of the Sea Convention. The call

for an environmental treaty in the western world to manage the effects of air and water pollution can be seen as an example of growing jointness of consumption of 'public goods' leading to their evolution into 'global common property'.

At a lower level there is 'state common property': those resources found within national boundaries whose use by groups within the country takes away from the ability of other groups to use them but which, within limits can be sustainably exploited, and which on the other hand are difficult to exclude users from: Examples of these are national parks, reserves, river systems or wasteland.

On a still smaller scale are 'common property resources' managed and customarily owned by local communities. This 'communal property' exists where a set of accepted rules works to allocate specific resources to a defined community. Often the community will practice the same production system and rules of entry will be based on kin membership of the group, or socially sanctioned linkages to the community. The range of resources, and the ecosystems such common property regimes encompass will characteristically be limited. These regimes have been defined as those:

'...for which there exist communal arrangements for the exclusion of non-owners and the allocation among co-owners' (Berkes and Farvar 1989:7).

and they are said to exist where there is:

'.... tacit cooperation by individual users according to a complex set of rules specifying rights of joint use' (Runge 1986:33).

A distinguishing feature of communal property is the existence of rights of individuals to the usufruct of a resource, but which does not extend to a right of disposal. Resources are inalienable from the community, and cannot be sold or given away.



A typology linking the attributes of resources to their management systems can thus be presented as in Table 1 on Page 24:

**Table 1: The Relationship between Economic Goods, Management Regimes, and Entry Rules**

<b>Economic Good</b>	<b>Management Regime</b>	<b>Entry Rules</b>
<b>Public Goods</b>	<b>None</b>	<b>Open Access</b>
<b>Common goods</b>	<b>International Property State Property Communal Property</b>	<b>Controlled Access</b>
<b>Private Goods</b>	<b>Private Property</b>	<b>Closed Access</b>

Common property for the purposes of this thesis is considered to be a generic term covering global/international commons, state and communal property, all of which provide the sanctions and legitimation for the management of common property resources which share elements of 'jointness' and 'exclusion'. Public goods are distinguished from them by being in inexhaustible supply and open to everyone's access, and private goods through being owned by an individual who can consume the goods entirely.

As it has already been pointed out, in an ideal world there would be a perfect 'fit' between the attributes of resources and their management regimes at the international, national, community and individual levels. As resources became more exclusive and joint so they would acquire the property rules and sanctions suitable for their equitable and efficient use. Looked at from this point of view, as resources become more exclusive and joint so they need more administration (i.e. their transaction costs increase), with private property requiring legitimation of community and state conventions to exist, community rules requiring the support of national bodies, and state property requiring the sanctions of international law.

In the real world, however, this 'fit' is far from perfect. At the international level, for example, the debate over the future of the

Brazilian rain forests and 'debt for nature' swaps raises issues of the compatibility of sovereign right with the interests of the global commons. This thesis is particularly concerned with the 'fit' between community and state property rules and will focus on two aspects of these property systems: their ability to manage the natural environment as they have evolved, and the relationship of one to the other. As has been mentioned above, state property defines the parameters within which other management systems work, and it will be argued here that the support or opposition of the (post-colonial) state is crucial in understanding how local producers are able to manage the natural resources upon which they depend.

State systems impinge on other property regimes within their frontiers in both direct and indirect ways. Directly, obviously through the allocation of resources to various regimes, but also through codes of practice (hunting, pastoral, forestry and fishery codes), development initiatives, through the arbitration of disputes and the exercise of justice, as well as through the actions of technical services created to oversee adherence to the rules they make. They influence them indirectly through fiscal policy and control over revenue flows that affect the economic climate in which rural producers work.

It is now coming to be increasingly appreciated (Oakerson 1986, Bromley 1989) that 'congruence' between state rules and policies and these different property types, and between them and the attributes of the resources themselves, is essential for the management of the environment, and that a lack of such 'congruence' is a powerful tool in understanding how natural resources might come to be degraded. 'Congruence' is generally meant to relate to the physical features of the resources themselves, the way they are exploited, the management unit most suited to their administration and the laws and rules adopted by the state and the community to bring this about.

This thesis is precisely concerned with the overlapping of state and community rules in the management of formerly communal resources and their outcomes.

## 2.2. The Evolution of Communal Property Systems

It is clear that tenure systems do not exist in a vacuum but are linked to one another in a number of important respects. They can be seen to exist along a continuum from 'open access' regimes (see Table 1 on Page 24), where there are no rules of entry (public goods) to 'controlled access' systems, which in its most concentrated form consists in private property. In this formulation 'global', 'state' and 'communal' regimes contain different elements of 'open' and 'controlled-access' systems. Linked to the concepts of 'exclusion' and 'jointness' it is an implicit assumption of this approach that within each group of resources (public, global, state, communal and private) as the joint and exclusive nature of resources increases, so access rules become more defined. It follows from this that there are thresholds and boundaries between groups of resources which define where they move from one group to the other, on the assumption that as the exploitation of the resources in question increasingly affect the ability of others to use them as well, so they will become more exclusive, leading, as resources become scarce, to their eventual privatisation.

There is some evidence from Africa and elsewhere in the literature on common property that bears out this schema. Noronha (1985), in a review of how tenure rules change in rural communities in Sub-Saharan Africa, argues that as population increased and pressure on natural resources intensified, land tenure systems evolved from open-access regimes, through common property systems, to private property institutions. According to this argument, in a first period resources were abundant, and were brought into production when the need arose; labour was scarce and was the most important factor of production; and technology was simple.

Membership of rural communities in these circumstances fluctuated and bonds between associates were loose. Strangers were welcomed into communities since labour was the scarce factor of production, fictitious genealogies characterised the social structure, and residence provided the basis of membership. The boundaries delineating rural communities' territories were ill-defined. Since

resources were abundant, there was no need to allocate land between co-owners, nor to exclude outsiders, therefore resources were 'open-access'.

In a second period a relative scarcity of resources arose, driven by rising population levels and, in Sub-Saharan Africa, colonial acquisition of land. Resources became differentiated by quality (fertility, access to water) and mechanisms were evolved by rural communities firstly to distribute the better resources among themselves and secondly to allow outsiders access only to inferior assets for which some entrance fee was charged. This period saw the development of more closely defined inheritance patterns, with the production and consumption unit becoming the extended family rather than the group or clan. Land tenure during this period had the characteristics of communal property.

Lastly, with a further increase in population, the establishment of a colonial and post-colonial state and the incorporation of rural production systems into a cash economy, land became privatised as the community became increasingly differentiated with regard to individual families' access to resources. Increased sales of land took place, landlessness appeared and out-migration from the community led to a rise in the number of absentee male farmers. This period was characterised by: the penetration of commercial credit into the access system of rural communities; allocation of resources was through the market; customary, cooperative labour groups within communities ceased to function; and the principle of co-ownership by clan or group no longer operated.

Part of this process is confirmed by Behnke (1985) for a different area of Africa, who shows that where market demand for a common property resource increased with the spread of new technology, rural communities adapted their property rules to redefine access to their resources. Drawing on the work of Demsetz (in Behnke, *ibid.*), who described how Indian hunting territories in Labrador evolved private property rights in line with the spread of the commercial fur trade, he argues that communities (or influential members within them), faced with increasing pressure on their

resources, re-defined the customary system so as to extend private control.

According to this view, communal property will become privatised in the face of demographic growth, commercialisation of the economy and differentiation within rural societies. Other writers (e.g. Jodha 1985, 1990) however, have shown on the one hand that this process can be brought about by other factors - notably legislation by the colonial and post-colonial state - and on the other hand that the direction of change is not necessarily towards privatisation: communal property is often nationalised. Further, they go some way to addressing the crucial issue of the relationship between different tenure systems within the same country: how state rules interact with communal and private property regimes in the allocation and management of natural resources. These accounts make it clear that the definition of common property according to criteria of 'exclusiveness' and 'jointness' - with its inbuilt bias towards privatisation as assets become scarce - cannot account on its own for the changes that take place in tenure systems, and that political and historical factors have to be taken into account in explaining the evolution of property regimes.

Gutto (1981) relates the laws governing property rights imposed by the British colonial administration in Kenya with the creation of a class of better-off farmers in alliance with wealthy urban interests, together with the formation of a class of peasants-cum-wage earners obliged to work for cash to meet subsistence requirements and pay taxes. Former community property (which did not imply a former lack of differentiation between rural producers), under the 1902 and 1915 Crown Land Ordinances became the property of the British Crown, was directly expropriated by white settlers in some cases, and all native tenurial rules were legally destroyed, with rural producers becoming tenants-at-will of the colonial authorities. In 1950 further areas were directly expropriated to take lands away from those who took part in the Mau Mau uprising, while the 1954 Swinnerton Plan and the 1956 Native Land Tenure Rules introduced the registration and privatisation of land.

Taking as a case study the rangeland ranches of the Maasai, Gutto shows how, through the implementation of the Land Group Representative Act of 1968, both rural and urban based elites were able to take control of incorporated groups of herders establishing legal claims to former communally-owned pasture. Gutto argues that these groups were established in order to extract revenue for the colonial and post-colonial state through long-term indebtedness tied to loans for new technology, through the provision of veterinary services, through a policy of destocking, and through a monopoly on the sale of livestock to the Kenya Meat Commission.

Kisangani (1986) looking at the evolution of land tenure systems in Zaïre since the late nineteenth century, argues that the imposition of 'command' law by the Belgians in 1934, by which national parks were established, licence fees and fines imposed for hunting elephants, and a system of taxes introduced, effectively transformed communal property rights to justify the exploitation of communal areas by the politically dominant group of Belgian settlers. The implementation of contract law since 1960 (independence) has equally allowed politically and economically powerful groups to exploit these same communal areas through the creation of small private hunting groups, effectively composed of the presidential clique.

Jodha (1985) reveals how post-independence legislation in Rajasthan, India, had the dual effect of privatising some communal resources while destroying customary rules governing the use of the communal property that remained. Land reform legislation destroyed the Jagidari system (which customarily charged rents to communal property users) and distributed land to former tenants. Associated with policies to reduce the costs of cultivating (through subsidies etc.) this has seen the number of cultivators rise, both through population increases and through the movement of former non-cultivating households into farming. Of particular importance has been the introduction of the tractor, which has led to a decline in the available post-harvest communal pasture resources through reducing the length of fallow. At the same time power to manage the remaining communal areas has been vested in village councils, which are unable or unwilling to impose levies on users of the residual

communal areas. Commercialisation, Jodha argues, has transformed the desert economy from dependence on subsistence to a reliance on the market, leading to an increasing investment in sheep and goats and the greater exploitation of communal land.

### 2.3. Communal Property and the Degradation of Natural Resources

These writers make the point that both scarcity and legislation by the post-colonial state can bring about changes in the nature of common tenure, through modifications in the internal structure of rural communities, and through the imposition of rules from outside these groups. The imposition of new tenure rules from the outside works in both directions: to privatise or nationalise resources. A significant body of literature in the common property debate argues that changes in tenure rules away from common property leads to better management of natural resources.

By extension, these arguments contend that rural producers in exploiting the 'commons' degrade their natural environment. Driven by population pressure they clear new land for extensive cultivation and cut trees to feed the urban cash market for woodfuel. As technology is fixed, their cultivation methods require large areas to be cleared and forces them onto marginal lands which will be productive for shorter periods, and therefore will require the clearing of even larger areas in the future. Open field forms of cultivation and removal of tree cover greatly increase the risk of wind erosion. Increases in livestock holdings (sometimes due to new land being unsuitable for cultivation and therefore leading to the diversification of farmers into herding) lead to over-exploitation of pastures through selective grazing of better species, premature grazing before fodder plants seed, and trampling of the ground. Moreover, herders burn pastures to produce green fodder causing wholesale damage to other organisms and exposing the soil to further erosion (Mortimore 1989, Harrison 1987).

These arguments in the common property debate suggest that rural producers are prone to abuse their environment above all on the

residual 'commons' rather than on the more valuable resources that have become privatised. One of the most influential of these is Hardin's 'Tragedy of the Commons' thesis (Hardin 1968), which sparked off much of the debate on common property. He argues that individuals exploiting resources held under 'common' forms of management have a vested interest in not changing access rules to a common good, while at the same time they create the conditions for their ultimate collapse by destroying the very resources the users of the commons depend upon.

Referring specifically to pastoralists, he argues that herders will seek to intensify the exploitation of a resource without competing for restrictive title to it because the benefit of increasing production will accrue to individuals, while the cost of degrading the resource will be borne by everyone. He claims that where animals are privately owned and pasture is open to anyone's use, personal gain from introducing more animals onto the pastures outweighs personal loss through diminishing the amount of available pasture by its exploitation by more stock. The addition of another animal to the herd is the owner's private gain, while the cost of diminishing the amount of feed is borne by herders generally. Since each herder follows the same strategy, there is a 'tragic' movement towards over-exploiting the resource in that herders are aware of the decline of pasture, but in pursuing their self interest will (or can) do nothing to prevent it.

An analytical foundation for the 'Tragedy of the Commons' thesis is that of the 'Prisoner's Dilemma' (Clark 1981, Runge 1981) which uses game theory to argue that if two competing users of a public good have a choice between two strategies of 'conserving' or 'depleting' a resource, then they will each follow the latter in the belief that if one conserves the other will 'defect' in order to exploit the other's restraint and so maximise his own gain.

The 'Tragedy of the Commons' hypothesis directly links resource degradation to a 'common' system and suggests that a sustainable environmental policy will only come about through the promotion of private property and/or through coercive measures. According to the



'Tragedy' argument the costs of exploiting the pasture are 'externalities' - costs everyone using the resource has to bear - and the logic of the thesis is that the resource will never be rationally used unless those who benefit individually have also to pay the costs of their actions. Private property achieves just such an end by 'internalising the externalities' of non-exclusive resource exploitation (Behnke 1985). These notions that common property systems are unable to sustainably manage their resources are commonplace and inform many developing countries' rural development policies, and have been used as a justification for the 'rational' management of resources under the auspices of modern practices introduced by the post-colonial state, as well as their privatisation by legislation.

Evidence from the Inland Niger Delta strongly contests this view. The thesis presented here argues that rural inhabitants have never been an undifferentiated set of individuals exploiting an 'open-access common'. For hundreds of years Delta inhabitants have lived in communities which have an hierarchical structure overseen by a resource manager who allocates access to resources clearly bounded within a territory that is accepted as being their property. Yet at the same time, increasingly in recent years, the conditions for 'Tragedy of the Commons' and 'Prisoners Dilemma' outcomes are becoming apparent. This situation cannot be accounted for solely as a result of increasing scarcity following a run of progressively drier years that the area has experienced, but rather must be looked for in the ways in which local inhabitants are being prevented from managing resources that customarily belonged to them.

This thesis is therefore closely linked to work on common property that explains the inability of rural producers to manage their resources in terms of growing differentiation within communities, and as a result of interventions by the post-colonial state that break down the ways in which rural inhabitants cooperate to manage their natural environment.

Gupta (1986), focussing on the issue of protecting the environment, argues that in stratified rural societies, rural producers will have varying stakes in conservation, depending on their access to credit,

whether household budgets are in deficit or surplus, social status, access to land and labour etc.. He shows by way of example how in agro-pastoral production systems the specie-mix of herds belonging to richer and poorer households (cattle versus sheep and goats) makes for different attitudes to common property forage and pasture resources. Referring to a pasture development project in Rajasthan in 1984-5, he describes how the relative importance of land and livestock to different households affected cooperation between them to manage fenced off pasture. Both types of households (i.e. those with land but little livestock and vice-versa) did not co-operate, but for different reasons, with land-rich households unconcerned about the degradation of the customary commons because they did not rely on access to its fodder, and animal rich households un-motivated to co-operate because village commons only provided a very small part of their overall requirements for grazing.

Jodha (1985), linking the commercialisation of the desert economy to an investment in sheep and goats, contends that rural producers degrade the commons because that is where the fodder and browse resources are found and because cash needs push them into maximising their revenue rather than conserving the resources. Access to these commons is relatively open, as the local council is insufficiently strong to impose access rules. The privatisation of communal lands by state legislation has had three effects: increasing intensity of use of sub-marginal lands, inappropriately, for farming; a deprivation of collective gains for the poor, who generally lost out to better off farmers in the distribution process of land reform (and who are therefore more reliant on communal land); and the loss of comparative advantage in livestock raising that the region once held. Kisangani (1986) attributes the slaughter of elephants in Zaïre equally to the inability of local inhabitants to control access to the hunting grounds.

These arguments provide evidence that the role of the state is crucial in determining the context within which rural inhabitants exploit their natural resources. The knock-on effects of privatising resources through legislation can lead to degradation on residual commons. The direct nationalisation of natural resources can lead to

the 'mining' of those resources by groups unconcerned with conservation and, it is argued, the failure to impose private ownership of resources leaves rural producers in a position where they inevitably degrade their environment. These arguments would seem to leave little room for rural producers themselves to evolve institutions that manage their natural resources.

#### 2.4. Communal Property and the Management of Natural Resources

Yet communal property institutions in the developing world continue to exist which manage individuals' rights to exploit a community's natural resources, and the state need not act to degrade local management regimes. Wade (1988) has shown how common property institutions are actively maintained in a differentiated mixed farming and herding community in Southern India where government legislation does not undermine rural communities' tenure of land. Berkes (1989) has shown how communal property in Cree hunting territories in Canada can be destroyed, and then re-assert itself in line with the rise and fall in value of a resource (fur) and the rise and fall in its availability.

Much of the debate on common property has refuted the basis of the 'Tragedy of the Commons' thesis and concentrated on the study of the conditions in which communal property systems have, or might, come into being. The implicit notions in the 'Tragedy of the Commons' theory that all rural producers in a community practice the same livelihood, have the same interest in a resource, and can act entirely independently of their fellow producers is manifestly untrue for most inhabitants living in rural communities in the developing world.

Rapoport (1985) has shown that when the initial 'one play' game of the 'Prisoner's Dilemma' is run through several 'plays', a second solution is possible in which users will cooperate to maximise sustainable yield. The implicit point that a learning process takes place between competing but linked users of a finite public good has been explicitly made by Runge (1984) to argue that given individual

decisions are conditioned by the expected decisions of others, then if expectations and actions can be coordinated to predict behaviour there is less necessity for people (i.e. herd owners) to pursue 'free-rider' strategies: indeed, cooperative behaviour might be encouraged as an utility maximising strategy. For Runge, the institutions of a society exist to coordinate and predict behaviour so that there may be significant incentives internal to any group to develop institutions which promote voluntary cooperation, and he suggests an 'Assurance Problem' as a key to understanding how public goods are used and might be managed in the future.

In later work Runge (1986) adds to this by suggesting that where communities have low incomes, are critically dependent on a local agricultural and natural resource base, and face a high degree of uncertainty with respect to income streams, communal forms of management are cost effective and efficient. He argues that relative poverty imposes a strict budget constraint on rural communities with regard to transaction costs, making the management of a private property regime too costly for a subsistence economy to bear. Where the distribution of basic natural resources - in particular rainfall - is random and where income streams are uncertain, communal property systems, by allowing access to other areas, act as a hedge against environmental risk.

At the village level, Runge argues, production decisions by individuals are based on the expected decisions of others, and this places a premium on the importance of customs, rules and conventions that coordinate decisions in a community. He suggests that in differentiated rural communities a certain amount of producers will have an interest in 'free-riding' on customary institutions, but that if a 'critical mass' coalesces around cooperative norms, communal property can come into being. Quoting Sugden (1984) Runge agrees that the more homogeneous a community the more likely optimal outcomes are, and the more heterogeneous, the more difficult cooperation becomes.

'It is a major implication (of this approach) that outcomes such as overgrazing do not necessarily arise from the strict dominance of free-rider strategy (although resource misuse may still occur) but from the inability of interdependent individuals to coordinate and enforce actions in situations of strategic interdependence.'

(Runge 1986, page 48)

Wade (1988) in his study of a 'tail end' village in a South Indian irrigation system has shown - conversely to the 'Tragedy of the Commons' thesis - that if rural producers perceive that a greater good will become available if they manage a non-exclusive resource communally, then they will act to bring this about. Farmers put in place a system of managing common resources that improved the availability of water and protected fields from damage caused by livestock but only, as Wade points out, under particular conditions. Two of the essential ones that Wade perceives are that the material benefits to be provided must be high and conversely, the risks of loss through not acting communally should be high as well. Other characteristics however, are very important, among them being: that villagers have secure legal title to the land they exploit; that it is easy to monitor abuses of the system; that most villagers depend on the resource; that differentiation between productive units is not too great and that relationships between them are good; that rules are simple and easy to understand; and that enforcement of them 'bites' sufficiently and includes maintaining one's reputation in the community as a whole.

Given that rural communities have demonstrated in practice their ability to manage a resource communally, 'Tragedy of the Commons' outcomes must be seen in relation to a specific set of circumstances. The foregoing discussion would seem to suggest three major variables account for the presence or absence of 'Tragedy of the Commons' conditions and for the viability of communal property institutions.

The first is the nature of the resource in question. Resources that are economically productive year on year, in conditions of population

growth or other circumstances where they become scarce, are the most likely to become privatised, while those that vary considerably in their productivity will have access rules that are less controlled. Examples for this are obvious: the better agricultural land in areas of reliable rainfall are almost everywhere private property, while pastures in the arid and semi arid lands, or fugitive resources such as wild animals or fisheries, are more often held under some 'common' system. One major reason for this is that more unreliable resources do not repay investment in them commensurate with following an alternative strategy of movement. Sandford (1983), in referring to pastoralists, has shown that the more variable rainfall is over time, the higher the opportunity cost will be in conserving herd numbers, rather than following 'opportunistic' strategies which lead to a boom-and-slump pastoral economy. In effect, in areas of extremely variable natural resource allocation (rainfall) it is uneconomic to restrict access to resources in order to invest in them because such an investment is less productive than moving to other areas where natural productivity has been greater in that particular year or season, and in order to get access to those areas, herders have a vested interest in a more open-access system than private property.

By this logic, communal property systems most usefully apply to resources that repay a certain amount of investment by providing in most years a sufficient income stream, but where the risk of failure is sufficiently high, and sufficiently unmanageable, for rural producers to need access to other areas on the one hand, and which make the transactions costs of private property systems uneconomic on the other.

A second major variable is the degree and type of intervention by outside social and economic structures in a community's management system. This chapter has shown that often colonial and post-colonial legislation has imposed state property systems on local communities that have denied all indigenous land tenure rules and ignored the attributes of the resources they covered. As explained above this has led to the privatisation of some resources and the weakening of access rules in others creating, in effect, the conditions for

'Tragedy of the Commons' outcomes. In other examples, such as those cited in Wade (1988), security of tenure backed up by the state, has been one of the major contributions allowing communal regimes to come into being.

Lastly, the degree of differentiation in rural society would seem important for the existence of communal property regimes or the creation of conditions favouring 'Tragedy of the Commons' outcomes. This differentiation can be at several different levels: between communities and the state; between members of the community themselves; between communities inhabiting the same area, but practising different production systems; and between communities engaged in the same production system, but living in different areas. 'Tragedy of the Commons' outcomes are more likely where the aims and policies of the state are at variance with the attributes of the resources, with communal responsibility for the management of natural resources, where there is great disparity in status, wealth, and activity between members of the same community, and where relationships with other production systems, or similar production systems who are outsiders to the area, are competitive and antagonistic.

This would imply that the 'enabling' or 'disabling' (see e.g., Chambers 1989) role of the state in coordinating or disorganising the strategies of the various 'actors' involved in exploiting a resource is crucial in determining how those resources will be used. This thesis argues that on the one hand Malian state policy weakens rural producers' ability to act in concert in their own long-term interests in managing resources, and that on the other hand the operation of state rules on the ground does not provide an alternative, consistent set of regulations amounting to a conservation policy. This situation, however, should not simply be seen in terms of inadequacy: the Inland Niger Delta has been a source of significant revenue - extracted in recent times in large part as a result of the ambiguity of state policy and practice - at least since the imposition of colonial rule at the turn of the century.

## 2.5. The Oakerson Framework: a Structure for the Analysis of the Evolution of Communal and State Property Regimes

The preceding discussion has identified three main areas in which the relationship between state and communal property systems will be discussed: the nature of the resources; the degree and type of intervention in communal affairs by outside institutions; and the degree of differentiation between and within production systems and outside institutions. The focus of the analysis presented here is on determining firstly how these factors interact to produce outcomes that promote or discourage sustainable management of natural resources in the Inland Niger Delta, and secondly, to examine how such management systems capable of conserving and regenerating natural resources might be fostered in the future.

In order to more clearly structure the argument, the Oakerson framework, prepared for the Conference on Common Property Resource Management (CCPRM) held in 1985, will be used (Oakerson 1986). This framework is not accepted by the author without criticism - in particular in its treatment of resources being in some manner exogenous to the economy and society in which they are found - but it is of great use in sorting and persistently linking the diverse historical, economic, political and ecological elements presented here to the issue at hand: the effective management of natural resources by communal regimes; their relationship to wider economic and political structures; and how they have evolved.

This framework groups data into four inter-related but exclusive sets: the technical/physical attributes of resources; the decision-making arrangements that govern their use; patterns of interaction between users and decision makers; and outcomes defined in terms of efficiency and equity. It is the underlying argument of this approach that for a communal system of management to work some 'congruence' must exist between these four elements.

Oakerson identifies three key natural and technical elements of communal property. Firstly, the resource should be characterised by 'partial jointness', that is, individual users in exploiting the resource can take away from others' ability to use it as well but,



within limits, all users can benefit jointly. Secondly, for physical or technical reasons it should be possible to exclude producers from exploiting the resource: through natural features (e.g. flood levels making the resource inaccessible); because the resource is concentrated in one place; because it is small in size; in a remote area; or because trespass is easily detectable. Lastly it follows the resource should have natural boundaries which distinguish it from other resources.

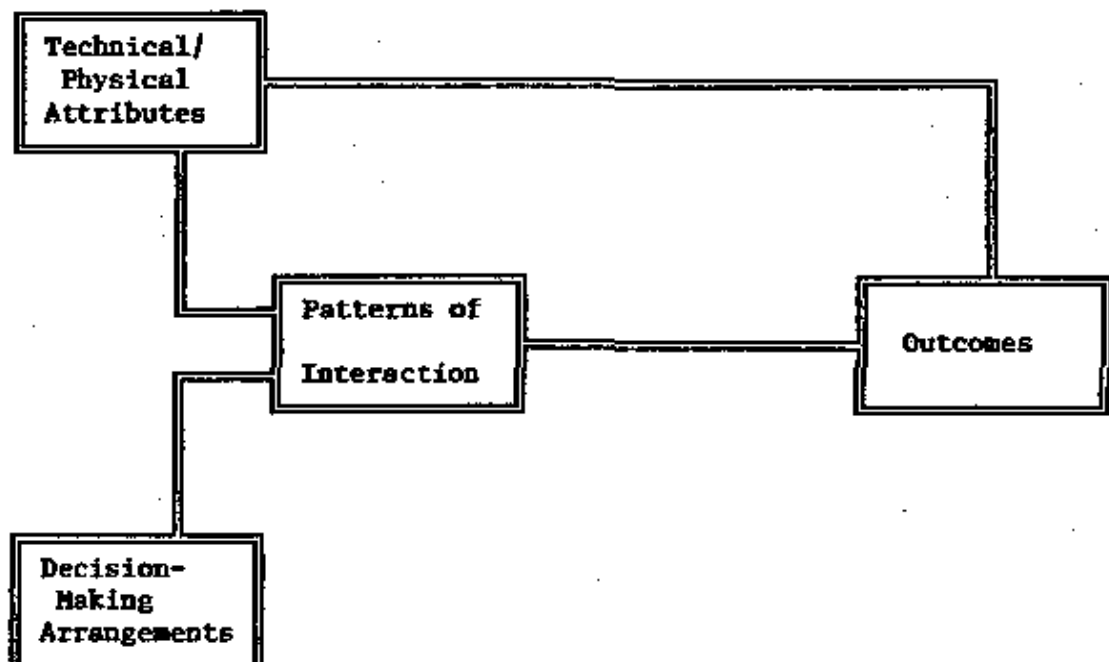
The rules governing how these resources are exploited are the 'decision-making arrangements' in Oakerson's framework, which equally have three salient characteristics. Communal property regimes imply firstly the presence of 'conditions of collective choice' which define rules that constrain the ability of individuals to act alone, if those actions create costs to other individuals; provide remedies to those so affected by other actions; imply a community can impose collective decisions over all users; and by extension also imply that there are few, if any, 'veto positions' held by individuals or groups within the community that can overturn collective decisions.

Linked to these conditions 'operational rules' should regulate entry and exit regulations in line with community interests, limit user behaviour in favour of 'jointness' so that rural producers receive an optimal benefit from the collective use of the resource. Further, jurisdictional boundaries (administrative areas, community territories) should be linked to the divisible limits of the resources as defined by their natural and technical characteristics. Finally - and most importantly for this thesis - communal regimes need to be linked to external structures which support the decision-making arrangements of the communal regime. Oakerson identifies two sorts of external structure impinging on communal property: market arrangements that inform the economic context within which management of communal property takes place; and linkages with the state structure including courts of law, administrative heads and customary chiefs where tribal law applies.

It is in the third component of Oakerson's framework - the 'patterns of interaction' - that rural producers and decision makers will choose the strategies they will follow with regard to communal rules of access to resources. Oakerson identifies two types: reciprocal strategies, which do not necessarily imply a *quid pro quo*, but do imply 'mutual expectations of positive performance' (Oakerson 1986); or 'free-rider' strategies, by which some members of the community break communal rules in order to take advantage of other members continuing to obey them.

The final component of this framework is the outcomes that ensue from the choice of strategies rural producers adopt. Oakerson makes the point that the evaluation of outcomes is of necessity subjective, and most often uses criteria of efficiency and equity. In terms of efficiency the overall rate of use of a resource should be defined by the technical and physical attributes of resources, closely linked in other words to their carrying capacity which, ideally, should amount to Pareto optimality, though Oakerson admits the optimal position is very hard to ascertain. In terms of equity the outcomes of a working communal system should provide a fair return to individuals for their contribution to the collective management of the resource. Oakerson presents his framework schematically in the following manner:

Figure 1: The Oakerson Framework



He argues that technical and physical attributes of resources are 'hard', inasmuch as they affect outcomes independently of human choice, while decision-making arrangements are 'soft' in that they come about through choice, consent and action between individuals. In a 'one play' game, these two factors combine to produce patterns of interaction, leading to outcomes. In a long run, dynamic, 'multiple play' game the elements of the model feed back on each other: outcomes, in other words, affect the physical nature of the resource directly; they also affect the patterns of interaction which feed back to the decision-making arrangements and the physical nature of the resource.

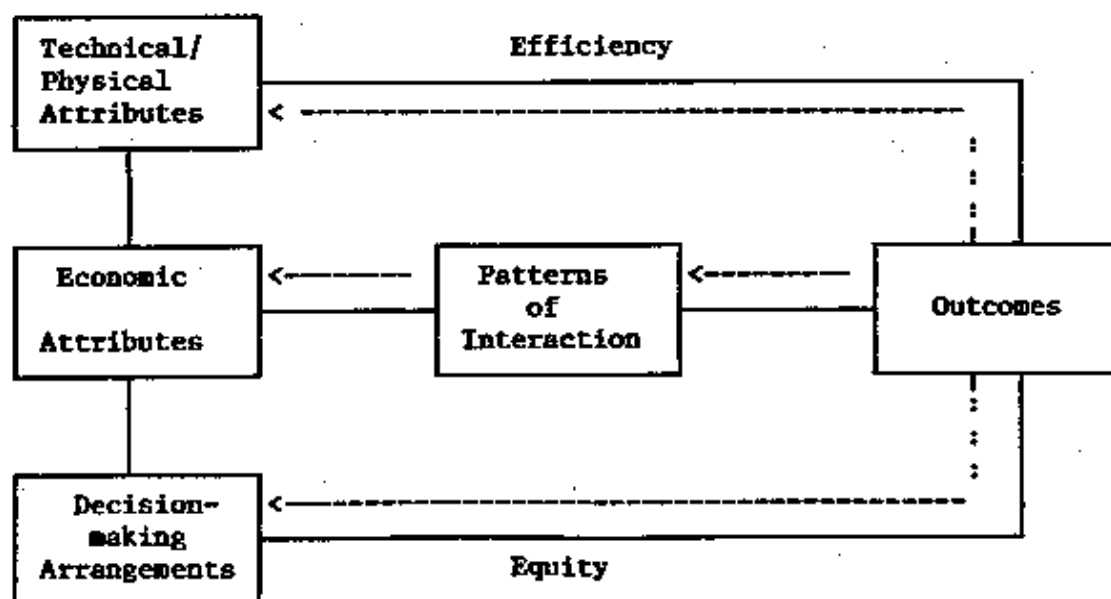
The Inland Niger Delta is an interesting case for such a study because each of the elements in the framework are present, and have undergone significant change in the recent past. Over the last twenty-five years the area has suffered from an increasingly dry period while new methods have been introduced to exploit the natural resources of the zone, so changing the technical and physical attributes of the resources in question. Production systems in the Delta had developed a detailed system of communal property management by the middle of the last century which has been progressively undermined by colonial and post-colonial legislation and practice since the turn of the century and particularly in the last two decades. Drier conditions and the commercialisation of the Delta economy have forced rural inhabitants to substantially adapt their customary coping strategies to meet the new physical, socio-economic and political circumstances leading to a new set of outcomes in how they exploit their natural resources.

In this thesis, the following chapter will look at the physical and technical characteristics of resources and how they have changed in the Inland Niger Delta, comparing a 'pre-drought' period of good rainfall and high flood levels with the 'post-drought' situation of today, when drier conditions have profoundly altered the way rural producers make their livelihoods.

Chapter 4 will compare the economic value of these resources for households making up the major production systems exploiting the northern sector of the Inland Niger Delta between these two periods. These data add to Oakerson's framework by showing how rural producers use a set of resources held customarily as communal property to achieve their livelihoods. This new component of the model stands between the physical/technical characteristics of resources, the decision-making arrangements and the patterns of interaction. The economic values of different resources affect the technical/physical attributes in that the increasing value of some resources (in subsistence and exchange terms) leads directly to their greater exploitation so making them less joint and increasing the difficulties of exclusion. They are closely linked to decision-making arrangements in that market conditions (part of the external arrangements governing the management of resources) express this increase in value. Finally, they are clearly part of the patterns of interaction in that rural producers choose strategies in line with their perception of the economic gains they stand to make by exploiting a resource.

This new element of the framework can be incorporated in the model in the manner presented in Figure 2 on Page 43.

Figure 2: Oakerson's Framework Adapted



Chapters 5 and 6 look at the decision-making arrangements governing communal management systems firstly in the period up to the end of colonial rule (1960), then from Independence to the present day. The focus of these chapters is on the relationship between external structures, in particular the state, and the conditions of collective choice and operational rules governing the management of communal fisheries, pastures and agricultural land.

Chapter 7 provides examples of the patterns of interaction characterising the present day administration of access through the analysis of several case studies illuminating the resolution of conflict in the northern sector of the Delta.

In a concluding chapter the outcomes arising from the patterns of interaction and the effect of drought on the physical characteristics of the area's resources are examined. In this chapter, an argument will be presented that links the decision-making arrangements of Oakerson's model directly to outcomes (as shown in the adapted version of his framework above) in their exploitation, for it is one of the main contentions of this thesis that state policy, regardless of the strategies rural producers adopt in the face of drought, and unmindful of the health or the characteristics of the natural resources in the area, are promoting policies that are both inequitable and inefficient.

## 2.6. Summary

This chapter has set out the theoretical framework within which the relationship between communal and state property regimes are to be studied with regard to their ability to manage the natural environment. It has defined common property as a term which spans both the attributes of natural resources and the property regimes used to administer them. Common goods are those resources that are neither wholly shared (public goods) nor wholly exclusive (private goods), but which combine characteristics of 'partial excludibility' and 'partial subtractibility'. As resources become more joint and exclusive, they become subject to four property regimes:

international rules where the resources in question become shared between nations; state rules where resources become joint between groups within a nation; communal regimes where they are shared between members of a community; and private property rules where they become exclusive to an individual. In an ideal world there would be a 'fit' between the attributes of resources and their management regimes at the international, national, community and private levels.

While there is some evidence from Africa that bears out the argument that as resources become more exclusive in their attributes, property regimes evolve to narrow access, other sources have shown that valuable assets, rather than become increasingly exclusive, can be made more 'open access'. The agency in this process is often the post-colonial state, which can also intervene to privatise some resources that might otherwise have remained communal. This action is often justified by the state concerned with the argument that 'common' forms of ownership inevitably lead to the degradation of natural resources, so that state action is required either to place assets directly under state jurisdiction where they can be managed 'rationally', with modern methods, or alternatively to privatise them, so that individual owners have to take account of damaging practices they might indulge in.

Yet a wealth of evidence points to degradation occurring on state property and private property. Further, there are indications that knock-on effects of state privatisation schemes lead to degradation on the residual commons. Conversely, it has also been shown that communal forms of tenure persist in many parts of the developing world, that they may very well be a form of tenure that effectively manages resources in areas of low income and great climatic variability, and that they can adapt internally to a wide variety of natural and economic conditions.

This focuses the debate on the relationship between state and communal forms of property, and in particular on the measures and conditions in which rural producers will cooperate to sustainably manage assets, or 'defect' and 'free-ride' in search of short-term gains. Three factors have been identified which promote or hinder

the formation and maintenance of communal regimes; the nature of the resource; the degree and type of intervention in communal affairs by wider social and political structures in the rural economy; and the degree of differentiation existing within the community, between communities, and between the community and the state.

This thesis examines these issues using an adapted form of the Oakerson framework, by which the physical and technical attributes of natural resources are analysed in the context of rules of access and management that customarily apply to them or have been recently introduced. The strategies of rural producers in choosing to cooperate with or 'defect' from state and communal regulations are then evaluated in order to assess whether rural producers exploit their environment in ways that are conducive to their degradation or to their wise management, and in order to ascertain whether the rules governing their exploitation provide the organisational basis for the long-term conservation and regeneration of natural resources that local producers depend upon.

This study looks at the evolution and coexistence of state and communal property regimes in the Inland Niger Delta of Mali, West Africa, an area of great natural and production system diversity that has been suffering from an increasing incidence of drought over the last twenty five years. The following chapter sets out the historical, political and economic background to the area and shows how natural conditions have worsened over the last quarter century. In this, it studies the first component of the Oakerson framework - the physical and technical attributes of natural resources - and describes the effect of increasingly dry conditions on the jointness, exclusivity and divisibility of resources held customarily as communal property in the area.

## CHAPTER 3

## 3. THE PHYSICAL, HISTORICAL AND ECONOMIC BACKGROUND TO THE INLAND NIGER DELTA.

The preceding chapter has defined common property and focused the theme of this thesis on the study of how property regimes have evolved in line with the changing attributes of natural resources in the Inland Niger Delta, with particular reference to the relationship of community and state property systems. It has argued that while in theory natural resources should move from 'open' to more 'controlled' forms of access entailing an evolution from state to private property as resources become scarcer and more valuable, in practice this has not necessarily taken place. State legislation in many parts of the developing world has either 'opened' access to resources that were partially exclusive, and or has privatised them, often without reference to their attributes. In both cases there is evidence that worse management of natural resources has resulted.

It has further suggested that a 'congruence' should exist between how natural resources are managed and their physical and economic characteristics, if they are to be exploited in a sustainable manner. This thesis examines these issues with regard to the Inland Niger Delta, using the Oakerson framework to examine how technical, physical and economic attributes of resources can be studied in relation to the property regimes that govern their use.

This chapter describes the natural resources found in the Delta and the climatic regimes that characterise the floodplains and the borderlands of the area. It proceeds with an account of the history, ethnic groups, population and production systems of the zone. Data are presented showing how drought has affected the productivity of the major resources of the Delta over the last twenty-five years, and how production systems have adapted to increasingly difficult conditions. This allows the first component of the Oakerson framework to be analysed, comparing the technical and physical attributes of the major natural resources found on the floodplains and the neighbouring drylands in a 'pre' and 'post' drought period.

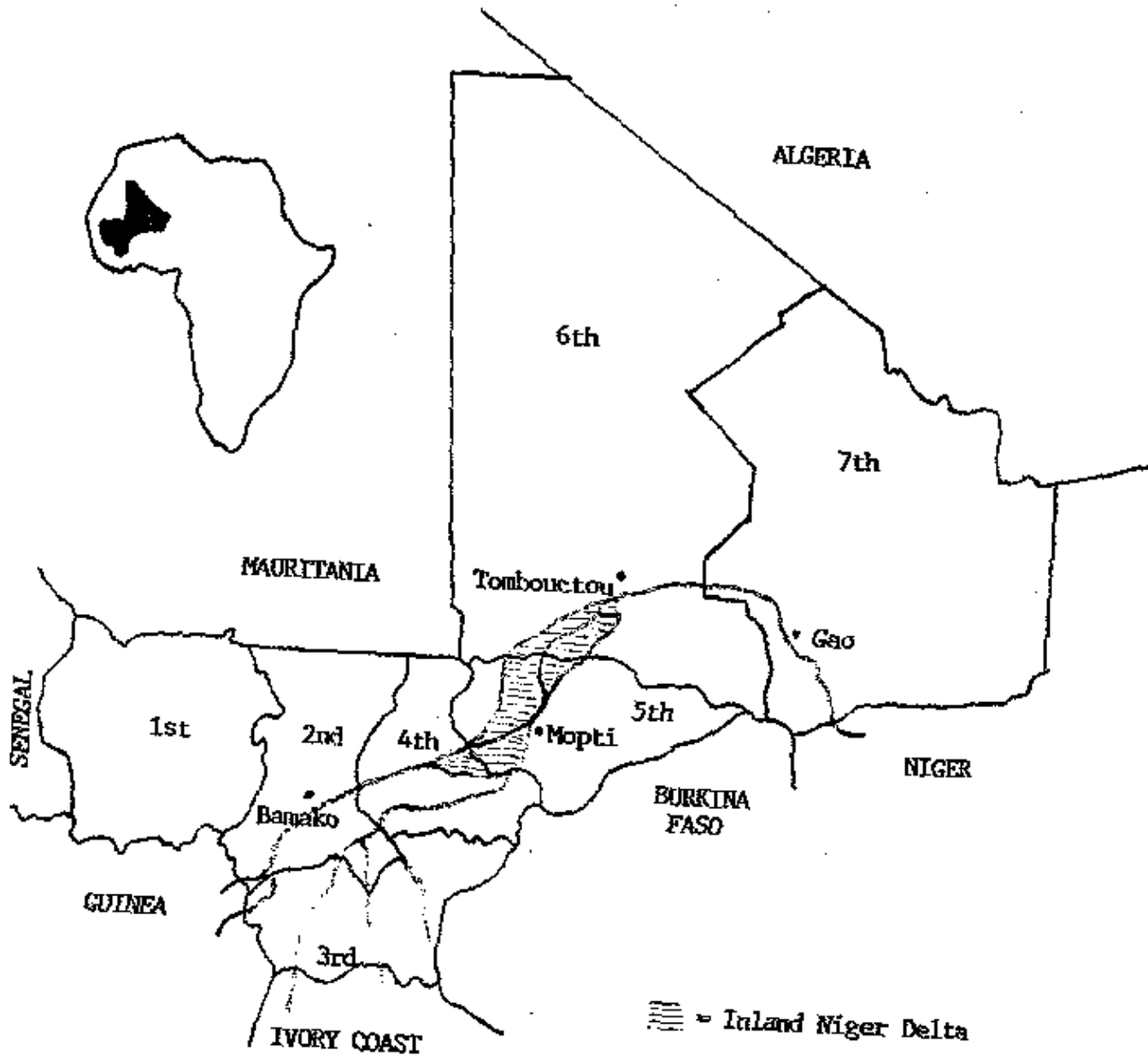


### 3.1. The Inland Niger Delta of Mali

The inland Delta of the river Niger lies between 13° 30' and 15° 30' latitude and 5°30' and 3°30' longitude in central Mali, West Africa (see Map 1 on Page 49, and Map 2 on Page 50). It covers an area up of to 15.000 km<sup>2</sup> (Gallais 1967) and is composed of a vast flat plain traversed by two major rivers, the Niger and the Diaka, and innumerable minor waterways and channels. To the north and east it is bounded by dryland Sahelian rangelands, to the west by the dried up waterways of the 'dead Delta' and to the south by the sandstone highlands of the Bandiagara Plateau. Between Ké-Macina in the south-west and lake Debo in the north east the plain falls in height by only 10 metres over a distance of 200 kilometres, giving it a gradient (0.05m) slightly flatter than the Niger Delta on the sea, and steeper than the Nile and Amazon (0.02m) (Gallais 1967).

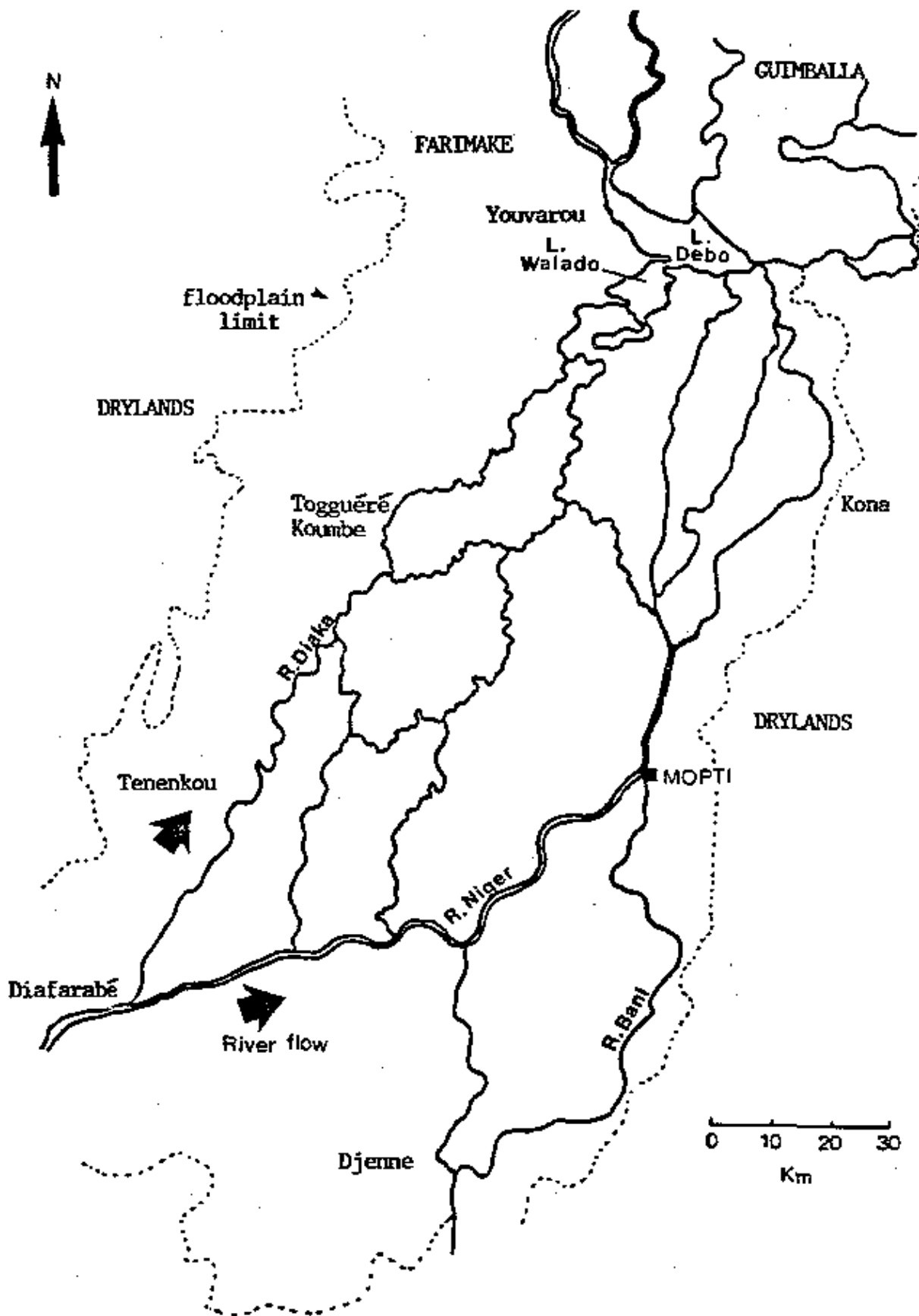
The diversity and productivity of ecosystems found in the Inland Niger Delta and on its borders makes it one of the most important wetlands in Africa. The area harbours about 500,000 people; two million sheep and goats and a million cattle (20% of the national herd) feed on its pasture and browse resources. The flood regime of the area provides ideal conditions for fish production, which is estimated to produce 100,000 tons of fish a year and six percent of Mali's export earnings. The Delta is also recognised internationally as an area of great importance for wildfowl and contained until recently a rich variety of other wildlife (IUCN 1989a).

Map 1: The Republic of Mali

Regions:

- 1st = Kayes
- 2nd = Koulikoro
- 3rd = Sikasso
- 4th = Segou
- 5th = Mopti
- 6th = Tombouctou
- 7th = Gao

Map 2: The Inland Delta of the River Niger



### 3.2. The Natural Resources of the Delta

#### 3.2.1. Flood and rainfall regimes

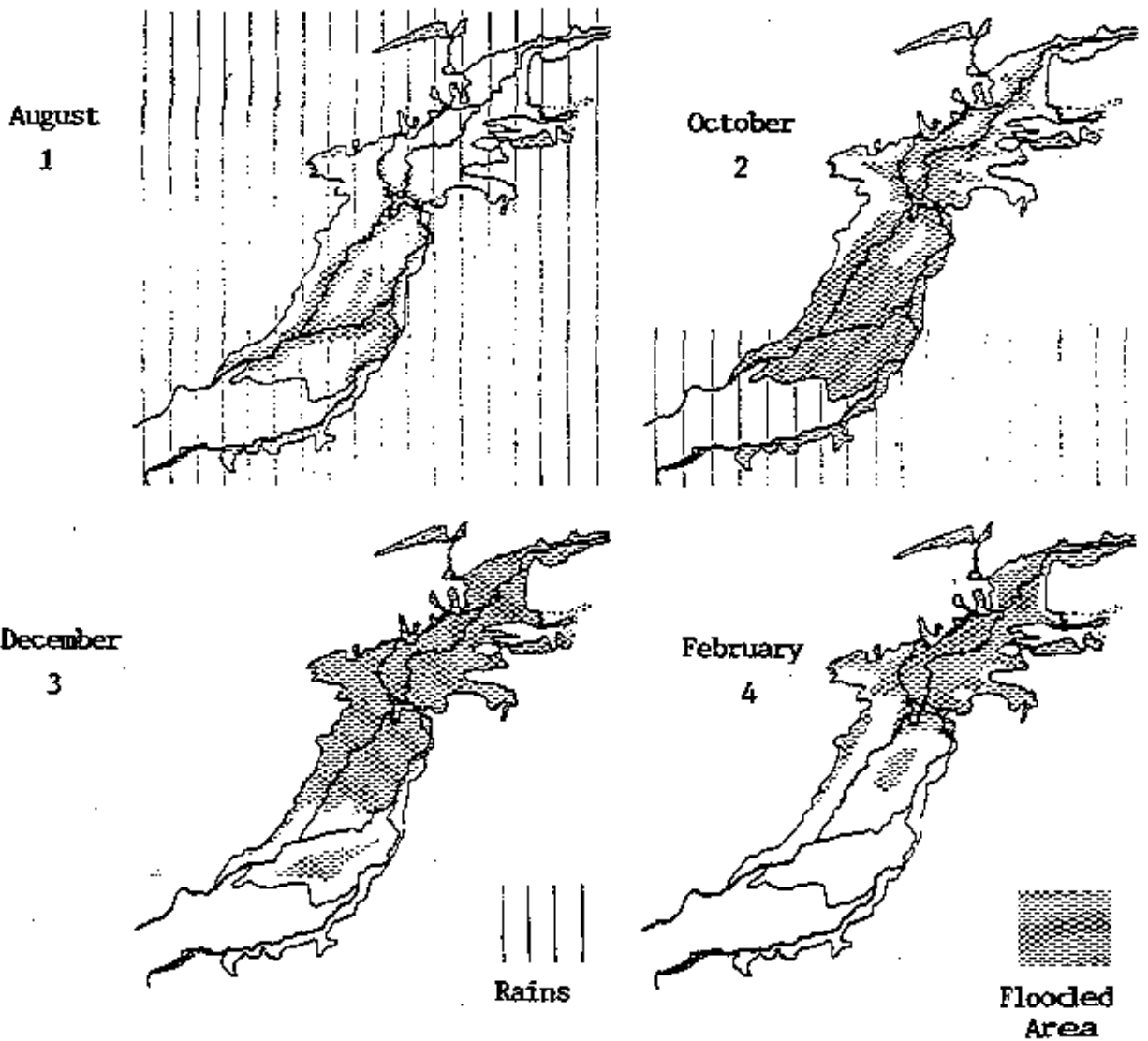
The most original aspect of the Delta is its annual flooding regime as each year the area is transformed from a dry plain into an inland sea. The flood regime commences as water descends the Bani and Niger rivers between July and October fed from their catchment basins in the Guinea mountains 1000 kms to the west and south west of the Delta, where rainfall is between 1300 - 1800mm. Of the 60,000 million cubic metres of water estimated to flow into the zone each year, half disappears in evaporation, transpiration or filters into the ground to feed the water table. The floodwaters move as a wave through the Delta with high water levels normally reaching the upstream end of the area in early October, the centre of the Delta in December, and its downstream end in February (Map 3 on Page 53). At its northern end, at Tombouctou, the river and plain is barred by the Erg of Niafunké, a set of stationary sand dunes running west to east, which back up the floodwaters into the lakes of Debo and Walado (IUCN 1987a).

The inland Delta spans the Sahelian zone to the north and the Soudano Sahelian climatic zone to the south. The northern part of the Delta receives on average between 200 - 300mm of rain a year, and the southern zone between 500 - 600mm, in a single short rainy season lasting between June/July and September/October.

The rainfall pattern and the timing of the floodwaters provide the seasonal cycle of the Delta. Between April and June the area is hot and dry, and the Delta has the aspect of a vast dusty plain with water running only in the deepest water courses. Between June/July and September/October the rains fall and the water rises in the main channels to spill out over the plains. The Delta becomes an inland sea between October and January, the high water season, and the period when cold winds (the harmattan) blow down from the northeast. Between January and March, the season of falling water, the Delta reverts to its dry condition. The area is thus characterised by climatic extremes and continually changing

conditions: in the hot season temperatures rise to 40°-45°C in the shade, while in the cold season they fall to 5°-10°C.

Map 3: The Seasonal Flood Regime of the Inland Niger Delta



### 3.2.2. Pasture, cropland and forest resources.

The soils of the Delta range from those almost entirely composed of sand, found primarily, but not exclusively, on its borders, to soils composed mainly of clay, found on the floodplains and in the water channels of the zone. The 'Projet Inventaire des Ressources Terrestres au Mali' (PIRT 1984) classifies them according to their morphology: 'dead' sand dunes with soils of a high mineral content; 'flat' dunes with poorly developed soils; vertisols and clay soils found on plains; plains with red and iron-rich soils; plains with brown and red soils; and black soils. From high levels to low the characteristic chain of soils are mineral soils, brown and red soils, sandy soils rich in silt, iron rich soils, clay and silt soils and, in its deepest areas, black vertisols (IUCN 1987a).

The characteristic topography of the Delta is composed of sand dunes on its dryland borders, a transition zone which is seasonally flooded leading to the floodplain proper containing the secondary and principal waterways. At intervals on the floodplain are found islands, known as Togguéré, on which the area's inhabitants live.

On the dryland borders of the Delta the principal grass species are *Schoenefeldia gracilis*, *Aristida mutabilis*, *Cenchrus biflorus*, *Tribulus terrestris* for the annual species, and *Andropogon gayanus*, *Diheteropogon hagerpugii*, *Loudetia togoensis*, *Eragrostis tremula* and *Pennisetum pedicellatum* for the perennial species. Forest resources include *Balanites aegyptiaca*, *Acacia radiana*, *Pterocarpus lucens*, *Combretum glutinosum* and *Lannea acida*. Primary production of this vegetation - dependent largely on rainfall levels - has been estimated at 800kg of dry matter per hectare per year in areas of lower rainfall, and 2500 kg/d.m./ha/yr in areas of greater rainfall. Dryland forests produce about 0.5 m<sup>3</sup>/ha/yr (Penning de Vries and Djiteys in IUCN 1987a).

The wetlands of the Delta have a vegetation type unique to the area which rely on a particular coincidence of timing of flood levels and rainfall for their productivity. Floodland pasture species and rice germinate with the arrival of the first rains (June/July) and need to have grown sufficiently by the time the floodwaters arrive to be able

to keep up subsequently with the rapidly rising flood levels. This vegetation includes the famous Bourgou (the Fulani term for floodland pasture) *Echinochloa stagnina*, (the 'bourgou' proper), *Vetiveria nigritana*, *Oryza longistaminata*, *Oryza barthii*, and *Vossia cuspidata*. The productivity of the vegetation is considerable, and has been estimated at an average of 7,000 kg/dm/ha/yr, which under ideal conditions can rise to as much as 25,000 kg/dm/ha/yr (Hiernaux and Diarra in IUCN 1987a). Floodland forest resources consist in *Acacia nilotica*, *Acacia Seyal*, *Andira inermis*. While exact production data for these species are not available, observations in the field show that their capacity for regeneration is considerable.

Two major crops are grown in the Delta and on its borders: finger millet and various varieties of floodland and rainfed rice. Both crops, from data collected by the writer in the field, are estimated to produce about 500 kg of grain per hectare in reasonable years. Floodland rice and dryland millet are planted after the first rains, millet is harvested in October, floodland rice in November/December. Rainfed rice is often planted in nurseries before the first rains fall. After the rains arrive and marsh pools fill, it is planted out to be harvested in October.

### 3.2.3. Fugitive resources

There are 130 genera of fish in the Inland Niger Delta (Daget 1954), of which the most common are *Clarias*, *Distichodus*, *Alestes* (the Niger sardine) *Tilapia* (carp) *Lates niloticus* (Nile Perch) and *Protopterus annectens*, which has the remarkable ability to hibernate through the dry season in the mud and which reappears, often walking across the land towards the main streams after the first rains, so informing the local belief that these fish come down with the rain itself.

The fisheries of the Delta depend - as with floodplain vegetation and crops - on the timing of the flood and rains, though the maximum height of the flood is of greater importance. Delta fish reproduce on the floodplains, and follow the leading edge of the floodwaters to



their spawning grounds between July and October. Between November and January they grow in the floodplains (where they are more difficult to catch because they are dispersed) before returning to the main watercourses and secondary channels as the water falls between January and March. The rate of reproduction of fish is therefore directly related to the area of the Delta flooded.

Over 300 species of bird are found in the Delta, 108 of them winter migrants from the palearctic region of which some, in particular *Anas querquedula*, form a significant proportion of the world's population. The strategic situation of the Delta on the southern reaches of the Sahara makes the area of international significance for the conservation of these species. The area also provides a habitat for manatees (*Trichechus senegalensis*), who may now form a unique sub-species since access to the sea via the Niger Delta in Nigeria has been cut off by dams (Stephen Cobb, personal communication). Warthogs (*Phacochoerus oethiopicus*), hippopotami (*Hippopotamus amphibius*), green monkeys (*Cercopithecus aethiops*), jackals (*Canis adustus*) and hyenas (*Crocuta crocuta*) are also found. In former times lion, antelope, elephant, ostriches (on the drylands) and crocodile were common.

### 3.3. The Inhabitants and Production Systems of the Inland Niger Delta

#### 3.3.1. History

Situated on the main West African waterway linking the interior with the coast, on the southern reaches of the Sahara, and surrounded by drylands, the Inland Niger Delta has a rich and varied history of human habitation and colonisation. Archeological sites both within the Delta and in its surrounding areas have indicated that a rice cultivating and fishing culture may have existed in the zone since the beginning of the neolithic period, almost certainly since 1500BC (Gallais 1967). The oldest inhabitants of the area are probably the Nono (or Noron), known as the original cultivators of the region and the Sorogho (Bozo) who traditionally specialise in fishing.

Between the 9th and 16th centuries the Delta was a strategic link in the great trading empires of West Africa: the empire of Ghana between the 9th and 13th centuries; that of Mali from the 13th to the middle of the 15th, and the Sonraï empire from the 15th until the middle of the 16th. These empires were principally concerned with the control of trans-Saharan trade, and their successive movement eastwards is partly explained by a movement in the same direction of trade routes as religious and tribal strife affected the desert tribes of the Sahara through whose territories the caravans passed (Gallais 1967). From the north came salt and manufactured goods from the Maghreb, exchanged principally for gold and slaves from the west and south of the Delta, which provided an ideal transport link for this commerce (Hopkins 1973).

In the Delta, this era witnessed the introduction and assimilation of various peoples into this trading network, affecting most of all the main rivers of the zone: the establishment of the trading town of Dia under the Ghana empire and the evolution of the Dioula and Diakankhé as two of the greatest trading peoples in West Africa; under the Mali empire the assimilation of the Delta's rice cultivators into commerce, known as the Marka, the establishment of the trading city of Djénné, and the formation of a caste of boatmen to handle river freight and act as a navy, known as the Somono; under the Sonraï empire the immigration of cultivators and fishermen (Sorko) into the northern sectors of the Delta, in the Erg of Niafunké (Curtin in Meillassoux 1971, Gallais 1967, Roberts in Crummev and Stewart 1981, Gerbeau 1958, Gallais 1958).

By the 17th century the trade in slaves and gold had moved substantially westwards towards European settlements on the coast, feeding the transatlantic and north European trade routes. The Delta during this period was densely populated, producing substantial quantities of rice and fish for the two great urban centres of the zone, Djénné and Tomboctou (estimated population in the 16th century 30,000 people), as well as continuing to be the strategic link in trade between the Sahara and the forest zone. Salt and cloth coming over the desert were transferred from camel caravans onto

boats at Tombouctou, and from boats onto donkeys at Djénné. Returning goods from the forest region included some gold and cola nuts. This trade continued in spite of the fall of the Sonraï empire to a Moroccan expedition in 1590, itself a despairing effort by the Maghreb kingdoms to retain control over the gold trade partly fed by the mines south of present day Bamako (Hopkins 1973).

Also in the 17th and 18th centuries, the rise of the Bambara kingdom to the south west of the Delta saw an influx of millet farmers into the zone, firstly into the Mesopotamia between the Niger and Bani rivers, later up the western bank of the Diaka river and the eastern side of the Niger. In the 18th century Fulani pastoralists - who had been migrating into the area from the east since the 11th century - began to consolidate their power, with the constitution of the Macina kingdom on the eastern borders of the Delta at Ténénkou and a further Fulani centre of influence in the Kounari, north of Mopti (Gallais 1967).

In the 19th century (between 1820-1862) the entire Delta was unified into a theocratic Muslim state under the hegemony of the Fulani, who managed the area in line with their predominantly pastoral interests. Much influenced by the kingdom of Sokoto (Barth 1890), Cheikou Amadou, spiritual leader of a federation of Fulani clans in the Delta, obliged the inhabitants of the zone to fix an area of origin, build permanent dwellings, and take up the Muslim religion. Pastoral, farming and fishing territories were codified and slave cultivating settlements composed of Rimaïbe introduced onto the floodplains to provide the Fulani with rice. The influence of this period, known as the Dina, which extended central administrative control to the remotest parts of the Delta, is still of great importance in understanding the allocation of natural resources to this day.

At the end of the 19th century, the comparatively stable years of the Dina were overthrown by the arrival of the Toucouleur Fulani from the Futa Jallon in Senegal, under the leadership of El Haj Oumar, fleeing the French armies led by General Faidherbe. Between 1861 and the arrival of the French in 1893, the Delta was subject to thirty years of scorched earth warfare between the original Macina

Fulani and Toucouleur armies. During this period large numbers of the Delta's population were deported from the zone, and were only able to return after peace broke out in the 1890s.

Between 1894 and 1960, the Delta was part of the French colonial administration of the western Soudan. In 1960 Mali became independent and for eight years followed 'socialist' policies of development under Modibo Keita, with the support of Chinese and Russian aid. In 1968, following a coup d'etat by Lieutenant Moussa Traoré, Mali reverted to the French sphere of influence. In 1991 the regime of Moussa Traoré itself was overthrown, and at the time of writing a military Council for National Reconciliation headed by Lieutenant-Colonel Amadou Touré (who is from Mopti) is ostensibly overseeing the transition of the country to a multi-party democracy. The Delta is now part of Mali's Fifth Region.

### 3.3.2. The ethnic groups of the Delta.

This bald statement of historical events merely hints at a salient characteristic of the Inland Delta of profound importance for the forms of land tenure found there: the diversity and fragmentation of the various ethnic groups and production systems using the area. Apart from the brief interlude of 1818-1862, the Inland Delta has never been politically or economically unified; each production system is practiced by more than one ethnic group; each major ethnic group has fundamental divisions within it. It is not at all uncommon to find two or more production systems using the same area, and the same resources, and yet to have only minimal contact. The reasons for this situation must be looked for initially in the history of the origins of the peoples of the area.

The layers of human migration into the Inland Niger Delta and the history of their inter-relationships provide the area with its unique characteristic of great natural richness being exploited by diverse ethnic groups. Figure 3 on Page 60 shows the timing of the arrival of these groups in the Delta.

Figure 3: The Immigration of Ethnic Groups to the Inland Niger Delta

Centuries

	I	13th	14th	15th	16th	17th	18th	19th
			Mali empire		Sonraï empire		Bambara/ Fulani Kingdoms	Dina
Bozo(Sorogho)	■	.	.	.	.	.	.	.
Somono	.	■	■	.	.	.	.	.
Nono	■	.	.	.	.	.	.	.
Marka	.	■	■	.	.	.	.	.
Fulani	.	■	■	■	■	■	■	■
Rimaïbe	.	.	.	.	.	■	■	■
Sonraï	.	.	.	■	■	.	.	.
Sorko	.	.	.	■	■	.	.	.
Bambara	.	.	.	.	.	■	■	.
Twareg	.	.	.	.	.	■	■	.
Bella	.	.	.	.	.	■	■	.

I = Indigenous inhabitants

The oldest inhabitants of the Delta are the Nono (or Noron) and Bozo, both of whom claim to be the original peoples of the Delta. The Bozo, who claim to have sprung out of two holes in the ground at Dia and Wandiaaka in the Delta (Bozo in Bambara means fishermen) are subdivided into four groups: Sorogho; Pondo or Fuono Sorogho; Tié; and Kélinga; according to where they live and the dialect they speak.

There are two theories concerning the origin of the Nono and the Bozo: the first argues that they are the same people who split early in their history. They formed a hunting and gathering society which increasingly specialised on the one side into a hunting society which

fished (the Bozo) and a gathering society which cultivated rice and also fished (the Nono). Evidence for this theory is provided by the fact that the Sorogho and the Nono speak a very similar tongue; that they exploit the Delta with the same fishing techniques, and that they share the ritual importance accorded to marsh pools, which they exploit according to the same rules. In line with this theory the Nono and the Sorogho became different peoples as a result of a post neolithic drought - one part of the population followed the lower water levels and became specialists in fishing and hunting, while the other group settled into the best rice-growing areas (Gallais 1967).

The second theory argues the Nono and the Bozo are different peoples, with the latter being the original inhabitants of the Delta and the former coming in to join them, as conditions to the north became drier in the post neolithic era. Evidence for this claim is that the Bozo cultivate fonio (*Digitaria exilis*) as a ritual crop while the Nono do not, and, secondly, that the Nono do not share the strong social links that the Bozo have with the Dogon, an ethnic group that inhabit the highlands found to the east of the Delta.

While the Delta was under the dominion of the Mali empire (1250-1450) two new ethnic groups were created: the Marka and the Somono, both initially drawn from the Nono/Bozo peoples. The Marka, or 'Mali-Ka' were quite literally 'the people of Mali' in the Mandé language, and were local inhabitants who had been converted to Islam and who practiced trade. In line with the empire's pre-eminent interest in trade, Marka communities are found on the banks of the main waterways. The Marka were originally composed of Nono rice cultivators, together with traders from the town of Dia, the commercial centre of the earlier Ghana empire in the Delta.

Also in line with their commercial interest, the Mali empire created a navy, initially out of the local Bozo population, but later including other ethnic groups captured in war: Bobo, Bambara, Dogon etc. The Somono, as this group was called, was settled on the banks of the main waterways - primarily the Niger - at intervals of a day's journey by boat.

By the middle of the 15<sup>th</sup> century it was possible to distinguish four different groups of hunter-fishermen and a group of fishermen-transporters. The four groups of fishermen were the Sorogho and the Fuono Sorogho, who fled into the marshes as the empire gained control over the Delta, the former to around present day Djénné and the latter to the remote areas of floodplain between the Niger and Diaka rivers in the north of the Delta; the Tié, who fell under the control of the empire and who live in the southern reaches of the zone near Diafarabé; and the Kélinga, equally under the control of the Mali empire, who live upstream from the Delta. In addition to these groups, collectively known as the Bozo, there were the Somono.

The Sonraï empire (1450-1590) did not fundamentally affect the bulk of the Delta, though a small community of Sonraï merchants were established in Djénné, where their descendants can be found to this day. In the north of the zone, however, around lake Dabo and in the Guimballa (Erg of Niafunké) there was a significant in-migration firstly of Sorko fishermen, later of cultivators.

In the 17<sup>th</sup> and 18<sup>th</sup> centuries there were two important in-migrations into the region, of the Bambara and the Fulani. Neither took place suddenly: rather the rise to importance of these ethnic groups was the culmination of a longer period of arrival in the Delta. The Bambara, who colonised and cleared significant areas of dryland within the Delta and also settled on its borders, were specialist millet farmers, and settled on the sandy soils. Their major influence in the zone came in the 1670s when the Fama of Segou, Biton Coulibaly, imposed control on the commercial centre of Djénné, and over the Fulani of Macina. This control extended as far north as the Guimballa, where the Bambara communities became dominant. This period of Bambara dominance, however, left no lasting institutional legacy: the Fama of Segou ruled by feudal means and relied almost entirely on the army, though some fishing communities were transported to Banakoro next to Segou to act as a navy (Tié of Nouh, Pora, Yonga, Koliéné) (Gallais 1967)

The increase in importance of the Fulani (or Peulh) in the Delta, on the other hand, was of profound importance to the region. Since the 13th century the Fulani had been moving into the Delta from the west in nomadic groups called *ouros* led by their *ardo*. Five main groups of Fulani can be distinguished in the Delta: the Dialloubé; Warbé; Ouroubé; Fittobé; and Ferobé; of which the most important by far are the Dialloubé.

These Fulani groupings colonised the western and north western reaches of the Delta first around the river Diaka, which came to be known as the kingdom of Macina. Those who were the direct descendants of the first, legendary shepherd guide to bring the Fulani to the Delta - the *ardo* Maghan Diall - settled on the Diaka around present day Ténénkou, while others colonised the northern plains of the Delta round present day Dialloubé. The Ferobé and Fittobé, moved east over the northern edge of the Delta, through the Guimballa, and down its eastern border through the Kounari to the Fakala.

This north-west to south-east movement of the Fulani was accompanied by a growing fragmentation of the clans as they moved into the floodplains, where small groupings from the five major clans either carved out smaller territories, or became mixed groups with access to defined pastures. The human and social geography of the Delta Fulani retains characteristics of this process to this day, where the four largest and most homogeneous pasturing territories remain in the north and west, and the smallest, most fractured ones are to be found in the east and south. Where the Fulani were strongest and most unified - the kingdom of Macina - the resident Marka populations were expelled, and village life was destroyed. In other parts of the Delta local populations were allowed to retain a measure of autonomy (Gallais 1967).

As the Fulani colonised and gradually came to control the Delta, a number of significant linkages took place between them and the local populations, which profoundly changed their society. These linkages concerned their intermarriage and interbreeding with local people,



above all the Marka, and resulted in the separation of the Fulani into two distinct groups, the 'red' and the 'black' Fulani.

Gallais (1987) argues that the creation of the 'black' Fulani came about as a result of marriages between the Fulani ardo and aristocratic Marka. The offspring of these alliances created a class of Fulani with interests both in pastoralism and the cultivation of millet and rice. They are characterised by a sedentary life style in villages, and only join their animals when they return to the floodplains after transhumance. Nowadays they are typically the heads of Fulani villages, and safeguard the floodplain pastures while the animals are away.

The 'red' Fulani are the descendants of the original nomadic group, and retained the way of life of their ancestors, adapted to the conditions found in the Delta, that is, a transhumant cycle that brings the animals into the floodplains as the floodwaters retreat each year and out to the drylands during and just after the rains.

The Fulani, as with other Sahelian pastoral groups, developed master-servant relationships with agriculturalists early on in the Delta, in order to provide them with a reliable source of grains. To this end they created a 'slave' ethnic group, called the Rimaïbé, composed of people belonging to local groups - Bambara, Bobo, Bozo, Dogon etc. - and implanted them onto the floodplains and neighbouring drylands. A further class of warriors, the sons of liaisons between the Fulani and their domestic servants, formed a military caste (Gallais 1967).

By the end of the 18th century the Delta and the neighbouring drylands contained six major ethnic groups : Fulani; Rimaïbé; Bambara; Bozo; Somono; and Marka, as well as further less important ones on its margins (Twareg, Bella, Sonraï, Sorko). Politically, the area was split into three zones: those under the control of the ardubé to the west; the Ferobé Fulani in the east (Kounari); and the commercial centre of Djénné in the south. Within each of these ethnic groups (apart from the Somono) there were

divisions, as within each of the political groupings there were smaller centres of power.

The Dina system, while unifying the Delta into a theocratic state, overlay another social group on those already present in the Delta. These were the marabouts, Islamic authorities often given pastures by Cheikou Ahmadou and installed in frontier areas to supervise opponents of the system. By no means all the Fulani of the Delta acquiesced peacefully to the Dina: the Macina ardo, the Dialloubé, and the Fulani grouping on the eastern border of the Delta all had to be subdued by Cheikou Ahmadou by force of arms. The Marka in the Delta also opposed the system (which monitored trade strictly in the area), but were obliged to acquiesce.

In 1861 a further group of Fulani arrived in the Delta - the Toucouleur - and the majority of the population living between Diafarabé and Lake Debo were forcibly moved to the eastern borders of the Delta, not to return until after the French arrived in 1893.

### 3.3.3. Population

About 550,000 people live in the Delta (7% of the population of Mali) administered through four 'Cercles' and twenty-eight 'Arrondissements', with an average population density of 20.4 inhabitants per square kilometre. Well over half of the population (65%) live in the two administrative areas containing the largest urban centres of Mopti (the capital of the region) and Djénné, found respectively in the central and southern parts of the Delta. There is thus a marked difference in the density of population between the central and southern zones on the one hand (30.5 ha/km<sup>2</sup>) and the northern and eastern areas on the other (10.1 ha/km<sup>2</sup>) [République du Mali 1987b]. This reflects the topography of the area: the eastern and northern parts of the Delta are the deeper zones of the floodplain where sites for habitation are limited to Togguéré; whereas drier areas are found in the central and southern sectors on the Delta. These figures cannot account for the vital seasonal movement of population as the water levels rise and fall in the Delta, but they

hint at its direction: from higher more populated parts of the Delta in the wet season, to lower areas as the water drains from the Delta, and back again as it fills.

The inhabitants of the area practice three main activities: fishing, herding and farming, but a major characteristic of the zone is the practice of dual production systems, such as agro-pastoralism, and farming and fishing. While detailed and reliable data on how many people practice each activity are not available, a variety of resources indicate, as a rough order of magnitude, that 100,000 people are urban dwellers, and 100,000 people practice herding as a full time occupation. The same number mainly fish and the rest (250,000) are either farmers, farmer fishermen, or agro-pastoralists (Gallais 1967, CIPEA 1983, RIM 1987, République du Mali 1987, République du Mali 1985).

To some considerable extent ethnic allegiance can be linked to customary principal activity: the herders of the Delta are Fulani; fishermen are Sorogho, Somono, and Sorko; farmers are Sonraï, Marka (Nono), Bambara and Rimaïbe. It is possible in the Delta to this day to know from someone's surname their occupation, the area in which they live, and the history of their arrival in the zone. Figure 4 on Page 67 shows their principal economic activity by ethnic group:

Figures 4: Principal Economic Activity by Ethnic Group

	FARMERS	FISHERMEN	HERDERS	TRADERS
BOZO		■		
SOMONO		■		■
NONO	■			■
MARKA	■			■
FULANI			■	
RIMAIBE	■			
SONRAI	■			
SORKO		■		
BAMBARA	■			

Contrary to a widely held belief in administrative circles in Mali, the population of the Delta is not growing very fast. Analysis of the first simultaneous census held in 1976 and subsequent 5 year administrative surveys indicated an overall population growth rate of 2.5%, with urban centres growing at a rate of 4.09% and the rural population by 1.95%. The 1987 simultaneous census found, in contrast, that the overall growth rate for the 5th Region was 1.07%, with urban centres growing at 1.22% and rural populations by only 0.68%. Growth rates in the Delta were found to be even lower, at 0.92%. Long-term migration at the regional level (though there is evidence of migration out of the drier towards the wetter areas) does not account for these low figures as it had only risen from 6% in 1976 to 8% in 1987 (République du Mali 1987b). It is worth noting that infant mortality is ferociously high in the Delta - in the region of 25-35%, three times the national average - in one part of the area (Hill 1985a, Marriott 1989).

### 3.3.4. Production systems

Five major production systems exploit the Delta: farmers, herder farmers, fishermen, farmer fishermen and transhumant pastoralists. Though to some extent this is an unrealistic characterisation, as production systems have been evolving in line with different political, climatic and economic circumstances over centuries, it does broadly represent a relatively stable grouping of activities that existed from the early years of this century until the early 1970s, and about which there are extensive written sources to draw upon, as well as oral accounts.

Farmers living on the borders of the Delta cultivate millet on the sandy soils and rice in pools that hold water in the rainy season as their two principal subsistence crops. Millet is sown in June/July after the first rains fall and harvested in October, while Koberé rice - said to have been introduced from Indo-China by the French<sup>1</sup> - is planted in nurseries before the rains start, and then transplanted out to pools when they have filled with water, being harvested in late September/early October. During the cold season (November-February) and through the falling water period, farmers cultivate flood retreat crops (cotton, sorghum, manioc, sweet potatoes, peanuts) in pools fed by water from the floodplains, some of which germinate and develop a root system before the hot season halts all vegetative growth, and then recommence their cycle in the rains and mature between August and the following cold season.

Floodplain farmers are specialised rice cultivators, growing various early and late varieties of the indigenous *Oryza glaberrima* species that can withstand water levels of anything up to three metres. The rice is sown in June/July and harvested from October through to December, depending on the variety. The intervening months between the harvest and sowing the new crop are spent preparing the heavy Delta soils for the next cultivating season, petty trading, and taking part in dry season collective fisheries.

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1 Based on information from local interviews.

Farmer fishermen on the floodplains generally cultivate fewer varieties of rice than full time farmers, favouring late maturing strains that ripen in December. Throughout the year they fish, moving out of their villages into camps on the floodplains at the outset of the falling water period, fishing the secondary channels and residual pools as water levels drop, and the main rivers in the dry season, before turning to exploit the secondary channels once more as the water begins to rise again.

Many transhumant fishermen farm as well, but they are distinguished from farmer fishermen by the distances they travel, the time they spend away from their communities and the areas they come from. Most often they originate from upstream sectors of the Delta, from around Djénné, Diafarabé and the Niger-Bani mesopotamia as well as from further up the Niger river as far as Segou. Leaving the old and the young behind at the end of the high water season, they follow the falling water levels down through the Delta, living in fishing camps they construct on the banks of the main rivers. By the dry season they are encamped around the lakes of Walado and Debo in the northern sector of the Delta, and with the approach of the rains they turn for home once more, cultivating and fishing in their own areas in the rising and high water season.

Herder farmers inhabit the borderlands of the Delta and often make up mixed communities with farmers of millet, which they also cultivate. Their agricultural activities are secondary - in terms of labour time and value - to their principal interest in cattle herding. Generally they belong to the pastoral group which holds a monopoly over access to floodplain pastures, the Fulani, and part of the household is engaged full time in accompanying animals on transhumance.

Transhumant pastoralists - perhaps the best known production system of the Delta - move their herds out of the zone at the onset of the rains, when the Sahelian pastures surrounding the area have begun to grow. They remain in the drylands - moving sometimes as far as the southern reaches of the Sahara in Mauritania - until water levels begin to drop again in the Delta, and then traverse into the

upwater reaches of the zone through a series of highly organised crossing points (see Chapter 5 for a detailed discussion of this system). They then move their herds down through the Delta as falling water levels reveal the Bourgoutières (wetland pastures), arriving in the lake zone at the onset of the dry season, where they remain until the rains fall again in June/July.

### 3.4. Drought

#### 3.4.1. The decline in natural resources

Over the last twenty years the Inland Delta has been subject to a cycle of increasingly dry years. Table 2 shows that the Sahelian belt, in which it lies, suffers from periodic dry spells, but those that have afflicted the region since 1968 have been of particular severity not only in terms of low rainfall and flood levels, but also because of their cumulative effect.

Table 2: Principal Droughts in the Sahel since 1740

Year	Type
1740	Drought, famine
1750	Drought, famine
1790	Drought
1855	Drought
1900-03	Drought
1911-14	Drought, famine
1931-34	Famine
1942	Drought
1950	Drought
1968-73	Drought, famine
1983-85	Drought, famine
1987 *	Drought

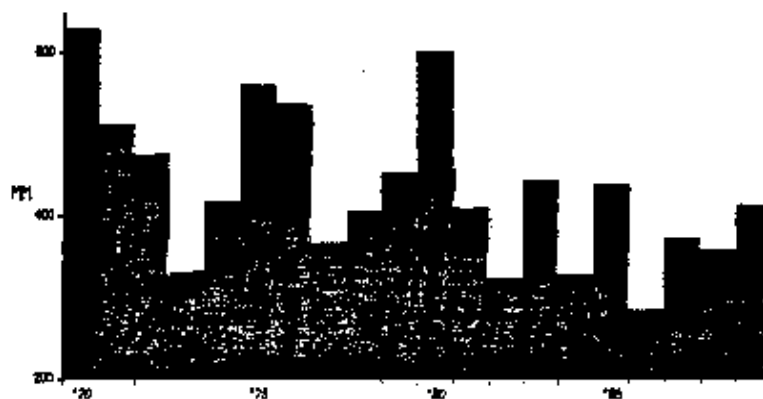
\* For the Delta, only

Source: ENDA 1985

While the origin of these climatic changes are still relatively little understood (IUCN 1989), their effect on the flood cycle and rainfall pattern in the Delta has been significant. In Mopti, the capital of the region situated in the centre of the Delta, the mean annual rainfall between 1920 and 1969 of 546mm a year fell to 326mm in 1973

and to 321mm in 1984, while the average for the period 1980-89 was 398mm - a drop of nearly a third (see Figure 5 on Page 71). This fall - involving a 200km shift southwards of the isohyets -has been accompanied by increasing variation in the timing and locality of rainfall, with shortages occurring at key moments of the productive cycle of crops (rice and millet), wild food and other vegetation.

Figure 5: Rainfall in Mopti, 1970 - 1985

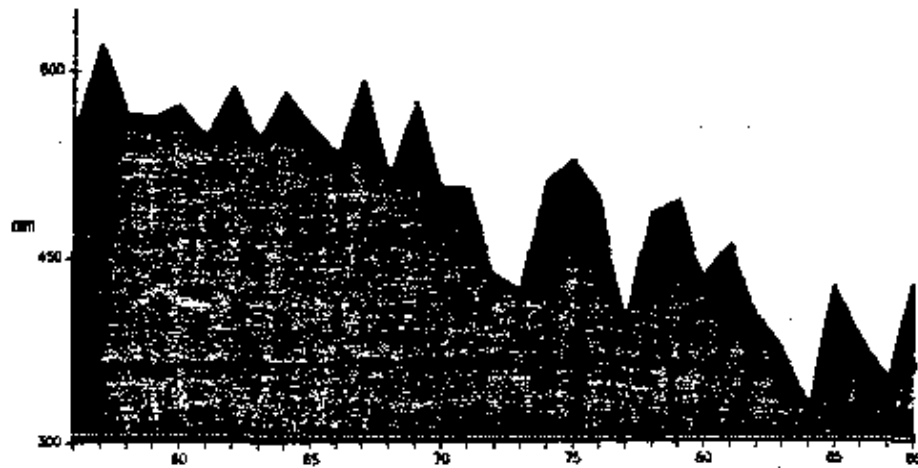


Source: IUCN 1989

Flood levels have equally diminished and varied in their timing. Figure 6 on Page 72 shows yearly high water levels at Akka in the northern sector of the Delta between 1956-1985, and Figure 7 on Page 72 compares the timing and level of floodwater between 1957-59 and 1983-85, demonstrating that while the overall quantity of water has diminished the duration of flooding has also fallen. In the northern sector of the Delta, where most of the data for this thesis were gathered, the effect has been to shorten the time when the floodplains were inundated from a period of five to six months in 1957-59, to two to three months in the early 1980s, thereby doubling the length of the dry season. The drop in levels has been particularly severe in the last decade: while in 1979-80 the average supply of the river Niger was of the order of 3000 m<sup>3</sup>/second, in 1984-85 this fell to 650 m<sup>3</sup>/second (ORSTOM in IUCN 1987a). A preliminary study carried out in 1988 estimated that in 1984-85 only 30% ( 4700 km<sup>2</sup>) of the total inundatable area was in fact covered in water.

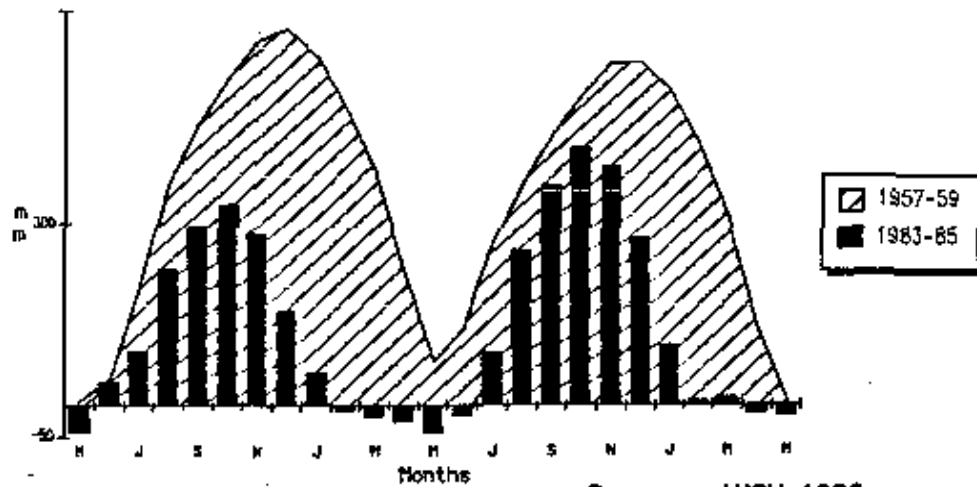


Figure 6: Maximum Flood Levels at Akka, 1956-1988



Source: IUCN 1989

Figure 7: Comparison of Flood Levels, 1957-59 and 1983-85



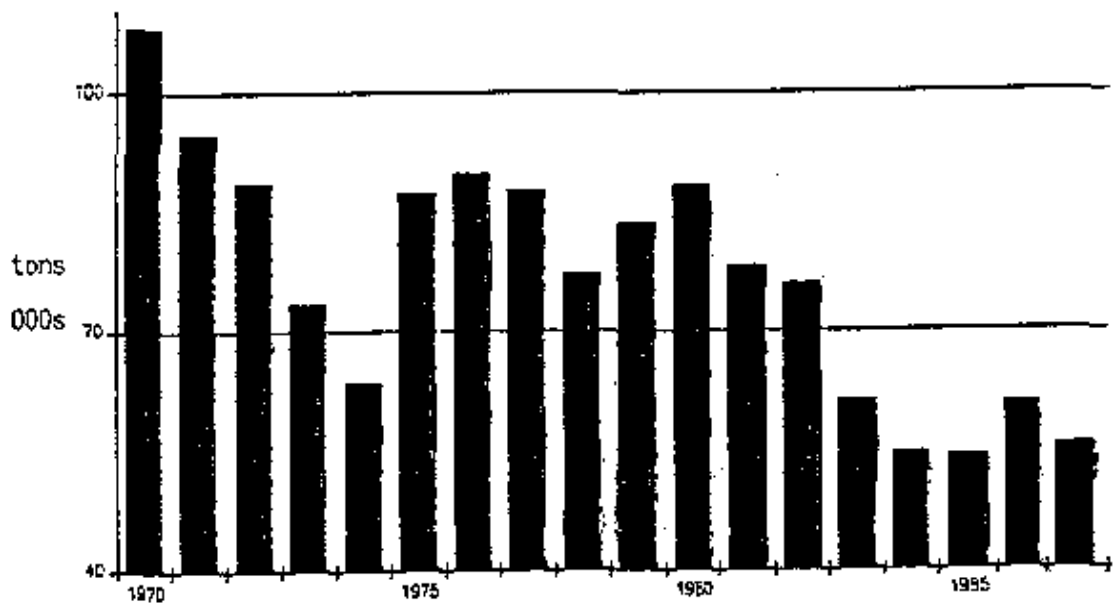
Source: IUCN 1989

The linked effect of reduced flood and rainfall levels on the productivity of the Delta has been marked. Figure 8 on Page 73 and Table 3 on Page 73 show the fall in fish production from 1970 -1987.

Table 3: Fish Production in the Inland Niger Delta 1970-1987 (in MT '000)

Year	1970	1971	1973	1974	1975	1976	1977	1978	1979
Tons	107.9	94.8	88.6	73.4	63.5	87.3	77.1	83.6	88.2
%	100%	87%	82%	68%	59%	81%	71%	78%	82%

Year	1980	1981	1982	1983	1984	1985	1986	1987	
Tons	91.3	78.2	75.9	61.3	54.7	54.2	61.0	55.7	
%	85%	73%	70%	57%	51%	50%	57%	52%	

Figure 8: Fish Production (thousands of tons),  
Inland Niger Delta, 1970-87

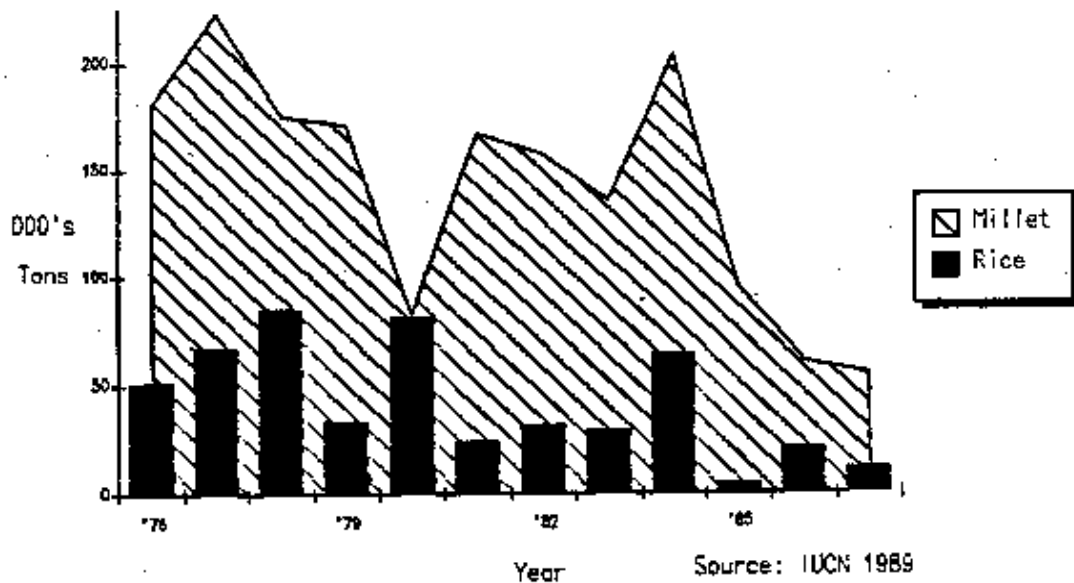
Source: Annual Reports, Opération Pêche, Nooti

**Table 4: Production of Cereals in the Fifth Region ('000 MT),  
1975/76 - 1986/87**

Year	1975/76	1976/77	1977/78	1978/79	1979/80	1980/81
Millet	181.9	223.4	176.4	171.9	82.5	167.9
Rice	51.3	66.9	85.0	33.5	80.9	23.9
Total	233.2	290.3	261.4	205.4	163.4	191.8

Year	1981/82	1982/83	1983/84	1984/85	1985/86	1986/87
Millet	157.9	136.0	204.2	95.2	61.0	55.7
Rice	31.3	29.1	64.0	4.6	20.9	11.0
Total	189.2	165.1	268.2	99.8	81.9	66.7

**Figure 9: Production of Millet and Rice in the Fifth Region, Mali,  
1975/76 - 1986/87**



While data on crop production for the Delta alone are not available Table 4 on Page 74 and Figure 9 on Page 74 show harvests for millet

and rice for the whole Fifth Region for the period 1975/76 to 1986/87 (the agricultural year runs from June to January).

Since almost all the rice grown in the region comes from the Delta, these figures give an indication of crop levels in the area, though the figures for millet take in areas of higher rainfall in the south of the region outside the Delta where the bulk of this cereal is grown. Research by the writer in the northern sector of the Delta revealed, by way of an indication, that in the drought year of 1985/86 agriculture was in a state of collapse, with millet harvests producing about 55 kg/ha, while rice provided 10 kg/ha.

Pasture resources in the Delta and its borders appear equally to have declined, though the situation can differ enormously year by year. Studies have shown that for deep-water pasture (*Echinochloa stagnina*), while biomass production during the flooding stage has not dropped significantly, green shoot production in the dry season (which is of great use to cattle) is strongly affected by dry conditions and, in a series of sites across the Delta, fell by 85% between 1982-84. Other floodland pasture production (*Oryza longistaminata*) fell by 90% over the same period. Both on the drylands and over much of the Delta perennial species are giving way to annuals, threatening the ability of the zone to provide adequate pasture through the long dry season. For many species, seed stock levels in the ground have fallen significantly (Hiernaux and Diarra 1986).

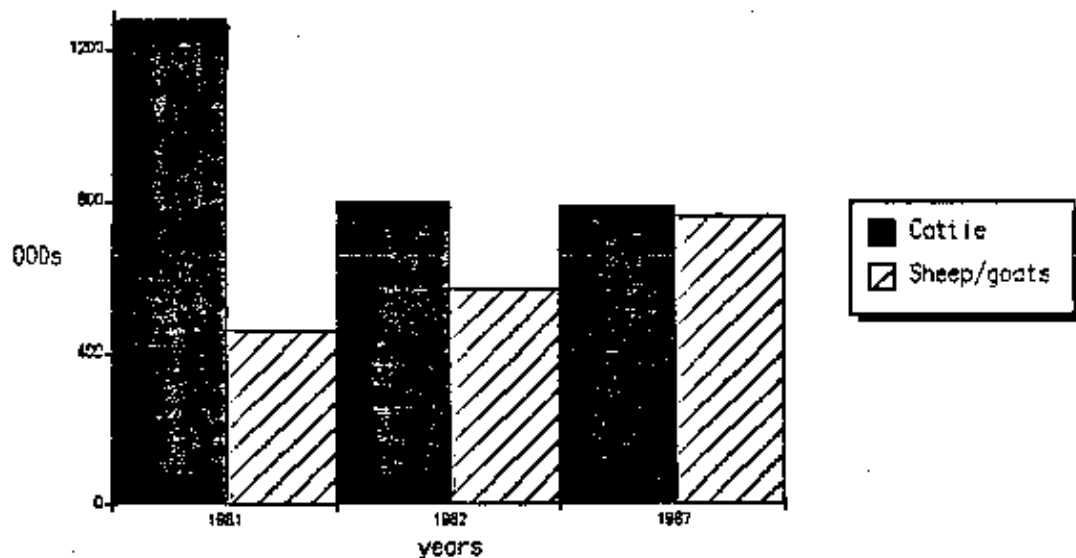
The effect of drier conditions on livestock numbers are presented in Table 5 and Figure 10 on Page 76 and show a fall of about a third in terms of Tropical Livestock Units (TLUs) from 1981 to 1987. Cattle numbers fell by 40%, while the small ruminant population rose by 66%, reflecting the strategy of rural producers of investing primarily in goats in response to drought.

Table 5: Estimated Population of Livestock in the Delta  
1981-1987

	March 1981	June 1982	May 1987
Cattle	1,280,097	800,161	788,920
Shp/Gts	461,041	571,010	763,941
TLU	942,172	617,213	628,638

Source: ODEM, RIM 1987, CIPEA 1983

Figure 10: Population of Livestock in the Delta, 1981-87



Source: République du Mali 1987, CIPEA 1983

The forests of the Delta - particularly on the floodplains - have been heavily exploited by the area's inhabitants and by parastatal development agencies clearing parts of the floodplain for rice polders. Woodfuel for the main urban centres of the zone is nowadays supplied from as much as 60 kms from the towns. Outside this radius, however, the situation concerning the natural productivity of the forests is not necessarily one of decline: while

some species, such as *Acacia kirkii* are in regression; others, such as *Balanites aegyptiaca*, are colonising the area. Two factors point however to their future degradation: first, the gap between the needs of the area for woodfuel and the production of woodstock, and second, the heavy investment by rural producers in smallstock, particularly goats.

Wildlife over the last twenty years has declined dramatically. Antelope, hippopotami and lion have all either disappeared or are on the way to extinction. Few manatees remain (though it is exceedingly hard to assess the situation because local inhabitants eat them and risk enormous fines if this comes to the attention of government forestry agents). While wildfowl numbers are still considerable, they are prey to local people who use them as alternative food, especially in dry years. Warthog, jackals and hyenas are still found.

#### 3.4.2. Production system adaptability

In these circumstances the production systems of the Delta have adopted a number of strategies including migration, bringing new areas and new resources into production, diversifying into new activities, adopting new technology and commercialising products that were not formerly marketed, or were solely used for subsistence.

Millet farmers, faced with low harvests and insufficient water in rainfed and floodfed pools, have sought to bring areas normally too deep for cultivation into production. Long-term migration to towns in search of wage labour is on the increase with, in bad years, up to 30% of the population leaving. Instead of investing in cattle which they habitually gave to the pastoralists to herd for them, farmers have invested in small stock which they herd themselves, effectively turning many households into farmer-herders. Above all, they have turned to wild food as a source of nourishment, exploiting dryland wild grains (fonio, wild melons) soon after the end of the rains, before moving onto the floodplains to harvest the grains of pasture plants (*Echinochloa stagnina*) and water lilies, as well as taking part

in rice harvests on the floodplain in areas where production has been high. They have also taken to felling wood and producing handicrafts (mats, woollen rugs) for the market.

Floodplain rice farmers and farmer fishermen now depend upon wild food harvests on the borders of the Delta and on the floodplains as well as moving to areas where rice production has been good if their own harvests fail, and to the borderlands to take part in millet harvests. To counteract the effects of lower flood levels and uncertain rainfall they have switched to production of shorter-term varieties of rice which flourish in shallower depths of water, as well as migrating to towns in search of wage labour, though the rates of out-migration - between 15-20% in bad years - is lower than that for border land millet farmers. In part, this is explained by their ability to turn to fishing to make up the shortfall in grain production, in so doing investing in more intensive forms of fishing equipment (smaller mesh sizes, gill nets etc.). In recent years they have begun to harvest pasture which they cut in the high water season and sell in the dry season to animal owners.

Transhumant fishermen have increased their migration out of the zone by leaving the Delta to look for work in the sea fisheries of the Ivory Coast, moving to the Manantali and Selengué dams in the west of Mali to exploit lakes created for hydro-power and irrigation schemes, and have extended their customary routes downstream to fish as far away as Gao, 800 kms to the east-north-east, where they remain for years at a time. Those that have remained in the Delta have moved into the deeper areas of the zone, staying there without returning to their villages each year, cultivating rice where they can, and using increasingly intensive methods to capture fish. They equally exploit the wild food of the floodplains and move to areas where there has been a good rice harvest.

Herder farmers, having either lost or sold their cattle in the drought, have, like millet farmers, invested substantially in smallstock, especially goats (see Figure 10 on Page 76). They also migrate to the towns, often in the same numbers as farmers. Wild food in the borderlands make up a significant proportion of their

diet. They cut wood and produce handicrafts for sale, and they migrate to outside harvests.

Some transhumant pastoralists have moved out of the zone to the south, as far as Sikasso in south-western Mali, while others have adapted their transhumant cycle to pass through the deeper areas of the Delta each year. They further maintain their animals for longer on the floodplains, arriving in the area at the end of October, and not leaving until they are certain that substantial rains have fallen in the drylands. They tend to travel less far on their transhumant cycles than before, in case the rains stop, and remain on the pastures bordering the Delta during the period of high water. In years of low flood levels, when large parts of the Delta remain dry, they maintain larger numbers of animals on the floodplains all year round.

The effect of drought on the resources of the Delta has been twofold. First, the drop in rainfall and flood levels has significantly reduced natural productivity. Second, and consequently, some resources have come under increasing pressure from the area's inhabitants. Two of the most important of these are pastures and fisheries which threaten to be seriously degraded if the present dry period continues. With regard to pasture, the stationing of increasing numbers of animals on the floodplains throughout the wet season is a cause for concern because the cattle are present when the floodplain pasture begins to grow again after the first rains, and their consumption of the recently germinated green shoots removes the plants' ability to withstand the rising floodwaters, so that they drown. The harvesting of floodplain pasture by farmer fishermen for sale - either by cutting the plant below the water before it seeds, or entirely uprooting it - clearly destroys the resource. Further, on the borderlands of the Delta, where increasing numbers of animals are nowadays stationed, evidence has indicated there might be serious degradation (CIPEA 1983).

The fisheries of the Delta are now exploited on a full-time basis not only by transhumant and farmer fishermen, but also by many farmers. Added to the increased time these producers spend in this



activity is new, more intensive equipment including smaller mesh sizes and the growing use of monofilament nets. As with pasture, fish are now intensively harvested at moments in the year - as they migrate into the marshes with the rising flood to spawn - when the effect of their capture will have its greatest influence on the ability of the resource to reproduce.

Other resources that have come under increasing pressure are forests - as the figures for smallstock numbers in the Delta attest, as well as being used as sources for woodfuel for urban centres - and wild food. It is a moot point as to whether this increased exploitation is leading to their degradation.

The strategies adopted by production systems in these drier years are presented in a schematic form in Table 6 on Page 80.

Table 6: Strategies Adopted by Rural Producers in the Face of Drought

	Transhum. Herders	Farmer Herders	Farmers	Farmer Fishermen	Transhum. Fishermen
Deeper Fields			■	■	■
Migration	■	■	■	■	■
Goats		■	■		
Wild Grains		■	■	■	■
Outside harvests		■	■	■	■
Handicrafts		■	■		
Woodfuel		■	■		
New crop varieties			■	■	
Intensify fishing			■	■	■
Cut pasture			■	■	
Move to deeper zone	■				■

### 3.5. The Oakerson Framework: the Physical and Technical Attributes of Natural Resources.

The material presented in the preceding sections of this chapter allows the physical and technical attributes of resources in the Inland Niger Delta to be compared between 'pre-drought' and 'post-drought' periods. These periods are not specific to any one particular year, but describe conditions that broadly pertained in years of good rainfall and flood levels (i.e. the 1950s and 1960s) compared to recent years when conditions have seriously worsened, as described in section 3.4.

Before proceeding to discuss the attributes of particular resources it is necessary to clarify this category of Oakerson's framework. It will be recalled from section 2.5 that Oakerson argues that common property resources have physical attributes of 'partial jointness' and 'partial excludibility', and exist within a clear set of boundaries. In the same chapter it was explained that 'partial jointness' refers to the availability of a common property resource, in that individual users in exploiting the resource take away from other producers ability to use it but that, within limits, all users can benefit jointly. In contrast to this, public goods are entirely joint in that their consumption takes away nothing from the ability of others to use them as well, and that private goods, conversely, are not joint at all, as they are consumed by one individual. It follows that common property resources are 'partially exclusive' in that their consumption excludes others from consuming the good but that, within limits, it includes some consumers. Public goods are non-exclusive and private goods wholly exclusive.

Oakerson attaches these qualities to the physical and technical characteristics of resources (as against the rules that apply to their management) by arguing the jointness of common property resources are defined effectively by their carrying capacity. Resources with an infinite capacity to be exploited (i.e. sunlight) are evidently public goods, while those which can only be sustainably used by an individual are private. Common property resources, in their technical and physical characteristics are those which can be sustainably

exploited by limited numbers of producers, or limited levels of intensity, these numbers and levels defined by the productivity of the resource, linked in turn to its physical and technical characteristics.

Whether these resources will or can be managed in favour of 'partial jointness' will depend to an important extent on their 'partial excludability': those natural features of resources that make it possible to keep out excess numbers of users, or prevent damagingly high levels of exploitation. Key characteristics of 'excludability' are natural features such as flood levels, concentration of the resource, small size, remoteness (in the sense of distance from urban centres and villages) and ease of detection of trespass. Lastly, common property resources need to exist within a set of natural boundaries that are indivisible into smaller units. The limits consist principally in natural features such as species (i.e. type of wood), topography, soil type, water regime etc.

The inference of this argument is that resources with attributes of 'partial jointness' and 'partial excludability' can be managed best by common property systems. As Oakerson writes (1986:15):

'Given an appropriate set of rules, based on limiting conditions, the same economies of sharing that Samuelson demonstrated with respect to a pure public good may also be available to the users of common property'

This implies in effect that resources with these physical characteristics managed as common property will not only promote sustainable production, but maximise benefits for rural producers exploiting these resources as common property. By extension it might be argued that resources with these characteristics managed as public goods will be degraded because they will be exploited above their carrying capacity, and if they are managed as private property they will not benefit from the 'economies of sharing' and might be underutilised.

Writers using the framework to order their arguments on common property issues have had some difficulty in applying these categories

to the physical and technical characteristics of the resources they study. The notion of 'partial jointness', with its stress on the sustainable production of a resource, implies the carrying capacity of that resource can be defined. This is not easy, as Artz *et al.* have made clear when they note that carrying capacity '...is not a biological constraint, but an abstract management concept' (Artz *et al.* in National Research Council 1986:261). It is particularly difficult to define in areas of high climatic variability such as the Inland Niger Delta, where rainfall is localised and where differences in maximum flood height of a matter of feet can affect the area inundated by hundreds of square kilometres. Harriss and Blaikie (in National Research Council 1986) have also pointed out that the implicit argument that as a resource becomes more intensively exploited it will become more joint, is not always borne out: some resources become more productive with increased use. This is arguably true for one of the principal resources of the Delta, the floodplain pastures composed of Bourgou (*Echinochloa stagnina*), the exploitation of which by cattle, particularly as they browse the floodplains when they are still wet, materially aids the plant to reproduce. This thesis cannot match rates of exploitation to carrying capacity because the data are not available, but it can point to resources that are coming under increasing pressure and suggest areas where this increasing use is making resources more joint. Moreover, it can identify the ways in which resources change in their natural attributes of jointness through the seasons of the year.

The analysis of changes in the technical and physical attributes of resources between a 'pre-' and 'post-drought' period presented below differentiates between four levels of jointness and exclusion, in different months of the year. It distinguishes between periods when resources were unused, when they were exploited but at levels of intensity that did not affect the ability of others to use them as well ('open'), and between two moments when their exploitation became increasingly joint and exclusive ('restricted' and 'concentrated').

In view of what has been said above on the lack of data on the carrying capacity of the Delta's resources, these categories can only indicate in the most general sense where exploitation of resources

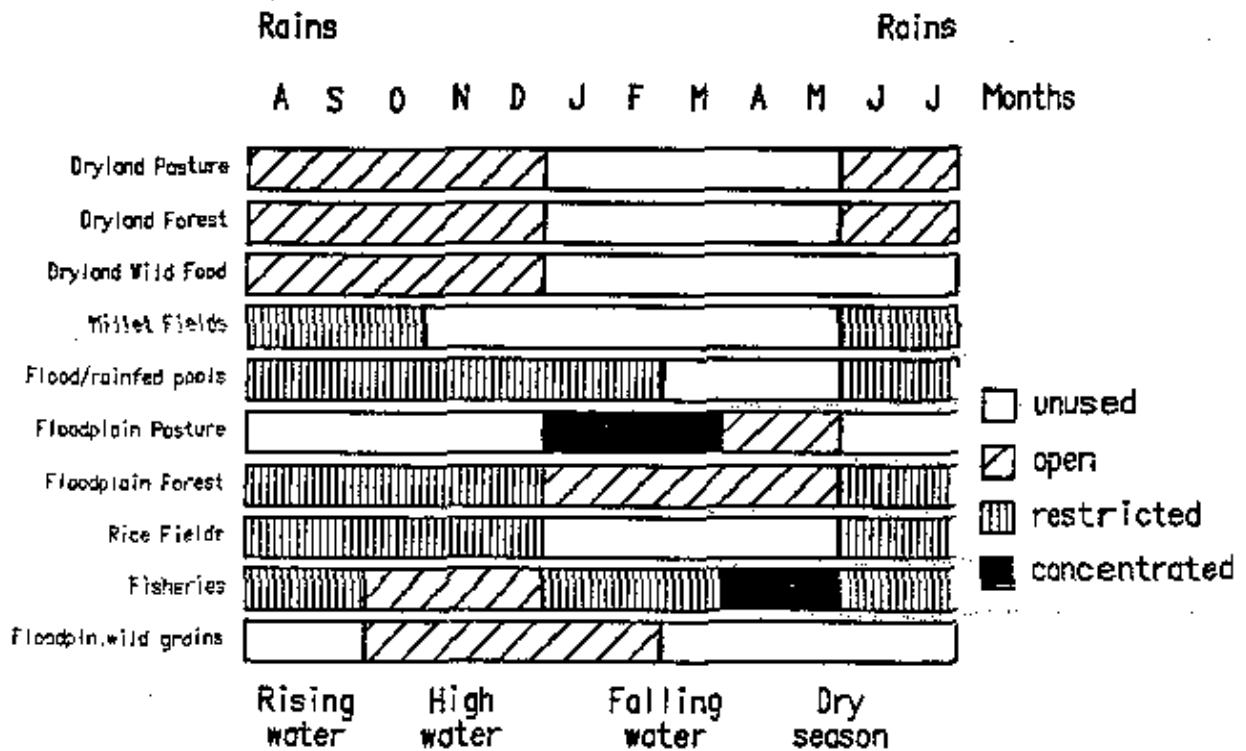
might affect their capacity to regenerate. They do, however, indicate where increasing levels of management are both necessary and possible in the 'pre-' and 'post-drought' period. They also indicate which and when resources in the Delta switched from having the attributes of public goods ('open') to those of common property resources ('restricted' and 'concentrated').

It is not suggested here however that resources that are 'concentrated' have the qualities associated with private property, for two reasons. First, it is rare for the production of one resource to be such that it can be entirely consumed by one individual, and second, as will be explained in subsequent chapters, it is in the interests of rural producers to manage their resources as common property so as to have reciprocal access rights to assets in other parts of the Delta when their own areas are unproductive. Rather, this analysis shows the physical and technical characteristics of resources which at increasing levels of jointness and exclusivity call for more organised forms of common property management, in particular seasons of the year.

### 3.5.1. Pre-Drought

Figure 11 on Page 85 presents a schematic view of the seasonal exploitation of the natural resources of the Delta and its borderlands in 'pre-drought' years of good rainfall and flood levels.

Figure 11: The Physical Attributes of Resources, by Season, Pre-Drought



The availability of pasture, forests and wild food on the drylands did not reach the point where exploitation of these renewable resources, was such as to take away from others ability to use the asset, if only because human and livestock populations were comparatively low (to their present numbers). Their productivity, further, was conditioned entirely by the level of rainfall (which was high), and the same quality of resource was spread out over a great area each year. Between August and December therefore (spanning the rains, rising and high water levels in the Delta) these resources were 'open' in that the rates of their exploitation did not affect their jointness; they were not exclusive because they were spread out over a large area supplied with water points. Between January and March (the falling water and dry seasons), these dryland resources became unusable for lack of water. When the rains began again in

June they reverted to their 'open' state, with the first wild food coming on stream in August.

Agricultural resources on the drylands and border areas of the Delta are situated on the best land (both sandy soils and in rainfed and floodfed pools) close to settlements, which are subject to 'partial jointness' because they are in limited supply. They were concentrated, comparatively small in size and trespass upon them was easily monitored, which was of great importance when transhumant herds were passing through the area. Flood retreat crops grew in well defined pools, and millet fields were cleared for exploitation by the local inhabitants from bushland and forest. Both resources were neither in infinite supply nor scarce (according to local reports it was easy to get access to a field if one wanted to, although there was a limit on the number of sites available close to settlements), and thus were 'restricted'. Millet fields on the dry sandy soils were exploited from the beginning of the rains in June through to the harvest in October and were then unusable until the rains began again. Flood-rising and flood-retreat fields, with their greater variety of crops and dependence both on rainfall and flood-levels, were productive from the beginning of the rains until the beginning of the dry season, when high temperatures halted all vegetative growth.

Pasture on the floodplains - available only between January and May each year - shared 'open' characteristics at the end of the dry season with joint, and exclusive ones between January and March. The green fodder available as the waters began to fall in the Delta each year was a premium resource for transhumant pastoralists returning from the drylands where their animals had been feeding for the last several weeks on dry pasture weak in protein. The comparatively small amount of this feed available as the waters slowly fell gave this resource its quality of jointness and its 'concentrated' nature. The topography of the floodplains meant that trespass was easily spotted, allowing exclusive management.

It was clearly bounded because herders had an intimate knowledge of the local terrain. The Fulani identify six elements of pasture on the floodplains: Togguéré, islands standing above the floodplain

composed of sandy soils on which herds camp (and on which eventually Fulani villages were erected); Roundé, the first part of the inundated plain to be uncovered; Dengwal, the river banks that form a natural network of paths into the floodpastures and which provide pasture during the middle part of the flood retreat season; Feya, floodpastures at medium depth; Débaré, deep level pasture analogous to the 'bourgoutières' proper; and Naval, a permanent dry season water point. By the end of the dry season (April) this green pasture had been eaten up, and what remained were dry stalks low in protein, and *Vetiveria*. The amount and extensive nature of this resource gave it a more 'open' quality at this time. Between June and December, rising and high flood levels made the flood plain pastures inaccessible to livestock.

The floodplain forests of the Delta customarily had mixed qualities. Their concentration and discrete location on the floodplains meant that between January and May (the falling water and dry seasons) they had both exclusive and joint attributes. But the low numbers of smallstock, particularly goats, meant that the levels of their exploitation did not affect the availability of the resource for other producers. In the rising and high water seasons (June-December); however, the concentration of wild animals trapped on islands as the water rose made these forests valuable firstly as hunting grounds, and then later as fisheries (the guano deposited by roosting waterfowl make the waters underneath the trees particularly rich) and converted them into more 'restricted' assets for the fishermen and farmers of the area.

Like agricultural resources on the drylands, floodplain rice fields were sited close to settlements in areas best suited to providing some crop, given that flood levels differed each year. These sites, close to higher parts of the floodplain where it was possible to erect settlements, were in limited supply. But, like flood- and rainfed pools and millet fields, demand was not such as to make their exploitation more than 'partially joint'. At the high water season, rice fields were excluded from herders; and in the falling water season when herders reappeared in the Delta - in upstream areas before the rice harvest was pulled in - it was possible to exclude



pastoralists because of their concentrated nature and their smallness. Boundaries of fields were (and are) clearly delimited, often by low mud walls built by farmers to break the speed of arrival of the floodwaters when they start rising in June-July. Between January and May, when the flood waters recede from the plains, the rice fields are unusable.

Turning to the fisheries, during the high water season access to fisheries was confined to those who lived on Togguéré above the floodplain, while the jointness of consumption of the fish was minimised by them being spread over the vast flooded plain and by this being the reproductive season of the year. In the falling water, dry and rising water seasons fish populations began to congregate: firstly around the rice fields as the crop ripened and ears of rice fell into the water providing additional food; then in secondary channels draining the floodplains; subsequently in the main rivers; and then again in the secondary channels as water levels rose once more. During this latter period the concentration and smaller area in which the fishstock was found made for greater opportunities of exclusion. The topography of the Delta, understood intimately by fishermen, made the boundaries of fishing territories - which included elements of high, falling, low and rising water resources - abundantly clear.

Thus from the beginning of the rains up until high water (June-September) the fisheries of the Delta were 'restricted' resources in that fish were grouped together as they migrated out of the main water courses into the floodplain, following the leading edge of the water as they moved into their spawning grounds. At high water (September-December), fish were scattered over the whole plain, and were thus 'open'. Between January and March, they migrated back into the main water courses and were once again found in 'restricted' areas. In the heart of the dry season (April-May), the fish concentrated in 'holes' found in the beds of the main watercourses and were therefore 'concentrated'.

Wild grains found on the floodplains (pasture seeds, water-lilies) were available on the floodplains through the high water period until

some two months into the falling water season. Their exploitation by local inhabitants was not joint: they grew over extensive areas of the Delta and were not bounded except at the level of the Delta as a whole, and therefore they were 'open'. From the onset of the dry season through until they reached maturity at the end of the rains (March-September), they were not of great use to local producers. The apparent anomaly of pasture being 'concentrated' in January and February at the same time as the grains of the same plants were 'open' as wild food is because the harvest of these grains takes place in September and October, long before the animals used to arrive in the Delta. Between November and February the wild food local inhabitants gather on the floodplain is from the water-lily, which is not eaten by livestock.

Two general points can be made about the seasonality of resource use in the Inland Niger Delta and on its borderlands in the pre-drought period. First, this material shows how the physical and technical attributes of resources vary between seasons: this belies the somewhat static view implicit in the Oakerson approach that resources, once they have been defined as 'common', are fixed in their partially joint and exclusive characteristics.

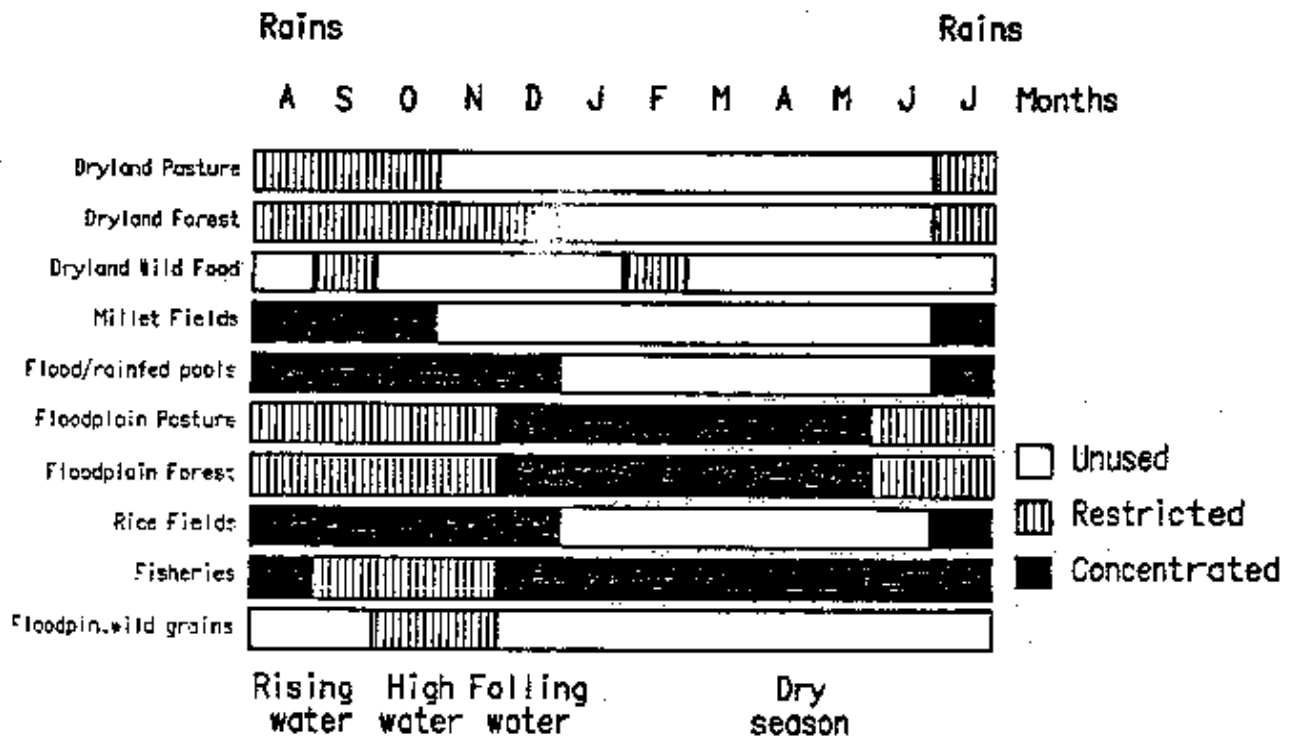
Second, this analysis shows that resources on the borderlands of the Delta are inaccessible for a longer time than those on the floodplains, and that they are less restricted in their jointness and exclusivity than on the floodplains. Further, resources on the drylands switch between two attributes (unused to open, or unused to restricted) while resources in the Delta switch between three (unused to concentrated to open; or restricted to open to concentrated). The two resources that are exploited throughout the year are found on the floodplains (fisheries and forests) and it is only on the floodplains that 'concentrated' resources are found at certain times of the year. Note should also be taken that within the floodplains, the period in which resources move through these attributes varies from upstream to downstream as the maximum water levels work through the hydrological system of the Delta.

This provides a clear picture of the symbiosis that exists both between the floodplain and the drylands, and between upstream and downstream areas of the Delta, which conditions the strategies rural producers adopt in exploiting the Delta. During the rains and as the water levels rise to their height, rural producers broadly practice more extensive productive activities over the whole Delta and the drylands. As the water levels fall they practice more intensive activities concentrated on the floodplains, accompanied by a movement of producers into the Delta, and down its length, as the dry season proceeds.

### 3.5.2. Post-drought

Figure 12 on Page 91 presents the attributes of these same resources in the 'post-drought' period (compared to Figure 11 on Page 85). 'Open' resources no longer exist either on the drylands or on the floodplains, and all assets have taken on more joint, and exclusive characteristics. On the drylands resources have become considerably more inaccessible as the rainy season has shortened and the dry season lengthened, while the converse has taken place on the floodplains, where three out of five assets are now exploited all year round.

Figure 12: The Physical Attributes of Resources, by Season, Post-Drought



Dryland pasture, forest and wild food resources have all moved from being 'open' to being 'restricted' between July and October (wild food remaining 'restricted' through to December). Forest and pasture resources come on stream a month later than before (as do millet fields, flood and rainfed pools and rice fields) because in recent years the rains have started late. They are 'restricted' during this period because low rainfall has reduced their productivity, and supplies fewer water points for less time. They are more joint than before because their exploitation is more likely to take away from others' ability to do so (though for lack of data it is a moot point as to whether their exploitation is undermining the capacity of the resources to reproduce sustainably). They are also more exclusive because they are available for a shorter time, and more bounded because they are spread over a smaller area.

Resources are particularly joint from October onwards as the animals move down to the Delta awaiting entry onto the floodplains. Arguments presented in section 3.4.2 of this chapter point to degradation taking place in these areas and animals gather close to the sites of the main crossing points (increased jointness). Wild food and forests continue to be 'restricted' through to December not only because rural inhabitants have recently greatly increased their exploitation of these resources as their cultivated harvests fail, but also because of a knock-on effect of cattle being in areas close to settlements on the drylands for longer periods in recent years (because they transhume less far). Livestock compete with people for access to this asset. These resources are not 'concentrated', however, as the areas in which they are productive year on year vary enormously in line with the variability and location of rainfall.

Cultivated crops on dryland millet fields and in flood and rainfed pools have moved from 'restricted' resources to 'concentrated'. In the case of floodpool crops this has seen a major shortening of the time they are exploited not only because the rains start late, but also because lower flood levels have reduced the time that pools are inundated and the area they cover. In effect, production on these fields is now confined to kobé rice and some vegetables. Cotton, peanuts, sorghum and manioc are now rarely found. This has reduced the time significantly in which these resources can be used (increased exclusivity). It follows that the pools that are deep enough to be productive and the millet fields that succeed are now rare, so that they are more joint; they cover a smaller area, and have clear boundaries.

On the floodplains, pasture that was formerly unusable from the beginning of the rains through to the onset of the falling water period is now accessible throughout the year, but in much reduced quantities due to lower flood levels and shorter periods of inundation. This has converted it from being 'unused' to 'restricted' between June and December. The 'concentrated' nature of this resource that previously applied only to the period when pastures were becoming available as the flood level fall, now extends right through the dry season. Floodplain forests have now dramatically

reduced in size and only occupy a few sites in the Delta, though they remain inaccessible to smallstock between July and December because of high water conditions (though they are exploited by floodplain inhabitants and are thus 'restricted'). Between January and June they are heavily exploited by goats and are thus 'concentrated'.

Fisheries have equally shrunk in size dramatically, as the water in many places fails to reach formerly productive floodplains. They are now 'restricted' between July and December as they spread out and move back from those floodplains that have been inundated, and are then 'concentrated' between January and June in the main waterways of the zone.

Both rice fields and wild grain resources have become inaccessible for longer periods, the latter because falling water levels occurring earlier in the season (and from a lower high-water point) effectively shorten the water-lily harvest.

All the resources on the floodplains, when they are exploited, are now either 'restricted' or 'concentrated'. The data presented in section 3.1 of this chapter suggest all these resources are exploited at levels greater than their carrying capacity (increased jointness). Data on the area of the Delta inundated in recent years (in 1984-85 a third of the 'normal' surface was flooded) provide a measure of the increasing exclusivity of resources in the zone. In this process the boundaries of productive resources have become more defined.

## CHAPTER 4

4. THE ECONOMIC ATTRIBUTES OF NATURAL RESOURCES<sup>2</sup>

Rural producers inhabiting the Inland Niger Delta and its borders rely for their livelihoods on exploiting a set of resources that change in nature season by season and vary considerably in their availability each year. The strategies they adopt in this risk-prone climate are to insure against bad years, to move between areas in the Delta and on its borders in line with the changing natural productivity of assets<sup>3</sup> as they are affected by rainfall and the movement of floodwaters through the hydrological system, and to take opportunistic advantage of zones in the region which have been particularly productive, especially in less favourable years.

The previous chapter has demonstrated how the Inland Niger Delta has been the victim of increasingly dry conditions over the last 25 years, leading to a significant drop in natural productivity. It has shown how natural resources change in their technical and physical attributes in different seasons of the year, and has indicated how these attributes have evolved as conditions have become drier. All resources are now more joint and more exclusive than they were in a 'pre-drought' period, at the same time as assets on the drylands have become unusable for longer intervals in each year, while resources on the floodplains are exploited for longer periods. Rural producers have reacted to drier conditions by moving to deeper areas of the Delta, migrating out of the zone, investing in more drought-resistant stock and grain varieties, exploiting wild food, and intensifying production of more productive and marketable resources.

This chapter matches the technical and physical attributes of resources to the productive strategies rural producers pursue by demonstrating the economic value of resources to rural households in

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2. This chapter is a shortened version of a fuller analysis presented in Appendix 1.

3. 'Assets' are used here as synonymous with 'natural resources'.

different seasons of the year, and by comparing the relationship between physical attributes and economic value in a 'pre' and 'post' drought period. Such an approach allows 1) the economic value of different resources to households to be ascertained, 2) the seasons in which particular resources are of strategic importance to producers to be identified and 3) the technical and physical characteristics of those resources to be correlated with the economic value derived from their exploitation by rural inhabitants practicing different production systems.

By correlating values of resources with 'restricted' and 'concentrated' attributes between production systems the analysis examines the degree to which producers have come to rely on assets that have become increasingly joint and exclusive for their livelihoods. This allows the need for more organised forms of common property management, defined by the physical attributes of resources, to be matched to the economic necessity of their exploitation by rural producers, revealed by this study of their household economy.

The economic logic of rural producers' strategies and the relative importance of the range of assets they exploit throughout the year can be assessed in this manner, providing an understanding of why different producers exploit which resources when. This chapter also identifies which natural resources are exploited by one production system alone as against those that are shared by several systems, or by different groups practising the same production regime, and thus gives an indication of which assets are most in demand.

By matching the technical and physical attributes of these resources to the seasonal value they provide to rural producers, some of the basic criteria for the seasonal 'manageability' of these assets are linked to the importance they hold for different production systems. This provides an indication of who the major 'actors' are, and the strategic resources they exploit, at key moments of the year. The comparison between 'pre' and 'post' drought periods shows how the seasonal value of assets have changed as their technical and physical characteristics have altered. It demonstrates the economic value of



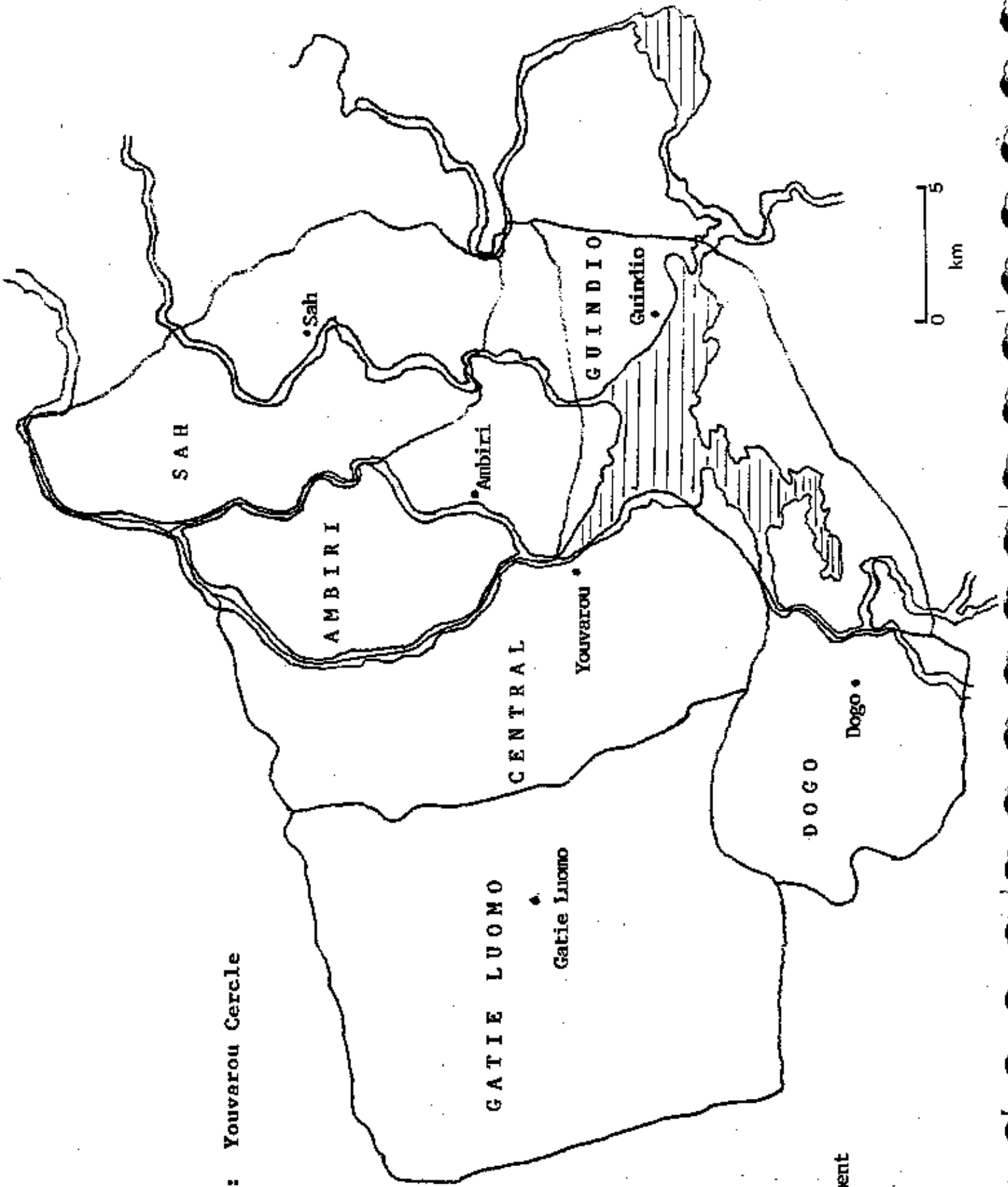
strategies adopted by rural producers in the face of drought, so illuminating why certain resources have come under increasing pressure. This analysis provides the basis for an examination of customary and latter day tenure systems that are the subject of the following three chapters.

#### 4.1. The Study Area: Youvarou Cercle

The data presented here were gathered in 1985-86 and 1980-81 in Youvarou Cercle, the northernmost Cercle of the 5<sup>th</sup> Region of Mali (see Map 4 on Page 97). The Cercle covers an area of 7139 km<sup>2</sup> and incorporates three major agro-ecological zones: the dryland borders of the Delta to the north and west, taking in the Arrondissements of Central and Gatie Luomo; a zone characterised by bands of sand dunes running west to east interspersed by waterways known as the Guimballa or the Erg of Niafunké, including the Arrondissements of Ambiri and Sah; and the area of inundated plains and the major lake system of Walado and Debo, found in the Arrondissements of Dogo and Guindio.

About 75,000 people inhabit the Cercle (République du Mali 1987b) - 15% of the Delta population - spread unevenly over the administrative district, as Table 7 on Page 98 shows. The areas of greatest population density lie to the north and east of the Cercle, in the Erg of Niafunké, while the south and west of the zone are less densely inhabited. Further, the data show that over the last ten years there has been a net movement of population from outlying Arrondissements (Sah, Gatie, Ambiri) to inner administrative districts (Central, Dogo, Guindio) around the lake system, floodplains, and main waterways. Overall there has been a drop in population of 0.64%.

Map 4: Youvarou Cercle



— - Arrondissement  
and Cercle  
Boundaries



Table 7: Population change and density of habitation, Youvarou Cercle, 1976-1987

arrondissement	Population	Density inh/km <sup>2</sup>	Change on 1976 Pop. %
Central	18026	14.0	+ 0.84
Gatie Luomo	7042	7.3	- 5.52
Dogo	7587	3.3	+ 0.32
Guindio	16161	17.0	+ 3.47
Ambiri	13933	14.4	- 0.93
Sah	13437	19.0	- 3.07
Total	76186	-	-
Average	-	12.5	- 0.64

Source: République du Mali 1987b

As with the regional figures, it is very hard to accurately measure the numbers of inhabitants making up different production systems in the area, but a broad estimate can be given by attributing principal activities to the ethnic groups that make up the villages that took part in the census. By no means all villages are composed of one ethnic group but, using the surnames of households as an indication of ethnic allegiance, and correlating this with the agro-ecological areas they inhabit, and information gathered in the field on the principal activities of communities, a tentative estimate can be made that about 70% of the censused population in the Cercle of Youvarou are either farmers or farmer herders, 20% farmer fishermen or transhumant fishermen, and 10% transhumant herders. Again, as mentioned in Chapter 3, these figures give no account of visitors to the Cercle each year: in 1985 the administration estimated these to amount to 30,000 people - 40% of the censused population (1987) - of which 6500-7000 were said to be fishermen. These figures need to be treated with caution, but nonetheless provide an order of magnitude for the occupations of the Cercle's inhabitants.

#### 4.2. The Sample

The households for which data were gathered for the 1985-86 study came from 11 communities. Four of these communities (Garceye, Taneredji, Fara Yeni and Gourao Bozo) are composed of Sorogho farmer fishermen living on the floodplains on the banks of the Diaka river and beside the Niger river where it debouches into Lake Debo. The remaining seven communities (Enguem, Aore, Modioko, Kokoro, Owa, Gourao Peul and Gourao Sare) are spread through the Guimballa and on the eastern borders of the lake, and are composed primarily of Sonraï (with some Fulani and Bella) farmers and farmer herders. Information on the transhumant herders of the Cercle came from its major Fulani grouping the Yaalabé, while that on the transhumant fishermen came primarily from 'strangers' inhabiting seasonal fishing camps beside the settlements where household data were being gathered from farmer fishing communities.

The production systems practiced by these communities are representative of the activities of the greater part of the Cercle's population. The farmer fishermen on the floodplains cultivate rice between June/July and December as well as fish, and concentrate their activities in fishing for the remainder of the year, moving out to fishing camps in the high water season and back to their settlements as the waters contract. The farmers grow millet between June/July and October and farm flood rising and flood retreat pools through the falling water season, while farmer herders, once the millet crop is in, concentrate their activities in managing their small stock. This distinction reflects on the one hand the clear difference between millet-based and rice-based societies relying on different ecosystems to make their living, with farmer fishermen being part of the latter group and farmers and farmer herders making up the former. Farmers and farmer herders have been brought together because of the similarity of their production strategies at the present day: farmers, unsuccessful in their millet cultivation have fallen back progressively on small stock - primarily goats - in order to provide them with their livelihoods, while farmer herders, who

usually keep cattle, have equally invested in goats that are more resilient to dry conditions.

They are also representative of the social structure most commonly found in the Cercle, being composed of founding and consanguine lineages and resident outsiders, through which rural inhabitants in the Delta customarily gain access to resources (see Chapter 5). In line with the brief historical account given in the previous chapter, the farmer fishing settlements are principally composed of the oldest inhabitants of the zone (the Sorogho), while the Sonraï, Fulani and Bella farmers and farmer herders originally arrived in the area in the 15<sup>th</sup> - 18<sup>th</sup> centuries. The Yaalabé probably migrated into the zone at about the same time: they only became owners of their floodplain pastures in the last century. The history of the transhumant fishing groups is diverse, reflecting the rapid changes taking place in their livelihoods: information was gathered from producers who customarily visit the area, as well as from more recent temporary migrants.

The household data for 1980-81 cover one community alone (Garoeye), which was studied in detail for another project<sup>4</sup>. This same community was part of the 1985-86 work and is composed of Sorogho farmer fishermen. The database gathered at this time is directly comparable to information gathered in the second survey and can thus be used as a 'pre-drought' comparative study, though only for farmer fishermen. More qualitative information gathered in 1980-81, and retrospective information gathered in 1985-86, allows some comparisons to be made for the other production systems.

There are 75 households in the 1985-86 study, 40 of them from farming and farmer herding communities, and 35 farmer fishermen. The mean household size for these households, composed of 746 people, was 9.8 persons, with three-quarters of households containing siblings, their spouses and children as part of the co-residential consuming and producing group.

4 This work was concerned to gather time and income and expenditure budgets for 12 households of farmer fishermen, and was the subject of an MA thesis submitted to Sussex University in 1982.

Farmer fishing households are smaller (9.0 people) than farming and farmer herding households (10.7), they are more polygamous (54% of households as against 37%) and fewer of them contain siblings, sibling's spouses and children (66% as against 77%). The dependency ratio (the ratio of inactive to active members) in the two groups is similar (0.7 and 0.6 respectively).

The same data for the 1980-81 study in the farmer fishing community show smaller household sizes (7.4) and lower dependency ratios (0.4) than the later material, as well as considerably fewer households with siblings living together (25%). This may reflect a movement of formerly independent units living elsewhere in the region into the village as conditions have become drier: Garoeye is not only situated on highly productive floodplains near Lake Walado, but is also on a lorry track in the dry season, when it benefits considerably from petty trade with overland traffic between Mopti and Tombouctou.

#### 4.3. Methodology

Three principal methodologies were used to gather data for this study: a survey of the regional economy and of Youvarou Cercle; the selection of a sample and the gathering of household data; and both directed and unstructured interviews.

At the regional level the administration archives were consulted, and the regional offices of the principal ministries dealing with the rural sector were contacted with a view to placing Youvarou Cercle in the context of the region as a whole. Aid agencies, parastatal development organisations, the customs bureau and the regional treasury were also visited, their archives consulted and personnel interviewed in order to establish the extent and nature of government fiscal and development policy, and the activities of non-governmental organisations in the area.

In Youvarou Cercle itself the administration records were consulted and administrative census studied with a view to establishing the distribution of the population of the zone, and the ethnic groups that inhabited the various Arrondissements of which it is composed. Local livestock, fishing, agricultural and forestry offices were also visited, their records studied and personnel interviewed, both at the Cercle and arrondissement level.

This was followed by three months spent visiting communities found in each arrondissement that were representative of the production systems found in the area, and in interviewing local inhabitants in order to establish their principal occupations through the year. Information on the resources they used was gathered, and a preliminary sketch of the major adaptive strategies they had adopted in the face of increasingly dry conditions was drawn up. The first elements of the social and political structure of these communities were also ascertained, and customary resource managers identified. Concomitantly, maps and publications on the area, and on the Delta as a whole, were being consulted in order to glean what background information there was on the history, economy and natural resources of the zone.

This preliminary work allowed the Cercle to be divided into the three agro-ecological zones. In view of logistical and manpower constraints and the difficult terrain, it was decided to locate the samples of households to the north, east and south of the Cercle, both because it was apparent that the most significant changes in natural resource availability and access rules were taking place in those areas, and also because the farmer and farmer herder production systems found in those areas were broadly representative of many communities living to the west.

Eleven communities that were representative of farmer fishermen, farmer and farmer herder production systems were then selected, covering as wide an area as possible given the difficulties of travel in different seasons of the year. Community chiefs were asked at the outset of the study to provide the names of ten households who could be visited once a month for the period of at least a year.

They were asked to provide the names of households that were large, medium and small in size, and, if possible, reflecting founding, consanguine, long-term resident stranger, and seasonal stranger units. These households were then visited once a month by a team of field agents, who asked retrospective questions of their income and expenditure for the previous period, and made measurements of productivity according to major economic tasks for that particular season (i.e. daily catch of fish, harvest and wild food measurements). This data was collated on forms that were refined by a process of trial and error, and the first two months were spent field testing information gathering methods.

Because of difficulties in covering the terrain, especially in the transitional seasons (August-September, December-January), and because households in the sample were frequently on the move, it was not possible to gather data for every household in each month. The fact that only 75 households make up this sample reflects the fact: these households are the ones for which the most reliable and continuous data were gathered.

As field agents became more familiar with the nature of their tasks, and, above all became known to villagers, so more qualitative subjects were introduced into the study, and the third methodology of directed and unstructured interviews came increasingly to be used. These covered the history of particular communities, who the founding families were, how their productive methods had changed within the lifetime of the oldest members of the community, where people were moving to in different seasons, what were the major constraints they found in their livelihoods etc..

The material presented here for the period 1980-81 is part of a wider study that was concerned to collect time, income and expenditure budgets and productivity data for households making up a farmer fishing community. The choice of site on that occasion was based on criteria of selecting a community representing the way of life of farmer fishermen living in the northern sector of the Delta, rather than with the specific aim of studying natural resource use and the manner in which it has evolved. Twelve households - 50% of the



community - were visited twice a week over a period of 14 months, and the activities of each household member for each day were recorded as well as data on fish catch, harvests and income and expenditure. This makes the 1980-81 database directly comparable with the 1985-86 study.

#### 4.4. The Analysis

The household data presented in this chapter have been analysed in the following way. It has been established in Chapter 3 that resources move through different attributes of 'open', 'restricted' and 'concentrated' characteristics through different seasons of the year, in line with the first category of Oakerson's framework. These attributes are retained here so that, for any one season, a value can be attributed to resources having different technical and physical characteristics. The value of these assets is considered to be represented by the income (both in cash and subsistence terms) or expenditure households made for those resources expressed in Francs de la Communauté Financière Africaine (FCFA), per capita, for active members of the producing and consuming unit, rather than for all members of the households concerned.

The analysis presented here is in two sections. In the first section (1985-86) the data were examined overall, for all households making up the sample, and then broken down into a comparison between farmers and farmer herders on the one hand, and farmer fishermen on the other. Both with the overall data, and that comparing production systems, the information is looked at from four aspects: 1) total per capita value of production, 2) production for subsistence and exchange, 3) cash income and expenditure, and 4) access to cereals. In each of these aspects the relative value of households' use of resources according to the seasonal physical and technical attributes of assets are examined, in order to provide a comprehensive view of the importance resources having different attributes have in the economic cycle of production systems. The data are presented both for the year as a whole, and by season.

This framework is followed in the analysis of farmer fishermen in 1980-81, presented in section two.

In both sections further qualitative information is presented to cover the production systems for which household data were not available: in 1985-86 dealing with transhumant fishermen and pastoralists, and in 1980-81 to cover farmers and farmer herders as well as transhumant producers. The chapter ends with an overview of how the attributes of resources have evolved in economic importance for different production systems as conditions have become progressively more difficult in the Inland Niger Delta.

#### 4.5. Resource Use in 1985-86

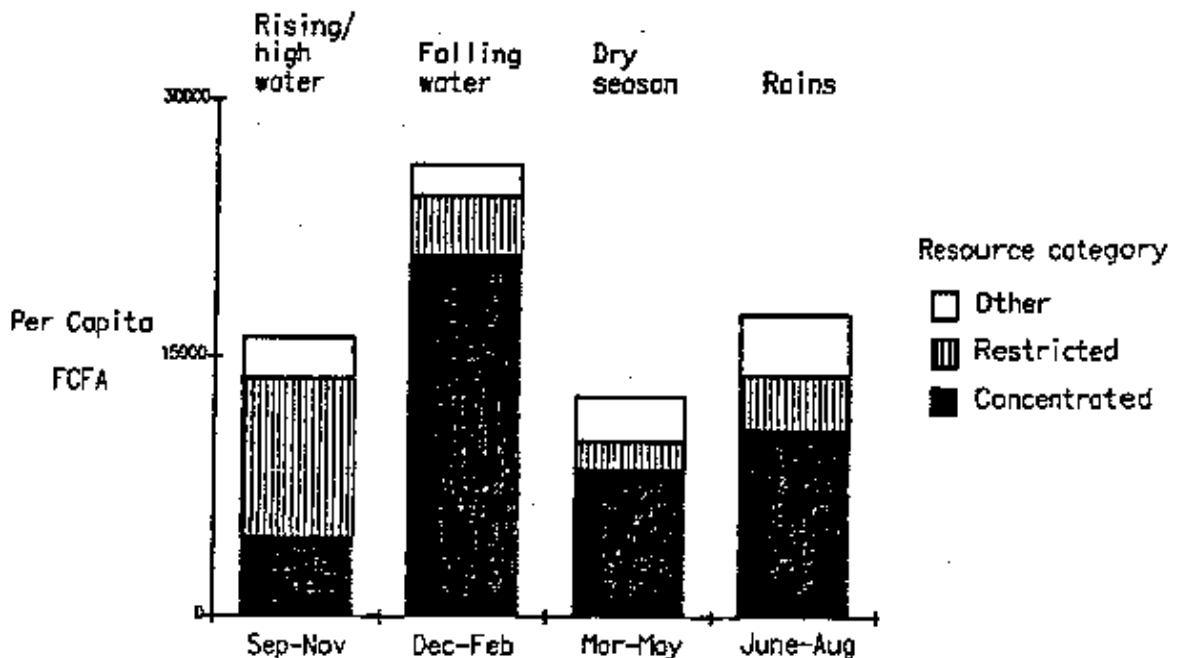
##### 4.5.1. All Households

##### 4.5.1.1. Total production, all households

An examination of what households produced through their major activities in 1985-86 demonstrates significant changes in the value of output through the year, with the falling water and dry seasons being the most productive, and the rising/high water and dry seasons being the least. Overall, per capita production stood at some 70,000 FCFA, or about US\$ 230 (1986: 300 FCFA = 1US\$).

Figure 13 on Page 106 shows that 'concentrated' resources are of greater value than 'restricted' ones in every season except the rising and high water period, when wild food production is at its height, fisheries are 'restricted' and when all livestock belonging to these production systems are in the borderlands of the Delta. It also shows that other forms of production become increasingly important as the year progresses, particularly in the rainy season, when agricultural labour brings in significant income, and when the value of these services are greater than the value of production from 'restricted' sources. The falling water season is by far the most productive interval in the cycle, followed by the rainy and rising/high water periods. The dry season is the least productive. Overall just over 60% of the value of what they produced came from 'concentrated' resources, just under a quarter from 'restricted' assets, and 14% from 'other' sources of income.

Figure 13: Per Capita Value of Production, By Category of Resource and by Season, All Households



The economic importance of the falling water season is due primarily to the rice harvest falling within this period, the high productivity of fishing, and the sale of garden products and livestock. In the rainy season fishing is the most productive activity, wood gathering is at its highest level of the year, while sales of livestock and garden products continue to contribute significantly to the value of production. It is also in the rainy season that other forms of income are at their highest, particularly revenue from agricultural labour and from remittances sent back to rural communities by producers who have left the zone.

In the rising water season the bulk of the value of production comes from the millet harvest and from the wild food producers gather from the drylands and the floodplains. Fishing, while contributing significantly, is at its lowest point in the year as are sales of livestock. Revenue from transport is higher in this season than in any other period, and remittances sent home to communities are also high. Fishing contributes the bulk of the value of production in this

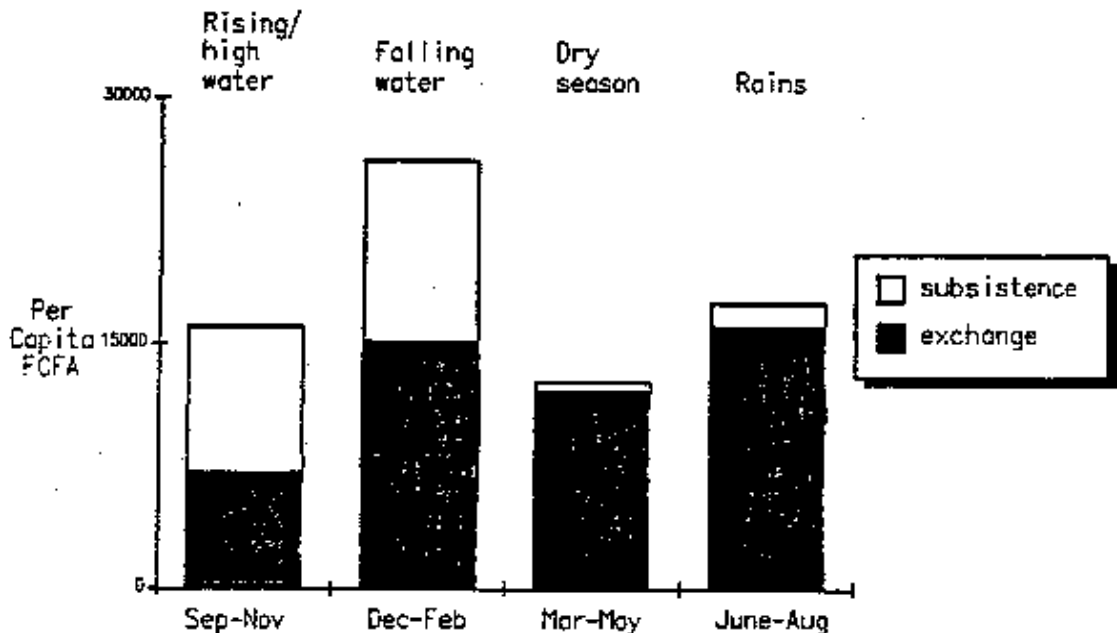
period, followed by wood gathering and livestock sales. Petty trade is at its most productive, while production from flood retreat pools is at its lowest.

This presentation allows the productive cycle of farmers, farmer herders and farmer fishermen to be divided in two periods according to the economic activities carried out within them, and the technical and physical characteristics of resources that are exploited. The first spans the rising/high and falling water periods when crop harvests and wild food gathering make up the bulk of the value of production, in the former season 'restricted' resources being the most important, and in the latter 'concentrated' assets. In the second period, covering the dry and rainy seasons 'concentrated' resources predominate, with fishing being the most productive activity as income from services and other sources increase in importance.

#### 4.5.1.2. Production for exchange and subsistence

Rural producers exploit their natural environment for two reasons: for their own subsistence and to raise cash to buy necessities and luxuries (if they can afford them) on the market. Figure 14 on Page 108 shows the value all households produced per capita in each season for these two sectors, and reveals that on average they all produced more for the market (69% of value) than directly for subsistence (31%).

Figure 14: Value of Per Capita Production for Subsistence and Exchange, by Season, All Households, 1985-86



The fact that under a third of the value of their production was for their own subsistence is a clear indication of the failure of their own crops: as will be shown below, in a reasonable year, household rice and millet production is of greater value than what they produce for the market. However, it should also be borne in mind that households are never entirely self sufficient: they have always relied on the market for essential items such as condiments for their cooking (oil, dried tomatoes, onions, salt etc.) and for other necessities such as clothes.

Figure 15 on Page 109 shows their subsistence production broken down by season and by resource attribute. It demonstrates that the primary months for subsistence production are between September and February, when wild food and cultivated harvests take place. The most important products for their subsistence production are cereals, which are 'concentrated' in nature, followed by wild grains, which are 'restricted'. Floodplain resources are of far greater value than dryland assets in their subsistence production.

Figure 15: Per Capita Value of Production for Subsistence, by Category of Resource and by Season, All Households, 1985-86

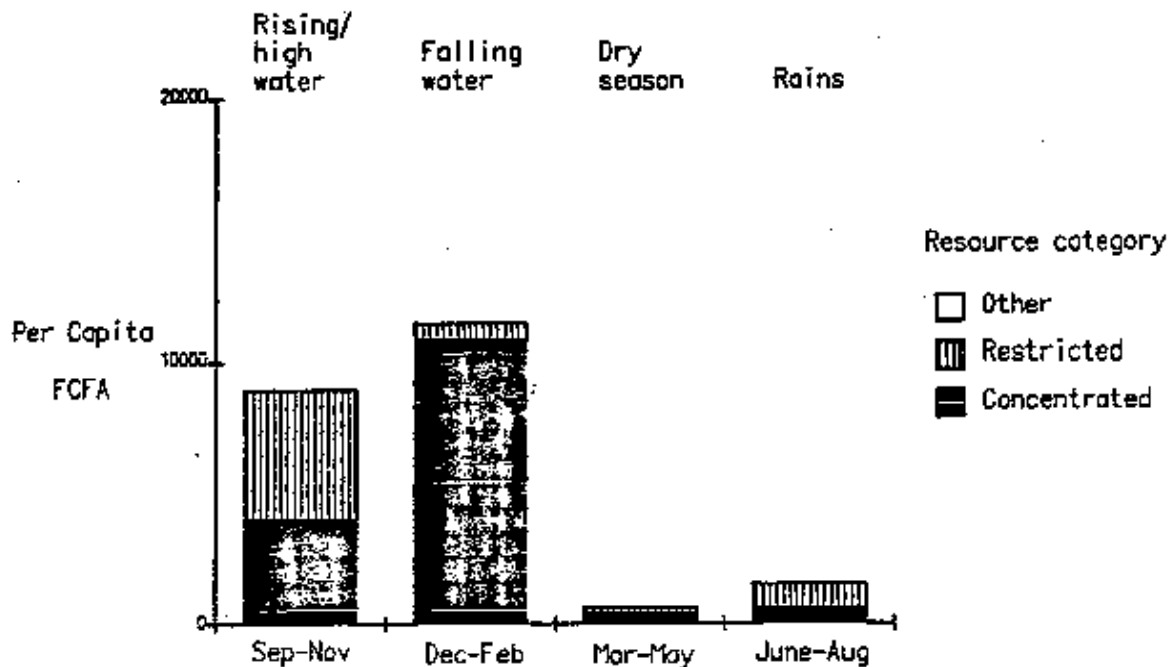
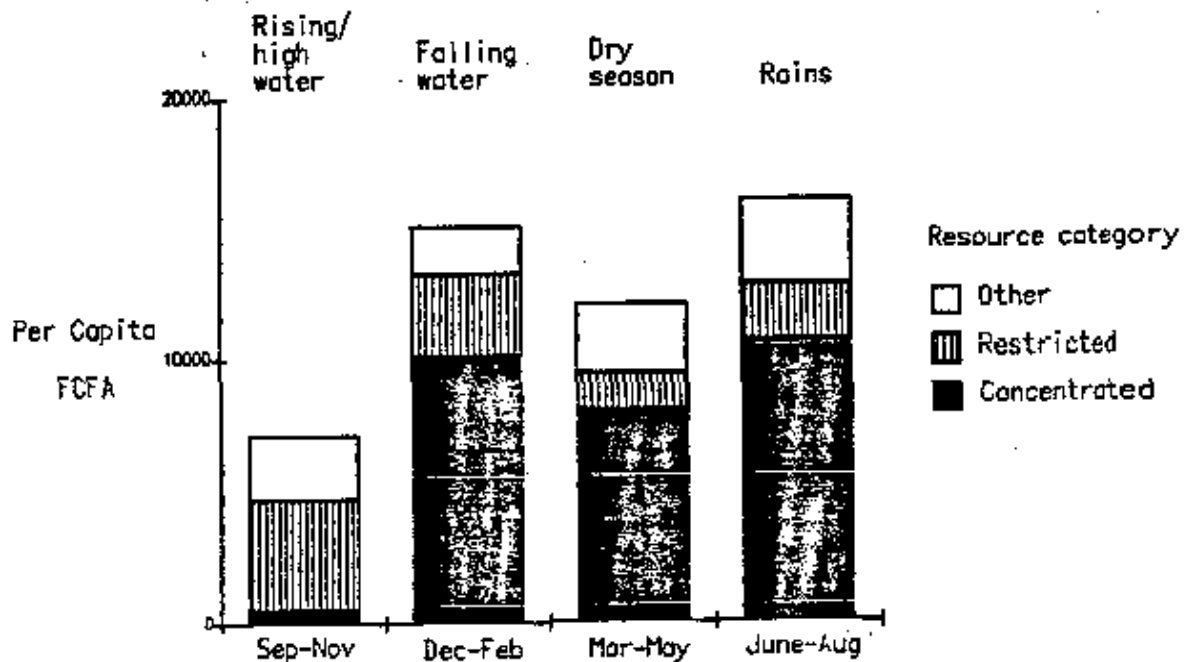


Figure 16 on Page 110 shows the value of their exchange production by season. The principal months for this line of activity are the falling water and rainy seasons, reflecting on the one side the productivity of their flood-retreat and flood-rising fields, livestock and woodfuel sales (farmers and farmer herders), and on the other (farmer fishermen), the productivity of the fisheries, which contributed over half the value of what they produced for exchange.

Figure 16: Per Capita Value of Production for Exchange, by Category of Resource and by Season, All Households, 1985-86



Over half the value of what these households produced for exchange came from 'concentrated' resources - mostly from fish - and a quarter from 'restricted' assets (livestock, woodfuel and handicraft sales). Twenty percent of the value of production for exchange came from 'other' sources of income (petty trade, agricultural labour etc.).

This analysis illustrates the basic duality of seasonal production in the Delta: September to February is the strategic period for subsistence production, and December to August the principal period of production for exchange. Further, it links three key characteristics of resource use in the Delta:

1) assets that generate the greatest value to rural producers are 'concentrated' in nature, both in what they produce for exchange and for their own consumption. They are also principally found on the floodplains,

2) the value of assets exploited for exchange are considerably greater than those used for subsistence and

3) those resources that are most valuable, which are predominantly 'concentrated', and are mostly exploited for exchange, are utilised primarily in the falling, dry and rainy seasons.

The analysis can now proceed to look at the needs this cash income is generated to meet by looking at the income and expenditure profiles of the households in the sample.

#### 4.5.1.3. Income and expenditure

The preceding sections of this chapter have shown the importance of 'concentrated' and 'restricted' resources to households in the sample overall, between seasons, and between production for subsistence and that for exchange. This section looks at the importance of households' cash income and exchange in providing necessities for their livelihood and assesses their (in)ability to accumulate wealth in the year in question here to take them through subsequent bad years.

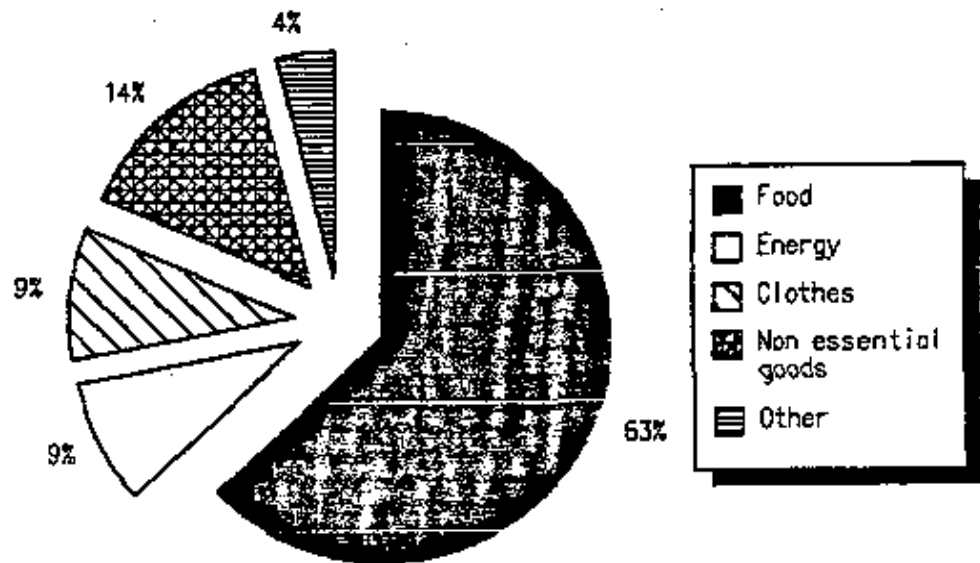
The issue of food security is the single most important factor underlying decisions made by rural producers over how, where and when they will use different resources. This was especially true in the year in which this study was carried out, for it came after three progressively drier years. Stocks, in the form of livestock (customarily cattle), grain stores and gold, which rural producers habitually husband against the high probability of a bad year following a good one, had been entirely exhausted by 1985, so that by the end of the harvest season (September-January) households could clearly see the months in which they would be short of food.

Figure 17 on Page 112 shows the degree to which they were dependent on the market both to make up shortfalls in their own production of cereals, and to provide them with other essentials they could not produce (condiments, clothes etc.). On average they spent



81% of their total per capita cash income on food, energy and clothes.

Figure 17: Proportion of Per Capita Expenditure on Different Items, All Households, 1985-86

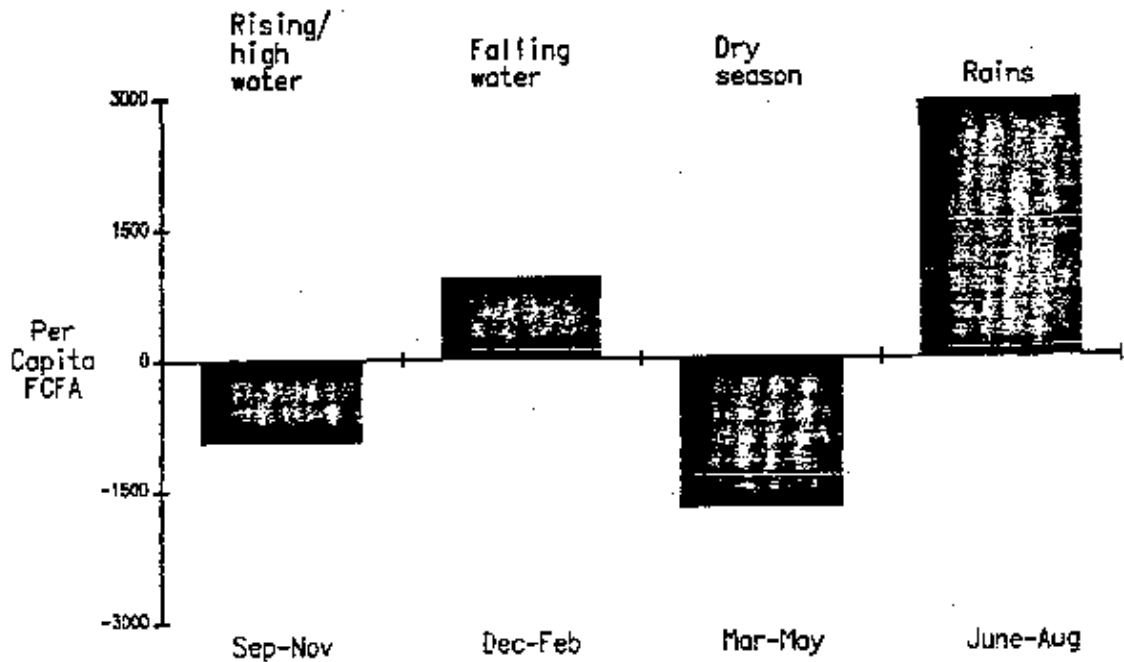


This expenditure was concentrated in the falling water, dry and rainy seasons and only 13% was on goods produced in the Delta itself (wood, fish, meat and milk). Most of the local goods they bought were provided by 'restricted' resources.

If data on income and expenditure are compared, as in Figure 18 on Page 113 it shows that in two seasons of the year - the rising and high water period, and the dry season - households made less revenue than they spent, though overall, they were marginally in surplus over the whole period. It is worth noting however, that the small surplus over expenditure in the falling water period did not wipe out the deficit from the previous season, meaning effectively

that rural producers went into increasing debt up until the end of the dry season.<sup>5</sup>

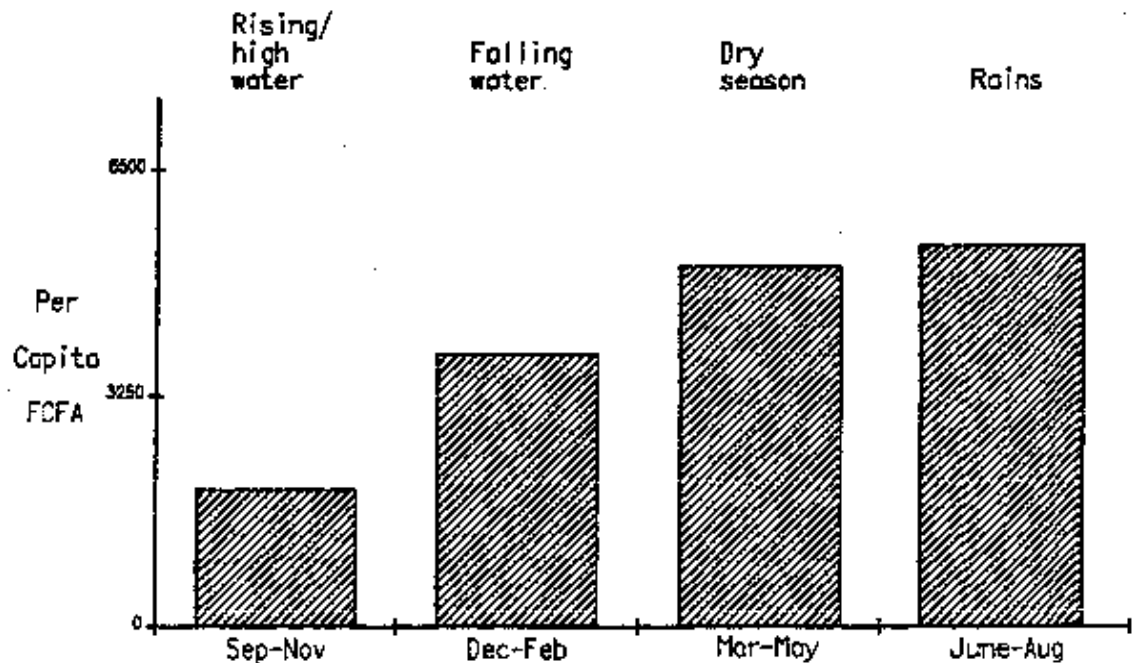
Figure 18: Balance of Per Capita Revenue and Expenditure, All Households, 1985-86



A major reason as to why rural producers are in deficit for certain seasons of the year is because of their need to buy cereals to make up for the deficiency in their own production, as Figure 19 on Page 114 illustrates. Cereal acquisitions make up a third of all their expenditure and over half of what they spent on food, and, as the Figure shows, this expenditure climbs steadily from December through to August, establishing the link between seasons of the year when they are obliged to buy food and their need to produce for exchange in order to meet these requirements.

<sup>5</sup> Without a doubt local producers - in particular fishermen, who need credit for their gear - are in greater debt than this with local merchants. Detailed data for these households were not available.

Figure 19: Per Capita Expenditure on Cereals, by Season, All Households, 1985-86

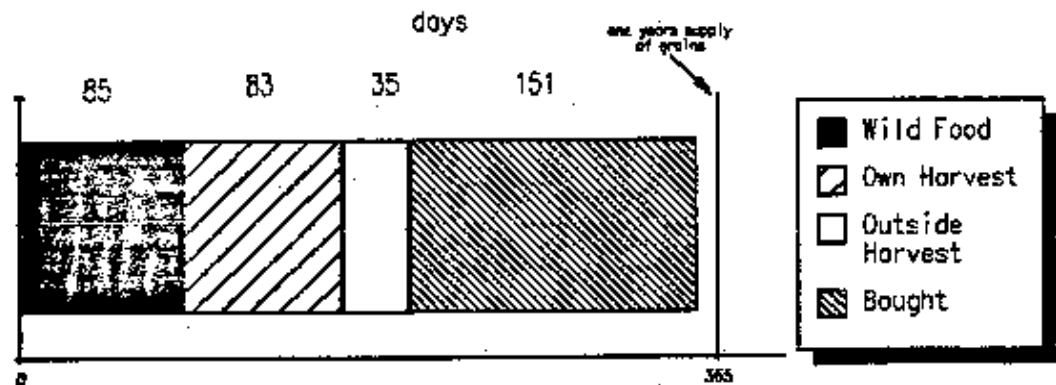


The analysis of the data on income and expenditure reveals the extent to which rural producers are involved in the cash economy in order to meet their requirements for basic necessities, and establishes that what they produce from primarily 'concentrated' resources, principally in the falling, dry and rainy seasons, goes overwhelmingly on the acquisition of imported items, with increasing amounts being spent on cereals as the year progresses. Further, it shows that for nine months of the year they are in debt, and only just balance their accounts by the end of the study period. This suggests that the accumulation of wealth within these production systems is at a standstill.

#### 4.5.1.4. Access to cereals and wild grains

The data presented below show how rural producers in this sample achieved their access to grains from different sources. Figure 20 demonstrates that households in general managed to grow or gather just over half (56%) of their grain needs, and that just under half of that amount came from gathering wild food. By far the greatest proportion of what they managed to attain from a single source came from cereals they bought on the market (41%). In all they were marginally short of achieving their needs, with a deficit for the period in question here of only 12 days of grains. It is worth bearing in mind here that this study ended in August; after the rains began, when both fisheries and floodland used for gardens are picking up in productivity once more. 1986-87 was hardly better than the previous four year dry period.

Figure 20: Per Capita Access to Cereals and Wild Grains, All Households, 1985-86



In all, a third of their needs were met by their production on their own fields or from the fields of outside harvests, and over 40% from imported cereals (from outside the region as well as from abroad)

they bought on the market, with just under three months supply from wild food they gathered on 'restricted' resources, mostly on the floodplains.

#### 4.5.1.5. The average household economy.

We are now in a position to make some tentative points on how households make seasonal use of resources with different technical and physical attributes in the Inland Niger Delta.

First the analysis of the data for all households shows that as resources change in characteristics between the rising and high water period and the rainy season the economic value of 'concentrated' assets increase at the same time as production moves from subsistence to exchange-oriented activities and from the drylands to the floodplains.

Second, it follows from this that 'concentrated' resources found on the floodplains and exploited for exchange production between the falling water period and rainy season are the most important for rural producers' livelihoods.

Third, that the value of what is produced from the most valuable 'concentrated' assets on the floodplains between December and August is used primarily to acquire items that are imported into the zone. These items are basic necessities for the farmers, farmer herders and farmer fishermen of the zone and principally consist in the acquisition of cereals and food. Rural producers were scarcely able to meet their grain needs and other requirements from what they produced for exchange and subsistence.

Fourth, these data have shown the breadth of natural resources rural producers exploit in the yearly cycle and have provided evidence of the logic of their seasonal movements - especially with regard to the value of wild food they gather on the drylands and the floodplains, and the sustenance they acquire through participating in harvests outside their zones of origin.

However, these aggregated data conceal significant differences between the two groups under study here: farmers and farmer herders living on the borderlands of the Delta on the one hand, and farmer fishermen inhabiting the floodplains on the other. The following sections of this chapter consider each of these groups in turn.

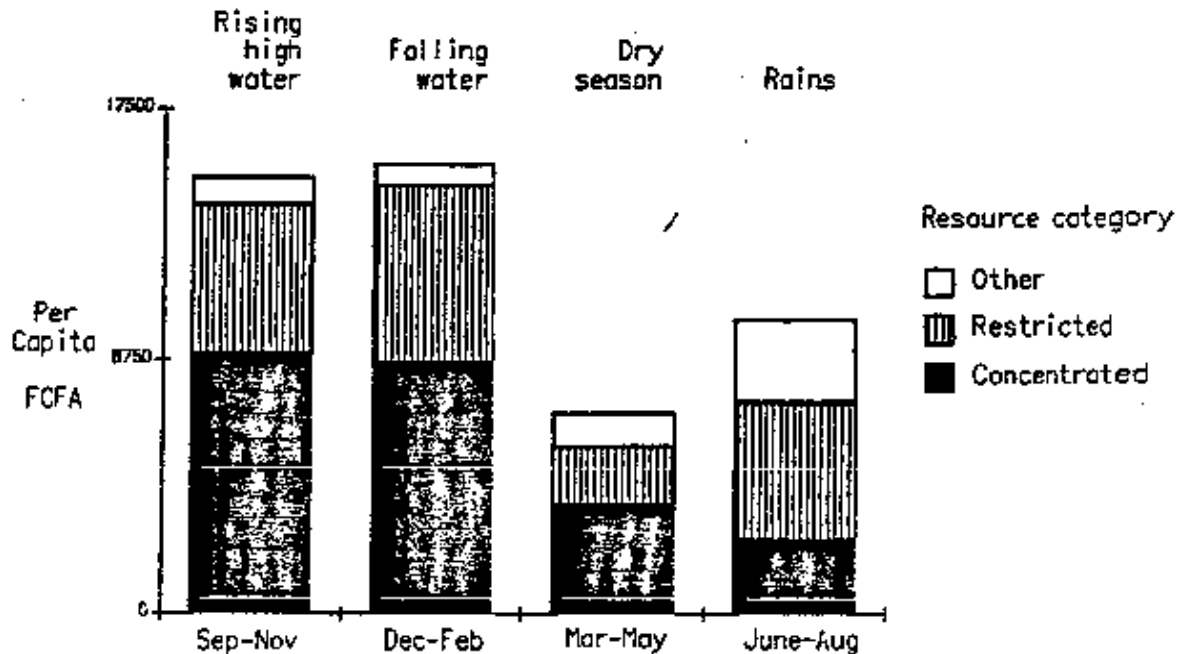
#### 4.5.2.. Farmers and farmer herders

##### 4.5.2.1. Total production

It will be recalled that the principal activities of the farmers and farmer herders living on the borders of the Delta and in the Guimballa are to cultivate their flood rising pools and millet fields from the onset of the rains (June) to the high water season (November), and their flood retreat pools in the falling water season. They gather wild food on the drylands in the rising water season, and on the floodplains in the high and falling water periods. Between December and January many of them migrate to parts of the Delta where the rice harvest has been productive, often staying away from their settlements until the onset of the rains. Households owning smallstock herd their animals close to settlements in the rainy and rising water seasons, and then move them down onto the floodplains in the falling water and dry seasons.

For farmers and farmer herders the rising/high and falling water seasons are clearly the most productive of the year as Figure 21 on Page 118 makes clear. Overall the per capita value of their production in 1985-86 stood at nearly 50,000 FCFA or US\$ 159 - significantly lower than the figure for the average household.

Figure 21: Per Capita Value of Production, By Category of Resource and by Season, Farmers and Farmer Herders, 1985-86



'Concentrated' resources including what farmers and farmer herders produced from their own harvests, harvests from floodpool crops and rice harvests they migrated to on the floodplains, were the most important assets they exploited in the rising/high, falling and dry seasons, and over the whole year accounted for half of the value of what they produced. 'Restricted' resources in the form of floodplain and dryland pasture, which they exploited for wild food, and forests which they use to browse their small stock, provide woodfuel, and produce materials for handicrafts, were the second most important assets in the rising/high, falling and dry seasons, and the most important asset in the rains. Overall they accounted for 38% of what they produced. The remainder of the value of their production came from 'other' sources of income, such as agricultural labour, remittances sent home to the household and petty trade, above all in the rainy season.

#### 4.5.2.2. Production for exchange and subsistence

Farmers' and farmer herders' major subsistence activities are composed of the cereals (millet) they grow upon their own fields, the harvests they travel to on the floodplains in order to get access to the rice crop, and the wild food they gather, both on the drylands neighbouring their communities and on the floodplains. Their major activities aimed at producing for exchange consist in the livestock, garden (floodpool) products, handicrafts and woodfuel they sell. They also derive significant amounts of income from services they provide such as Maraboutage and transport, and from remittances they receive from members of the community who are employed outside the region.

Figure 22 on Page 119 shows the value of production for these categories by season. Overall, the value of what they produce is nearly evenly split between production for subsistence (46%) and for exchange (54%), but it is very unevenly distributed through the year, with the rising and falling water period being characterised by subsistence production and the dry season and the rains by production for exchange.

Figure 22: Value of Production for Subsistence and Exchange, and by Season, Farmers and Farmer Herders, 1985-86

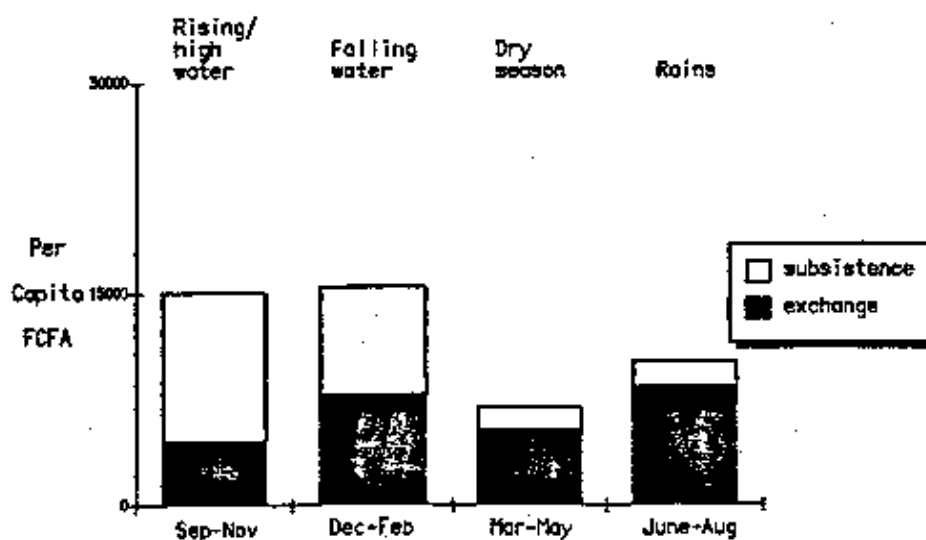




Figure 23 on Page 120 breaks their subsistence production down by season. Nearly three-quarters (70%) of the value of what they produce for subsistence comes from 'concentrated' assets (millet, rice, and floodpool fields) and just under a third from 'restricted' resources (the wild food they gather on the drylands and the floodplains).

Figure 23: Per Capita Value of Production for Subsistence, by Category of Resource and by Season, Farmers and Farmer Herders, 1985-86

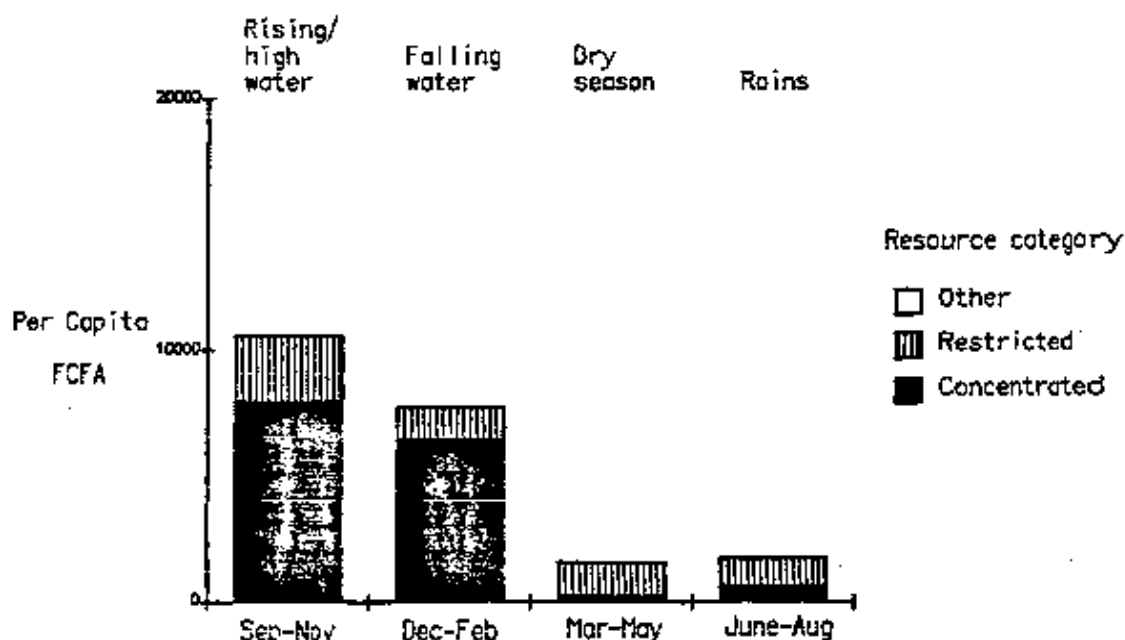
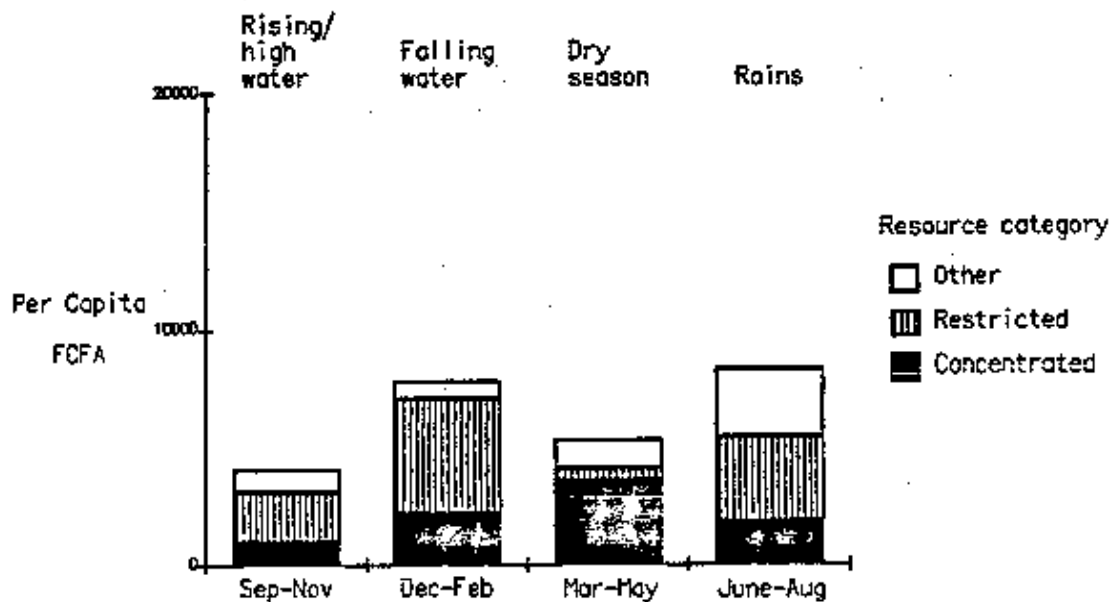


Figure 24 on Page 121 demonstrates that 'restricted' assets are the most important resources for exploitation for exchange. Small stock, handicraft and woodfuel sales account for 44% of the value of their production for exchange, which are particularly important in the falling water and rainy seasons. Twenty-two percent of the value of production for exchange comes from 'other' sources, such as maraboutage, agricultural labour and remittances.

Figure 24: Per Capita Value of Production for Exchange, by Category of Resource and by Season, Farmers and Farmer Herders, 1985-86

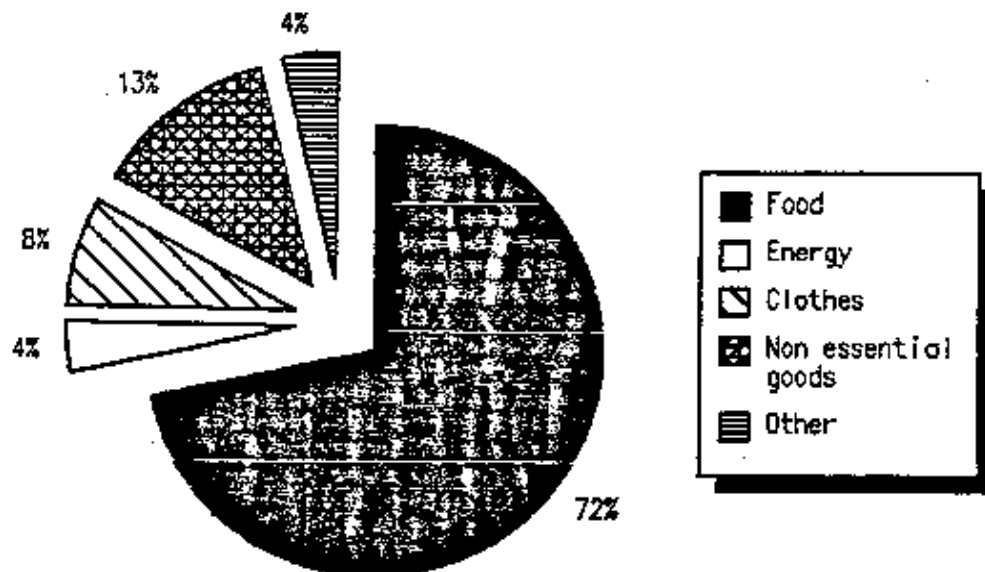


This provides evidence of the economic value of two coping strategies they have adopted as physical conditions have become more difficult. In demonstrating the importance of subsistence production in the rising and falling water seasons it has shown the value they produce from moving onto the floodplains in search of wild food and in gaining access to rice crops that have succeeded in the Delta even in bad years. In showing how the dry and rainy seasons are given over essentially to production for exchange it has revealed the importance of forest resources to these producers in providing nourishment for their smallstock, woodfuel for sale, and the materials for handicraft production.

#### 4.5.2.3. Income and expenditure

Farmers and farmer herders spent nearly two-thirds of all their expenditure on food, as Figure 25 on Page 122 shows. The seasons of greatest expenditure run from the falling water period through to the rainy season. The rising water period when the millet crop ripens and farmers are gathering wild grains on the drylands and the floodplains is the period of the year when they are least involved in the market. It should be mentioned here that this is the time of year when travel in the Delta is most difficult, therefore weekly markets are attended by fewer merchants from Mopti than in other seasons, and the general level of commercial activity is low.

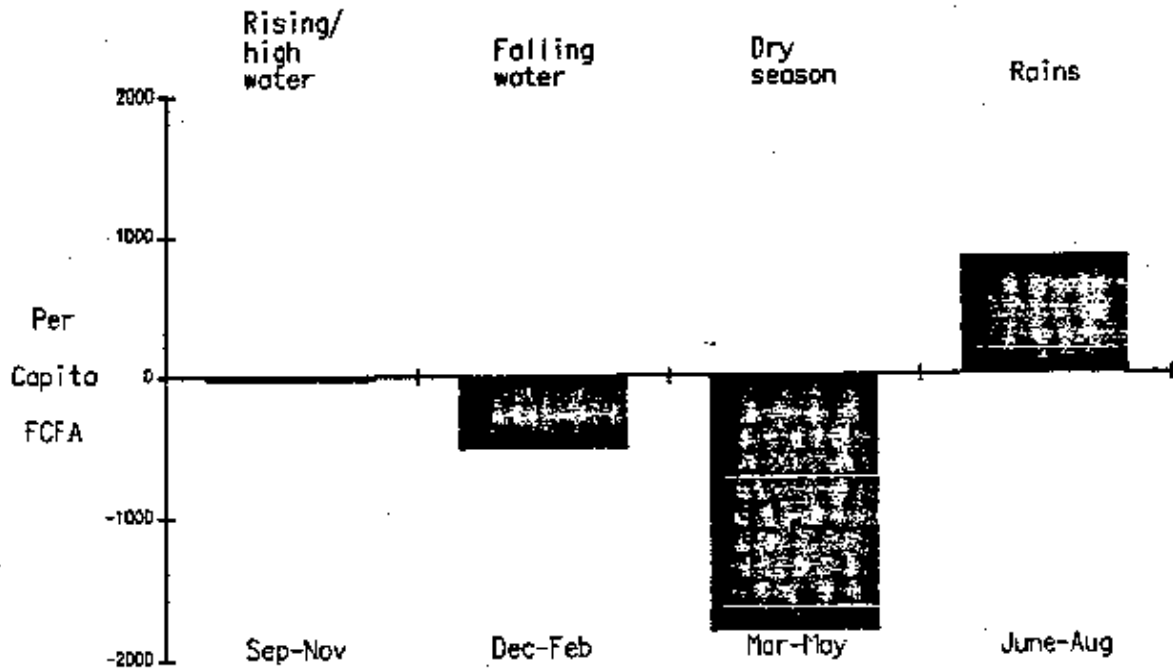
Figure 25: Proportion of Per Capita Expenditure on Different Items, Farmers and Farmer Herders, 1985-86



Eighty-five percent of their acquisitions were on imported goods. A comparison of the seasonal balance between their cash income (25,988 FCFA or US\$ 87) and expenditure (27,529 FCFA or US\$ 92) shows (Figure 26 on Page 123) that in three seasons of the year - from the rising water through to the dry season - they are in deficit,

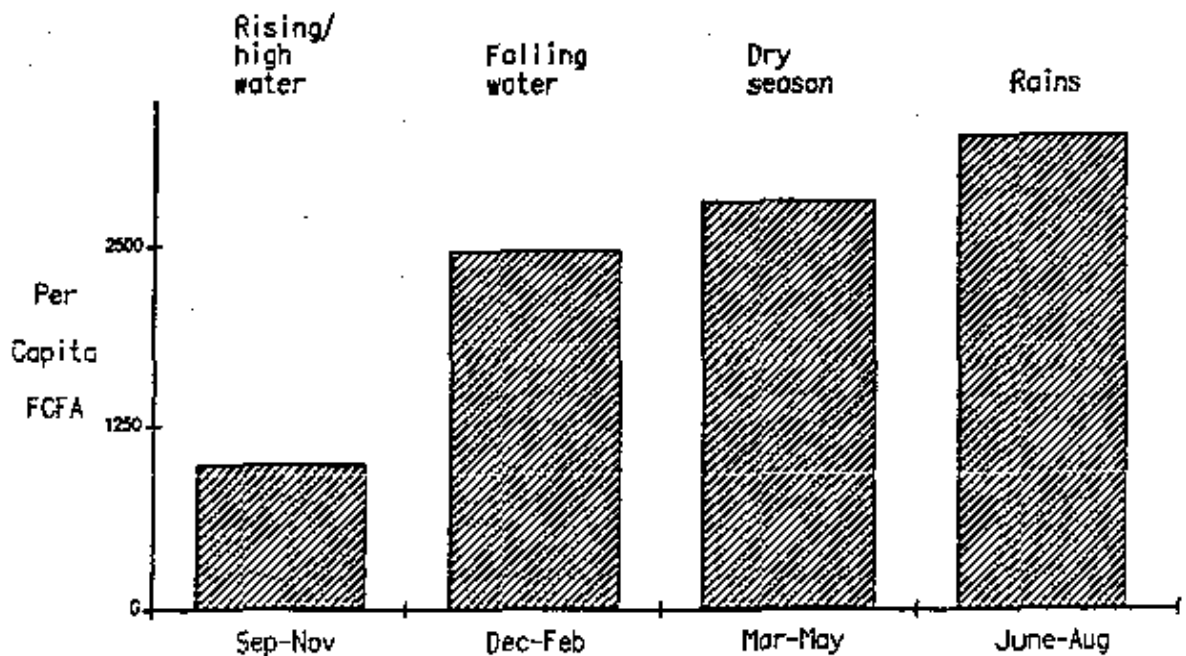
especially in the latter period. The cumulative balance leads these households into an overall deficit at the end of the year.

**Figure 26: Balance of Per Capita Revenue and Expenditure, Farmers and Farmer Herders, 1985-86**



One of the principal reasons for this is their need to buy cereals, as Figure 27 on Page 124 demonstrates, showing a steady climb in acquisitions through the year. On average, farming households spent well over a third of their total income on cereals: in the dry season this rose to half their seasonal income.

Figure 27: Per Capita Expenditure on Cereals, Farmers and Farmer Herders, 1985-86

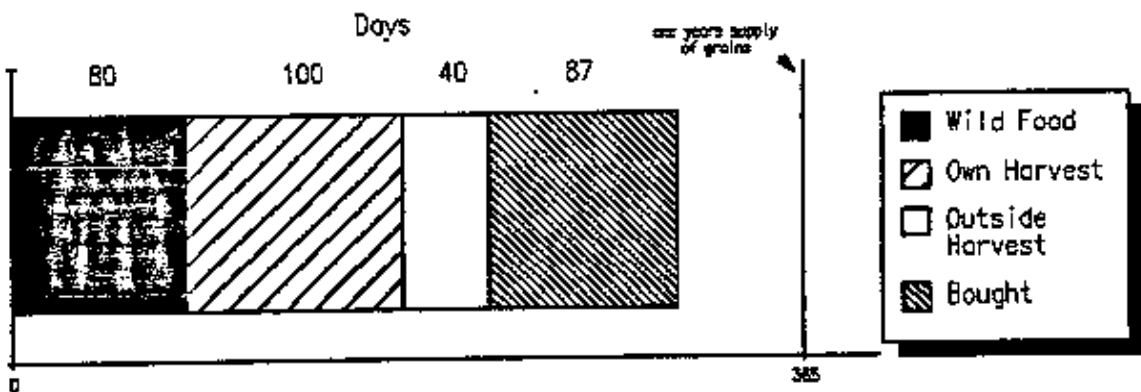


By the end of the study period in August 1986 most farmers and farmer herders were in debt to cereal merchants either from the community in which they lived, or to merchants in larger towns. The terms of these debts were disadvantageous, as habitually the merchant requires repayment to be for the same value as the amount lent. Farmers and farmer herders are often obliged to repay this credit as soon as the harvest comes in, and had only their crop to sell (in 1986, if farmers and farmer herders had any goats left, they were most unwilling to sell them because they formed the seed stock on which they would build a sufficient herd to take them through the next dry season). Prices for cereals - particularly millet - just after the harvest plummet, thus the amount of grain they are obliged to dispose of is often two to three times greater than what they were loaned when prices were high.

#### 4.5.2.4. Access to cereals and wild grains

Farmers and farmer herders are substantially in deficit for their cereal needs, with all farming and farmer herding households being on average two months short of grains. Figure 28 on Page 125 shows their principal source of cereals came from their own harvests, followed by what they bought on the market, the wild grains they gathered and what they earned from migrating to outside harvests. If this data is looked at from the point of view of the productivity of the drylands and wetlands it shows that on average households derived nearly five and a half months (162 days) supply of grain from resources neighbouring their communities, and nearly two months supply (58 days) from wild food and cereals they gathered and earned on the floodplains. In view of their overall deficit, and the debt they accumulated over the year mentioned in the last section, it can be appreciated that the four months supply of grains they received from wild food and migrating to outside harvests was of strategic value to their livelihoods.

Figure 28: Per Capita Access to Cereals and Wild Grains, Farmers and Farmer Herders, 1985-86



#### 4.5.2.5. The farming and farmer herding economy

This review of the farming and farmer herding economy in 1985-86 makes the following points:

1) In line with the trend identified from data including all households in the sample, production for subsistence switches to production for exchange between the rising and falling water seasons and the dry and rainy periods.

2) From the rising water through to the dry season 'concentrated' assets - millet, rice and floodpool fields, and floodplain forests in the dry season - are the most important resources. In the rainy season 'restricted' resources and 'other' sources of income are more important than 'concentrated' assets.

3) Dryland resources are more important than wetland assets for farmers and farmer herders. Of greatest value to them are the dryland forests they exploit which produce forage for their livestock, woodfuel for their own consumption and for sale, and materials for producing handicrafts, amounting to a third of the value of all they produce, and which are most productive in the falling water and the rainy seasons.

4) In contrast to the tendency identified when data from all households were analysed, farmers and farmer herders do not produce more for exchange from 'concentrated' resources on the floodplains in the dry and rainy seasons, but anchor their livelihoods around the exploitation of their fields and neighbouring forests, and make forays onto the floodplains at strategic moments of the year.

The data presented here has shown that overall these strategies were unsuccessful, and they finished the study period both with a shortfall in their access to grains, and in debt.

#### 4.5.3. Farmer Fishermen

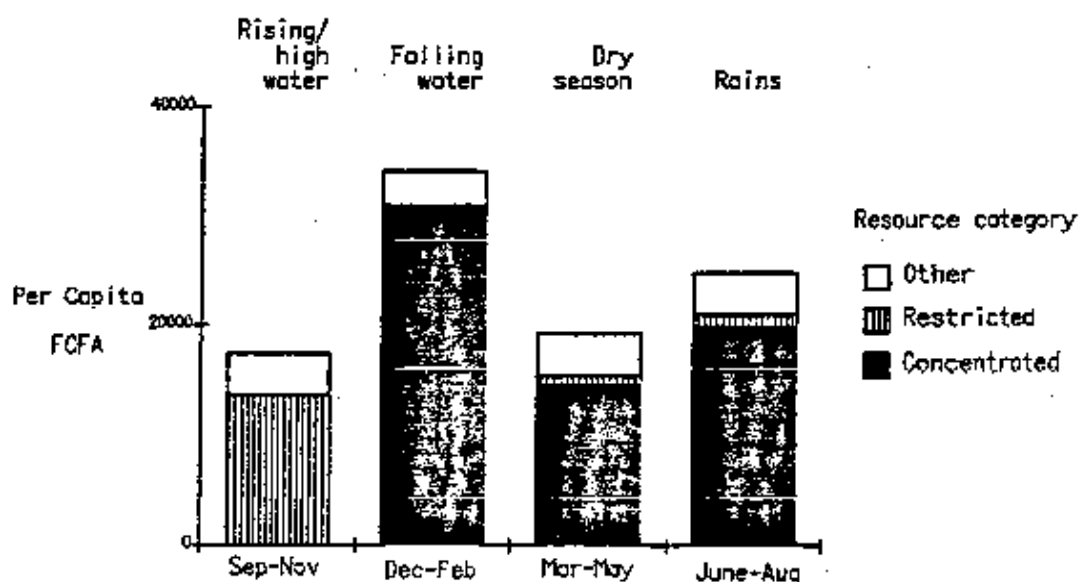
##### 4.5.3.1. Total production

In the rising and high water season farmer fishermen living in the communities under study here cultivated their rice fields, harvested wild grains, and fished the main rivers and secondary channels followed by the floodplains as water levels rose in the Delta. In the falling water season their principal activities were harvesting the rice crop when it ripened in December and fishing the secondary channels as water levels fell. Towards the end of this period they began to exploit the main waterways, in particular through collective fisheries organised around certain productive points of the river beds. In the dry and rainy seasons they principally fished the main waterways neighbouring their communities, in the latter period also sowing and weeding their rice fields. Overall the per capita value of what they produced was just under 100,000 FCFA, or US\$ 319 - twice the value of production of farmers and farmer herders.

Figure 29 on Page 128 shows the seasonality of their production. It demonstrates the overwhelming importance of 'concentrated' resources in their economy throughout the year, composed principally of the value of their fishing activities, which account for well over half (57%) of the total value of their production. By far the most productive season of the year is the falling water period, when they harvest their rice crops as well as increase their fishing activity as the fish migrate out of the floodplains. They produce a third of all they make in this season.



**Figure 29: Per Capita Value of Production, By Category of Resource and by Season, Farmer Fishermen, 1985-86**



The high level of fish production in the rainy season is of particular significance: it will be shown later in this chapter how in former years of higher rainfall and flood levels, farmer fishermen did not exploit the fisheries to anything like the same degree at this time as they were principally concerned with preparing their rice fields, and weeding the crop. This shows that farmer fishermen's response to drier conditions that make many of their fields unproductive has been to exploit the fisheries, at a time when this activity has a disproportionate effect on fish stocks, as it is at this moment that fish are migrating into the floodplains to reproduce.

#### 4.5.3.2. Production for exchange and subsistence

Farmer fishermen's subsistence activities consist in the rice they grow on their own fields, the harvests they migrate to in other parts of the Delta when their own crops are insufficient, the wild food and woodfuel they gather, and fishing for their own consumption. Their activities orientated towards exchange include fishing, agricultural labour, providing transport and petty trade.

They also derive income from remittances sent home by household members working away from the community, and from Maraboutage.

Figure 30 on Page 129 and Figure 31 on Page 130 show their production for exchange and subsistence by season, and by characteristic of the resources they exploited.

Figure 30: Per Capita Value of Production for Subsistence, by Category of Resource and by Season, Farmer Fishermen, 1985-86

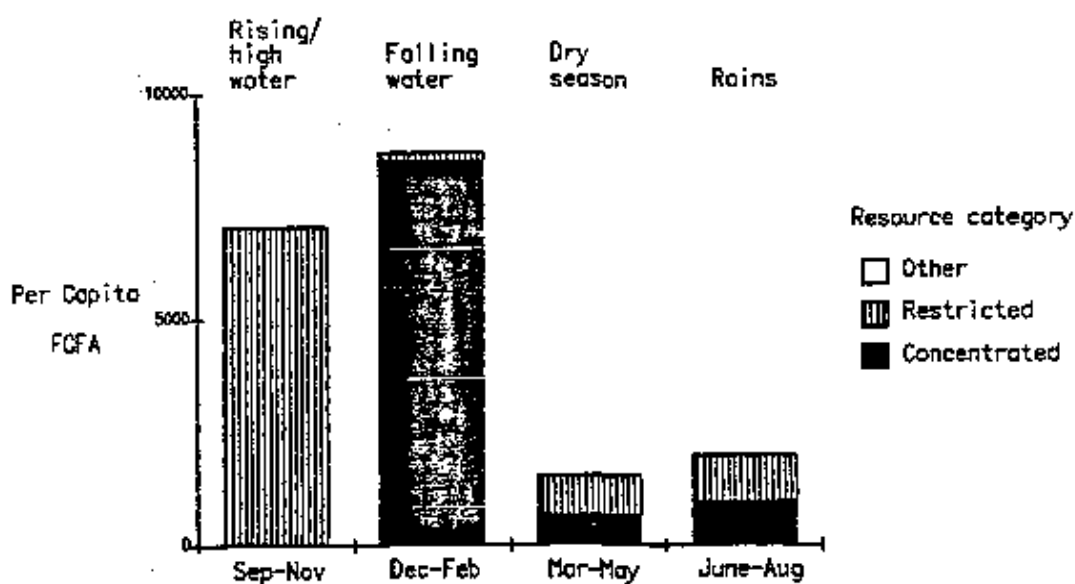
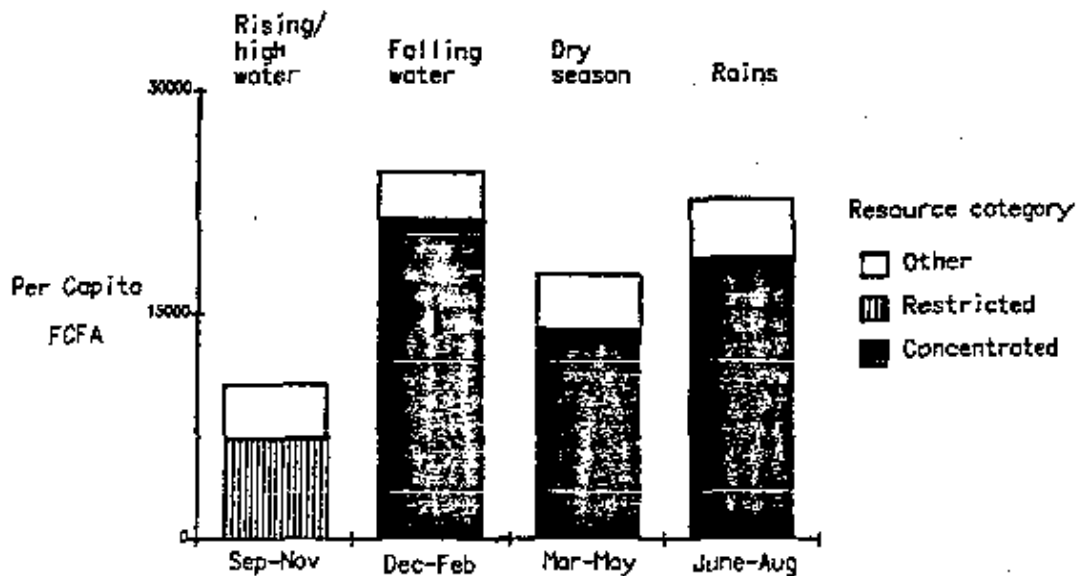


Figure 31: Per Capita Value of Production for Exchange, by Category of Resource and by Season, Farmer Fishermen, 1985-86



It can be seen that their subsistence activities were almost entirely confined to the rising, high and falling water periods, the former primarily concerned with the wild food they gathered from 'restricted' assets on the floodplains, and the latter season with their harvests from 'concentrated' rice fields. Overall the value produced from 'restricted' assets (47%) was almost equal to what came from 'concentrated' ones (53%) and amounted to 20,242 FCFA (US\$ 68).

It should be noted that they do not migrate to the dry lands for the millet harvest, as the farmers and farmer herders do for the rice harvests: there is some qualitative evidence that in years of good millet production they do in fact do this, but in 1985-86 neither the millet nor rice harvest was good in the northern sector of the Delta, thus rural producers moved south into areas of the floodplains in the centre of the Delta where rice production was high. Nor did farming and fishing households move into the borderlands of the Delta to take part in the wild food harvests of that area. They preferred to remain where they were and fish, and the benefit of such a strategy will be demonstrated below.

In contrast, production for exchange was concentrated in the falling, dry and rainy seasons, and over three quarters of the value of production for exchange came from fisheries. 'Concentrated' resources provided the bulk of this value, though 'other' sources of income - principally transport, trade and agricultural labour - made significant contributions. The value of what farmer fishermen produced for exchange, at 75,715 FCEA (US\$ 251), was nearly four times as great as the value of what they produced for subsistence.

Overall this review of farmer fishermen's production for subsistence and exchange has revealed the degree to which their livelihoods depend on exchange related activities, and their specialisation in one major endeavour. In stark contrast to farmers and farmer herders, farmer fishermen rely almost entirely on one agro-ecological area for their living (the floodplains), and within that area, on resources that are 'concentrated'.

#### 4.5.3.3. Income and expenditure

Farmer fishermen earned nearly three times as much as farmers and farmer herders. Figure 32 on Page 132 shows they spent proportionately less on food than farmers and farmer herders (60% as against 72%), proportionately more on small luxuries such as tea, sugar, kola nuts etc. (15% as against 8%). They also bought significantly greater amounts of wood, which they need both for their own cooking and for smoking their catch.

Figure 32: Proportion of Per Capita Expenditure on Different Items, Farmer Fishermen, 1985-86

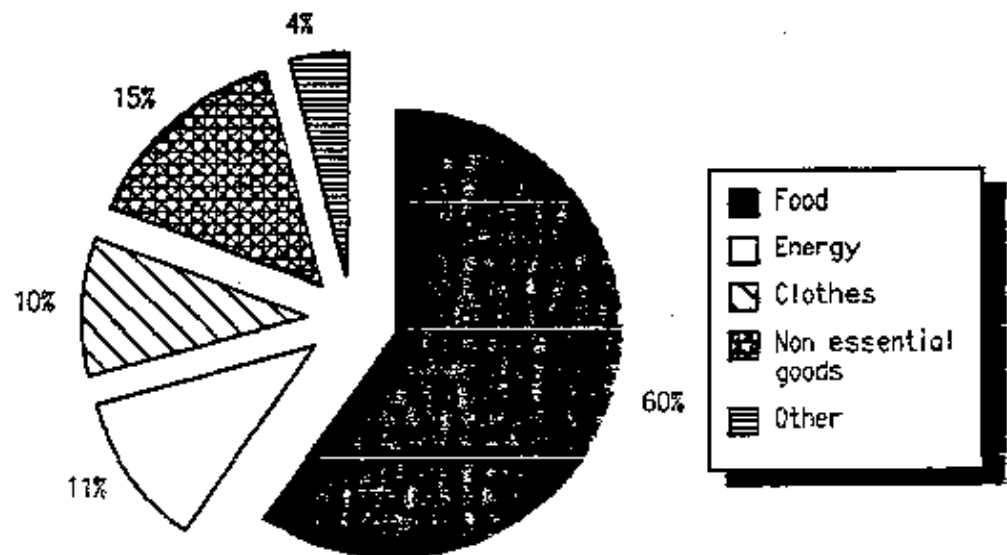
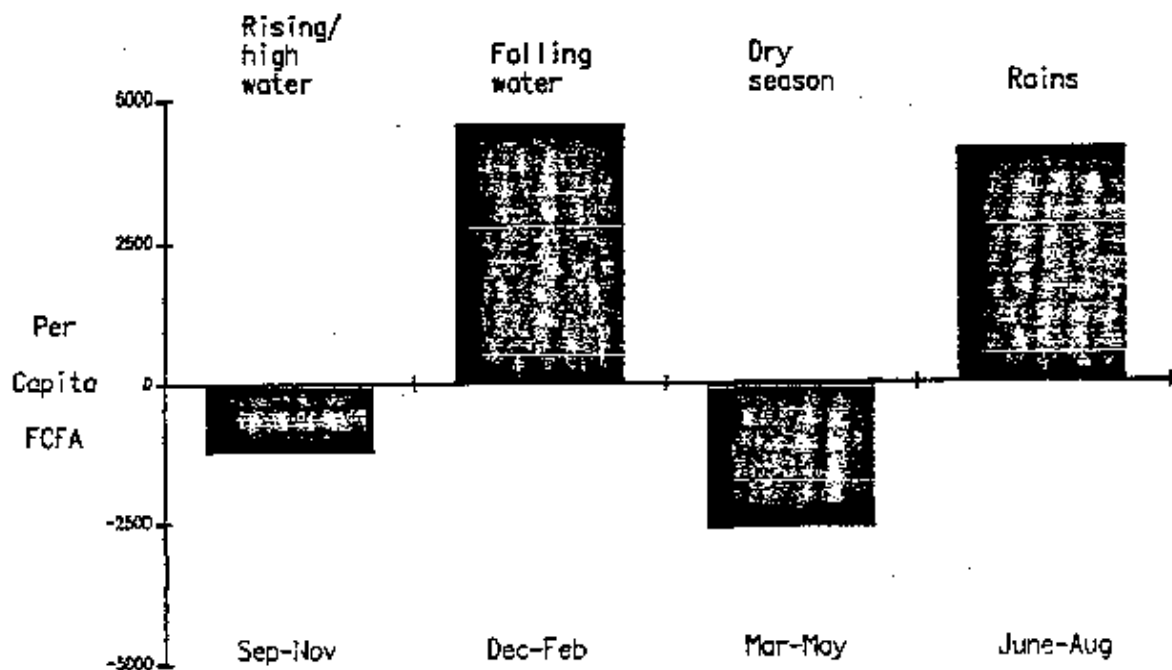


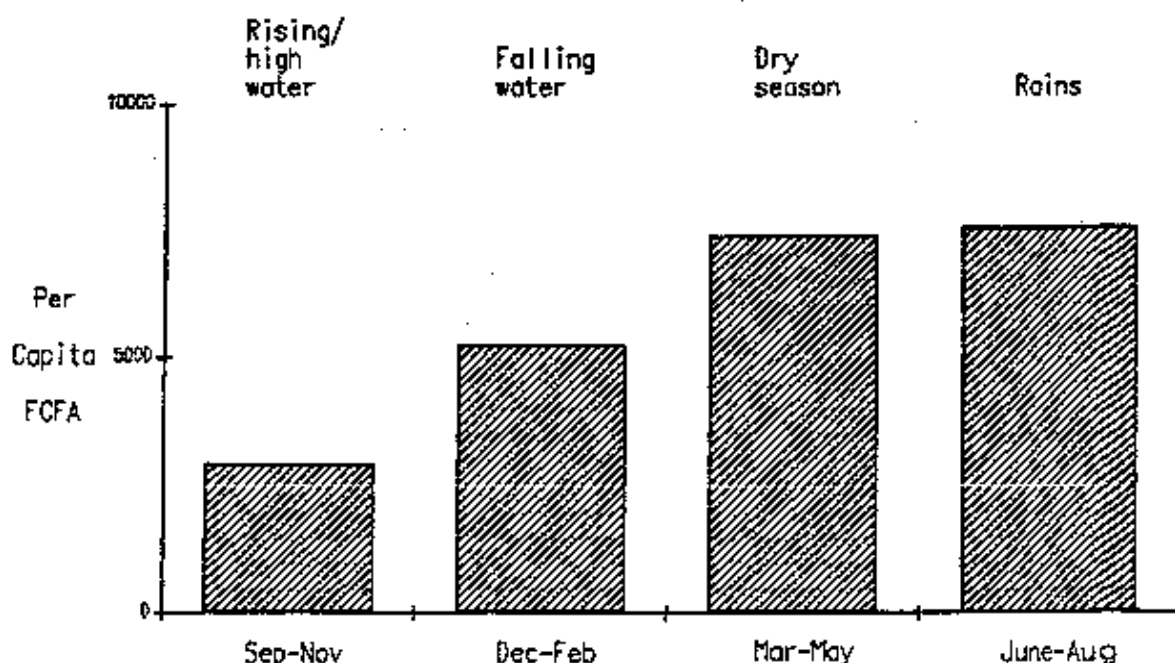
Figure 33 on Page 133 demonstrates that in spite of these higher levels of income, nonetheless two seasons of the year - the rising water period and the dry season - are periods of deficit, when they earn less than they spend, which coincide with the months when the fishery is at its least productive. Overall, however, they came out marginally in credit at the end of the year (4894 FCFA, US\$16).

Figure 33: Balance of Per Capita Revenue and Expenditure, Farmer Fishermen, 1985-86



Again, one of the reasons for these deficits is explained by their expenditure on cereals (Figure 34 on Page 134), which, proportionately, remain at the same level as those for farmers and farmer herders at over half of what they spend on food. As will be shown later in this chapter, farmer fishermen in fact gather and buy much more than their cereal needs based upon the amount of people in their household, mainly because they are obliged to offer hospitality to the many people who come to the floodplains in the falling water and dry seasons.

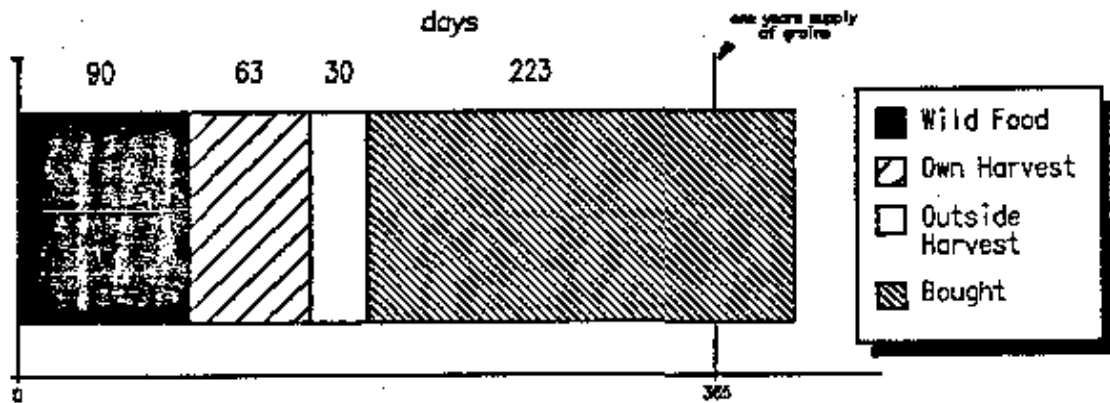
Figure 34: Per Capita Expenditure on Cereals, Farmer Fishermen, 1985-86



#### 4.5.3.4. Access to cereals and wild grains

Farming and fishing households buy fully half of their grain on the market and have a 1.4 month surplus over the study period. As Figure 35 on Page 135 illustrates, the amount they produce from their own harvests is less than what they acquire from gathering wild food on the floodplains. Also, they do not earn many days supply of grain from migrating to outside harvests, as has been mentioned above. They buy double the value of what they produce themselves.

Figure 35: Per Capita Access to Cereals and Wild Grains, Farmer Fishermen, 1985-86



This clearly shows the extent to which farmer fishing households concentrate on fishing in order to assure themselves of access to grains through buying cereals on the market. It also produces evidence to support their own claim that they need to buy these quantities of grain not only because of the failure of their own harvests but also to feed visitors to their communities, many of them from the borderlands of the Delta, particularly in the falling water and the dry seasons. The 'surplus' alluded to in the data does not therefore represent a stock of grains they held at the end of the rainy season in 1986, but rather represents the quantities of grain they consumed over the previous 12 months.



#### 4.5.3.5. The farmer fishing economy

The strategies of farmer fishermen revealed by this review of their household economy allow the following points to be made:

1) Fishing is their principal economic activity in every season of the year and particularly in the falling water and rainy seasons. In this later period the intensity of their exploitation of fish is likely to have a disproportionately negative effect on the resource, as it takes place as fish are migrating into the floodplains to breed.

2) This specialisation of their activities ties their economy both to the exploitation of primarily 'concentrated' resources and to the market: in every season of the year the value of what they produce for exchange is greater than that for subsistence.

3) In the little they do produce for subsistence they generate as much value from gathering wild food as from cultivating crops (whether their own, or those that they travel to help harvest), giving 'restricted' resources a strategic role in what they generate for their own consumption.

4) In specialising in production for the market, and relying on production from 'concentrated' assets, farmer fishermen were singularly successful in generating sufficient revenue to meet their needs, implying they were able not only to reproduce their own livelihoods, but to contribute to the livelihoods of the many visitors who migrate into the floodplains each year.

#### 4.5.4. The seasonal exploitation of natural resources in 1985-86

##### 4.5.4.1. Farmers farmer herders and farmer fishermen

This analysis reveals important differences as to how resources with different physical and technical attributes are exploited by two major production systems in the Cercle of Youvarou. Farmers and farmer

herders rely on both 'concentrated' millet, rice and floodpool fields, and 'restricted' forest and wild food resources, while farmer fishermen depend above all on 'concentrated' fisheries.

Seasonal productivity is very different for these two production systems: farmers and farmer herders produce double in the period from September to February than they do in the remaining six months of the year under study here, while farmer fishermen produce more in the dry and rainy season than they do in the rising and high water season. This reflects on the one side the occurrence of the millet harvest in October for the farmers and farmer herders, and on the other side the continuing productivity of the fisheries in the dry season and the rains for the farmer fishermen. The oft quoted 'dead season' that is meant to run through the dry season, is therefore much more applicable to production systems based in the dry lands and founded on millet production than it is to floodplain producers, and even then what they produce from dryland and wetland forests, from their flood pool fields and from other sources of income belies the widely held notion that they are underemployed.

It follows from this that dry-land cultivators on the borders of the Delta are more differentiated in their tasks: farmer fishermen, more dependent on their strategic resource for what they produce, devote almost all their efforts towards 'concentrated' resources except in the rising and high water period, while farmers and farmer herders spread their activities over both 'concentrated' and 'restricted' assets in all seasons of the year. Further, while farmer fishermen restrict their activities almost exclusively to the floodplains, farmers and farmer herders exploit both the drylands and the floodplains, using the wetland areas for strategic access to wild food and rice crops.

It is apparent that inhabitants of the borderlands of the northern sector of the Delta were considerably worse off than those living on the floodplains themselves, having much lower per capita incomes, and in particular in the extent to which they were able to achieve access to staple grains. The basic principle of how rural households during this time were able to meet their needs remains the same

however, for in both cases their ability to exploit their environment to produce goods for sale on the market was of seminal importance. In the case of farmers and farmer herders this was through exploitation of primarily 'restricted' assets on the drylands, in that of farmer fishermen, 'concentrated' resources on the floodplains. In spite of the lesser importance of 'concentrated' assets to farmers and herder farmers, what they did manage to produce from this source for cash was nonetheless of great significance inasmuch as it provided a third of the cash income they received, in circumstances where they endured considerable shortages in access to basic necessities.

The overall perspective this section provides is of one group of producers (farmers and farmer herders) unable to provide locally for their own needs from what they produced either directly for their own subsistence or indirectly from what they produced to sell, moving down onto the floodplains and migrating out of the area to make up the shortfall; and of another group (farmer fishermen) concentrating their activities on a local resource whose product they could sell in order to achieve food self sufficiency and buy some luxuries. Both these cases make the point that floodplain 'concentrated' and 'restricted' resources are of strategic importance not only for the local inhabitants but for neighbouring producers as well, and that dryland 'restricted' resources are the safety net farmers and farmer herders rely upon to provide them with the cash they need to buy the cereals they can neither produce nor gather themselves.

#### 4.5.4.2. Transhumant fishermen

A brief mention has been made at the end of the last chapter of how transhumant fishermen have adapted to increasingly dry years in the Delta. In 1985-86 it was estimated in a fairly summary manner by the local administration that the Cercle of Youvarou received something in the region of 7000 migratory fishermen, who remained in the area for five to six months of the year. Field work carried out under the

auspices of the IUCN research project at the time (IUCN 1986) indicated three broad strategies being followed by these fishermen:

- 1) Fishing households that habitually only migrated to one fishing camp each year, probably near their village of origin (i.e. in the upwater parts of the Delta), increased their migratory circuit to take in more than one camp, and to travel as far as the lake region.
- 2) Households that traditionally visited the lake region increased their length of stay in the area.
- 3) Households that customarily went further than the lake region on their migratory cycle, no longer did so, but remained near the lakes.

Further research showed that up to 30% of seasonal visitors to the zone no longer returned to their villages, and that many fishermen from upwater regions that had never migrated before began to do so at the onset of the drier years.

In a broad sense it can be said that in these drier years, the region of the lakes in the Cercle of Youvarou had become a refuge for upwater fishermen many of whom came to the area essentially to settle. Many fishing camps on the floodplains and even on the main lakes that were normally flooded remained dry at this time, and remained populated. Many of these households attempted to cultivate rice in the area, but with little success as often the camps they remained in were not close to suitable areas for agriculture, and for lack of knowledge on their part of how water levels changed in a locality they habitually only occupied in the falling water and dry seasons, and only to fish.

In terms of the attributes of resources they exploited through the year the same tendency can be seen as with the farmer fishermen described above: a concentration of their efforts on fishing in order to raise enough cash income to buy the cereals they needed and on gathering wild food found on the floodplains (migratory fishermen are also adept hunters of the areas' wildfowl). As such,

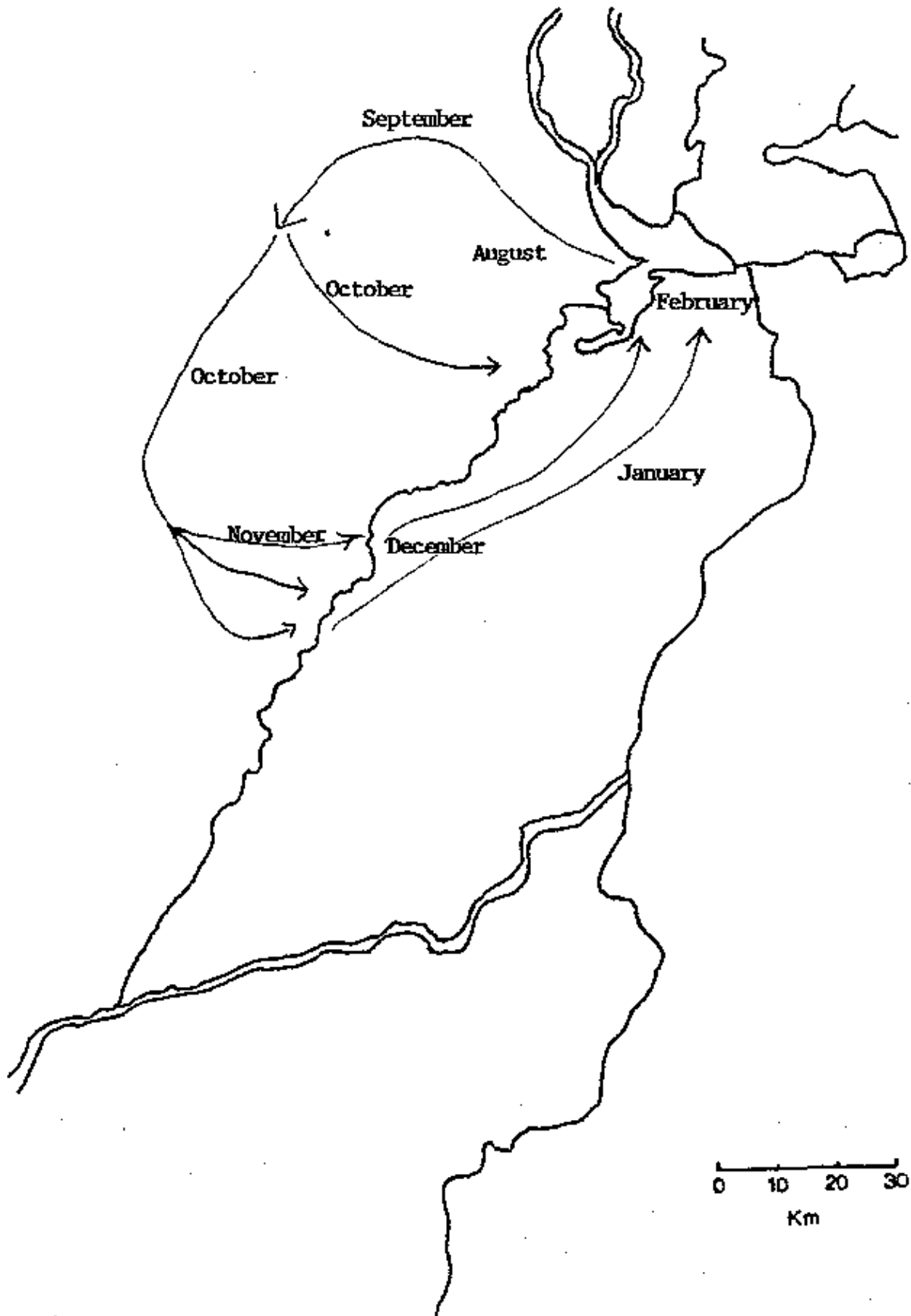
'concentrated' resources were the principal assets they exploited through all the seasons of the year except the rising and high water season (for those that remained in the area) when the fisheries were 'restricted' in nature. Given that they cultivated less, or were less successful in their cultivation because their fields were in less appropriate sites, it is likely 'restricted' wild food assets were more important, proportionately, in what they produced for subsistence, and that overall they were even more involved in production for the market than other producers. They were also considerably in debt to fish merchants in Mopti for credit to buy gear.

#### 4.5.4.3. Transhumant herders.

In 1985-86 the Yaalabé Fulani herders who come from the Youvarou area kept some of their cattle on the floodplains all the year round, rather than sending all their livestock on transhumance. Those that did go on transhumance left late (August) - well after the rains had begun - migrated up to the borders of the zone to the north where they remained for most of the rising and high water season before moving south to the borders of the centre of the Delta and then crossing back into the floodplains at their traditional crossing points. These crossings took place early - in October and November - and the animals remained in the centre of the Delta for two months before moving rapidly north for the crossings into their own pasture, the first of which took place in January, and the second in March (see Map 5 on Page 141).

For the period their herds spent on the borderlands of the Delta, these herders were exploiting 'restricted' dryland pasture, and for the time they were on the floodplains 'concentrated' wetland grazing. Animals that were kept on the floodplains through the rainy season were making use of 'concentrated' assets through to August and then 'restricted' resources in the rising and high water season.

Map 5: Yaalalbé Transhumant Map



In the light of this it can be said that 'concentrated' resources found on the floodplains were of greater value to these herders in 1985-86 than 'restricted' resources they exploited both on the floodplains (June-November) and on the drylands. However, the time herds spend on the drylands is of strategic importance both for their reproduction (rainfed pasture is significantly more nutritious for the animals than floodplain pasture, thus it is during this season that the females come into oestrous) and for milk production. The period animals spent on the borderlands of the Delta in 1985-86 (August-October) coincided with the millet harvest in these areas, and herders bartered milk for significant quantities of millet during this time. Between November and February they further bartered dairy products for rice with farming communities on the floodplains in an effort to build up a stock of grains to take them through the dry season. In this they were only partially successful, and from February on they were obliged to buy cereals on the market.

While there are no figures for this cycle, it can be suggested here that in 1985-86 the rainy and rising water periods (June-November) were characterised by their exploitation of primarily 'restricted' resources, allowing them access to grains, through barter, that were grown on 'concentrated' millet fields; the falling water season was characterised by their exploitation of 'concentrated' pasture giving them access, again through barter, to rice from 'concentrated' fields. The dry season saw them exploiting 'concentrated' resources, buying their cereals on the market with revenue from the sale of milk and the rare sale of an animal.

This reveals a singular feature of the transhumant herding economy: the emphasis on production for barter rather than cash in the attempt to get access to grains.

The implications of this are that the transhumant pastoral economy, while sharing the features of other production systems of producing primarily for exchange from 'concentrated' resources, have strong linkages with other production systems in what they produce from their 'concentrated' fields. These linkages are expressed through

various contracts they engage in with cultivators: the loan of milk animals while they are away on transhumance in return for a portion of the crop, the loan of work animals early in the rainy season which farmers use to prepare their fields and, customarily, the herding of animals belonging to farmers and farmer fishermen, though this latter contract is becoming less important as farmers have lost their animals due to the drought, have sold them to raise cash, and have invested in their own goats.

#### 4.6. Resource Use in the Pre-Drought Period

The preceding sections of this chapter have given a detailed account of how two sets of producers in the northern sector of the inland Niger Delta use 'concentrated' and 'restricted' resources through the different seasons of the year for the period 1985-86 and has provided qualitative evidence of how transhumant systems exploited the zone as well. In this section this use is compared with how they utilised the same resources before the recent increasingly dry period commenced. In one particular case - that of the farmer fishermen - a direct comparison can be made, using the same indicators, as a result of research carried out by the author for the period 1980-81 in one of the communities that made up the 1985-86 sample. The methodology and make up of the sample of this earlier study has already been presented at the outset of this chapter. More qualitative evidence will be presented here for the evolution of resource use for transhumant fishermen and herders, and for farmers and farmer herders.

The period 1980-81 is treated as a 'pre-drought' period: as data presented in Chapter 3 have shown these years were the last two moderately good years (but still not as good as the 1950s and 1960s) in terms of flood level and fish and cereal production, before the onset of increasing drought after 1982. As such, resources are considered to have the technical and physical attributes set out for the 'pre-drought' period at the end of Chapter 2.



#### 4.6.1 The production of farmer fishermen in 1980-81

##### 4.6.1.1. Total production

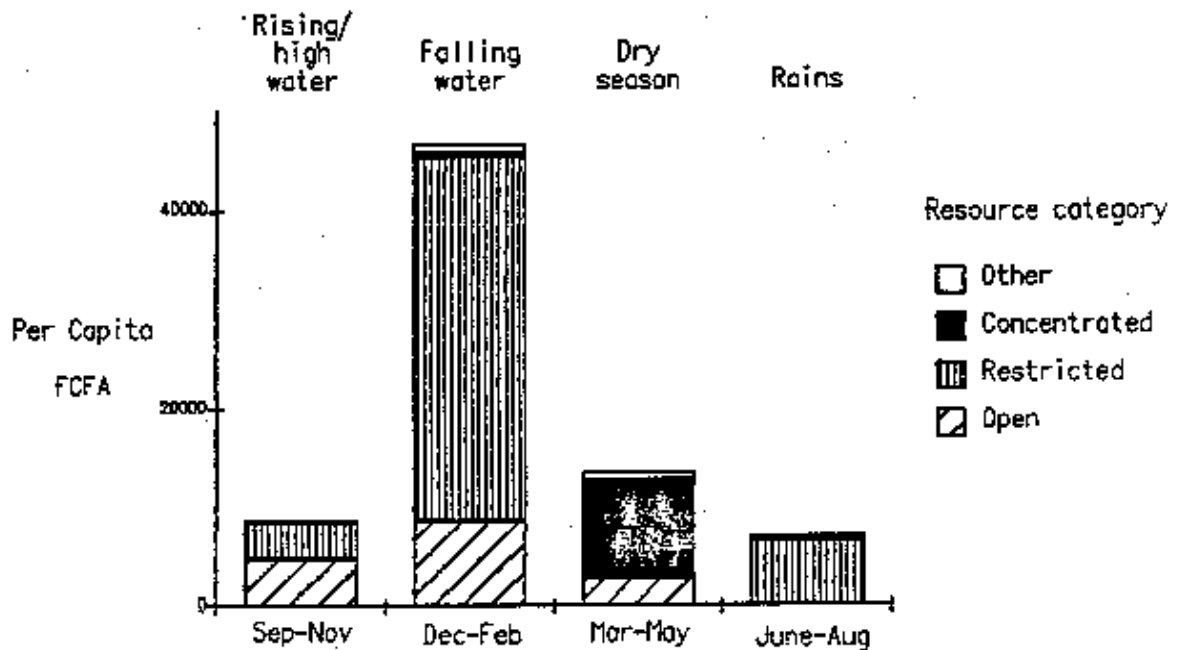
Farmer fishermen's activities were significantly different in 1980-81 compared to 1985-86. In the rising and high water period their most productive occupation was gathering woodfuel from forests on the borders of the Delta which they could reach because water levels were high enough to allow access by boat; all households were cultivating their rice fields and fishing the floodplains, towards the end of this period moving out to camps so as to have better access to the dispersed fisheries. They gathered no wild food. In the falling water season the rice harvest came in, dwarfing the value of all other economic activities. Households moved in from the fishing camps at this time: their revenue from this activity was the next most important after cereal production. Households continued to gather wood from borderland forests.

In the dry season their revenue from fishing reached its high point of the year, reflecting the productivity of the collective fishing season. Households were still gathering wood, and were involved in handicraft production, building a house for the fishing cooperative and also collecting grass from the floodplains to make into huts which they sold to seasonal visitors, and sold for forage. In the rainy season fishing provided the most value and wood gathering took on increased importance.

Half the value of their production came from cereal production, a third from fishing and 14% from wood gathering. In 1980-81 therefore, they were literally farmer fishermen while by 1985 they had become fishermen farmers.

Figure 36 on Page 145 shows the importance of the falling water period for farmer fishermen in 1980-81 compared to other seasons, and reflects the value of the rice crop they harvested at this time. Over half of the value of their production came from 'restricted' resources (cereals and fish), principally in the rising and falling water periods, only 14% from 'concentrated' assets (fish in the dry season) and from housebuilding.

Figure 36: Per Capita Value of Production, By Category of Resource and by Season, Fishermen Farmers 1980-81



This compares with farmer fishermen deriving the greater part of the value of their production from 'concentrated' assets and the value of their production actually rising due to intensified fishing effort in the dry season of 1985-86.

#### 4.6.1.2. Production for exchange and subsistence

The extent to which subsistence activities dominated farmer fishermen's productive cycle in 1980-81 is demonstrated by Figure 37 on Page 146. The rice harvest accounted for 64% of the value of their production in 1980-81.

Figure 37: Value of Production for Subsistence and Exchange, BY Season, Fishermen Farmers 1980-81

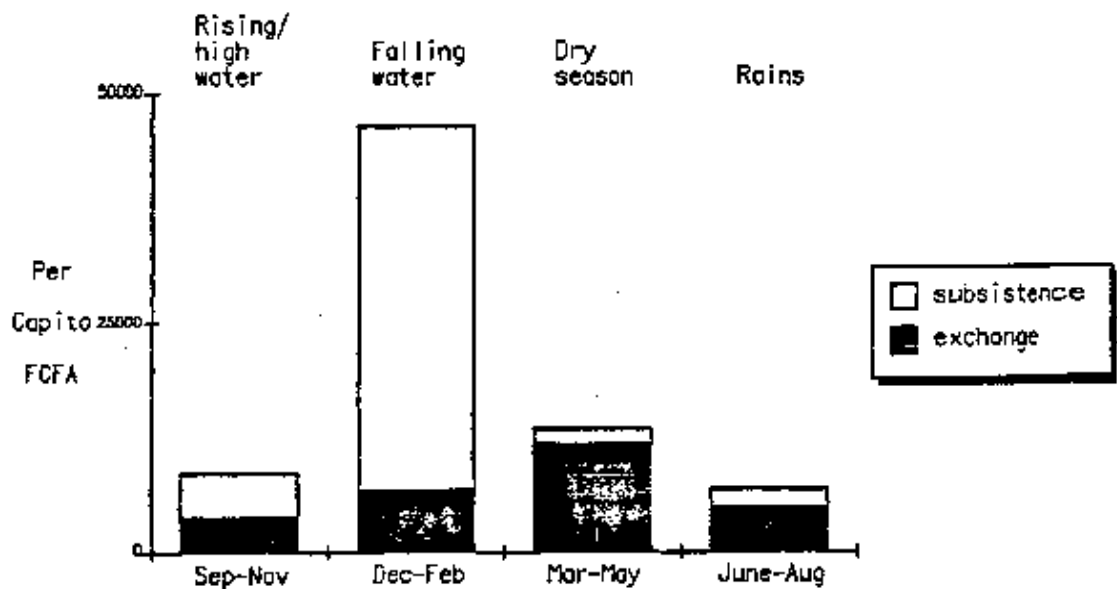
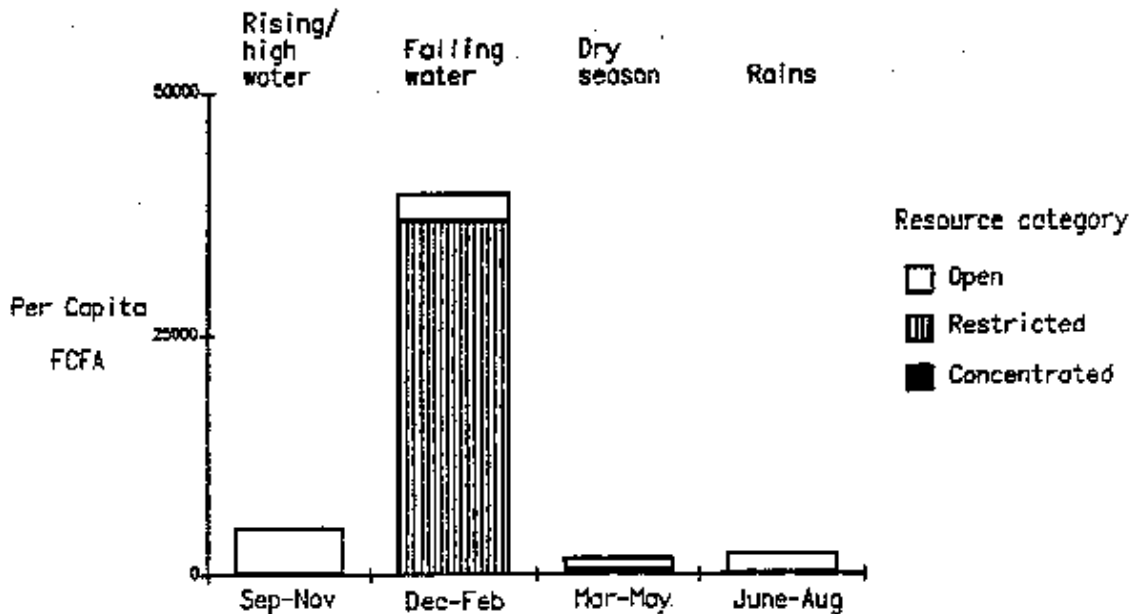


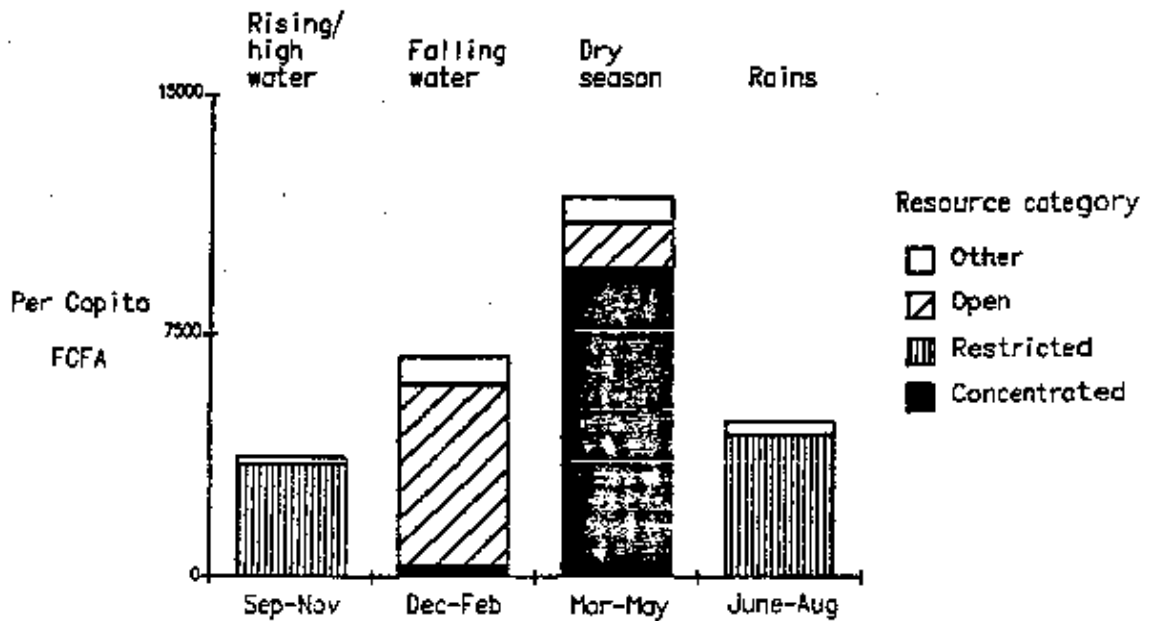
Figure 38 on Page 147 shows the overwhelming proportion of the value of subsistence production came from 'restricted' resources - primarily their rice fields - followed to a much lesser degree by 'open' resources - the wood they gathered for their own consumption. 'Concentrated' resources - which accounted for over half the value of subsistence production in 1985 - in 1980 contributed only 1%, made up of the fish they consumed in the dry season.

Figure 38: Per Capita Value of Production for Subsistence, by Category of Resource and by Season, Fishermen Farmers 1980-81



The attributes of the resources they used for exchange production shown in Figure 39 on Page 148 present a more varied picture. Over a third of what they produce in this category is 'concentrated', over a quarter 'restricted', and 26% 'open' - all consisting primarily in the fish they caught. Only 9% of their income came from other sources. It will be recalled that in 1985-86 nearly three quarters of their income derived from 'concentrated' resources.

Figure 39: Per Capita Value of Production for Exchange, by Category of Resource and by Season, Fishermen Farmers 1980-81

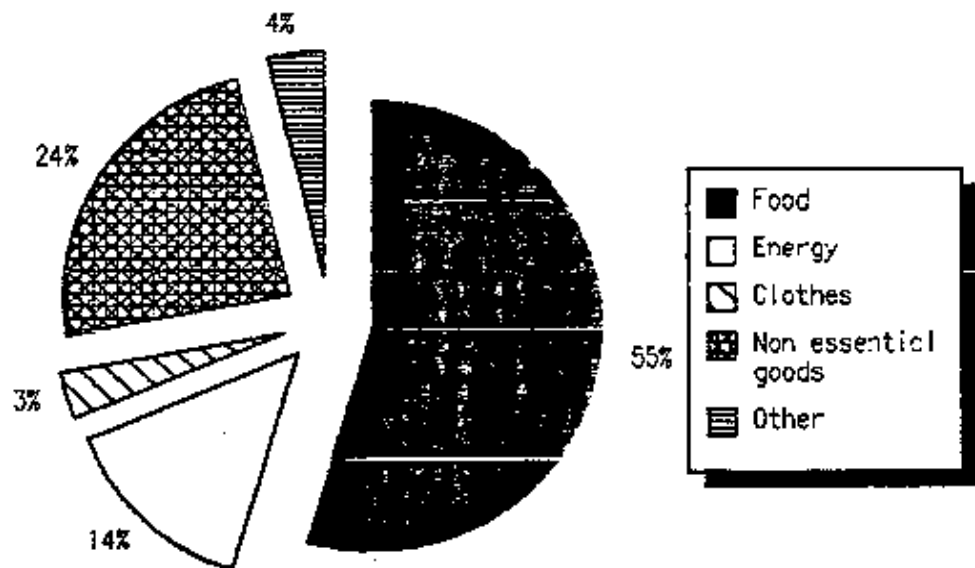


These Figures show the switch from subsistence to exchange production operated in the 'pre-drought' as well as the 'post-drought' period, the significant difference being, of course, in the relative importance of production for these two categories, and the attributes of the resources they exploited to produce these goods. In 1980-81 subsistence production dominated exchange activities and 'restricted' and 'open' assets were of greater value than 'concentrated' ones, while the reverse was true in 1985-86, when there were no 'open' resources left.

#### 4.6.1.3. Income and expenditure

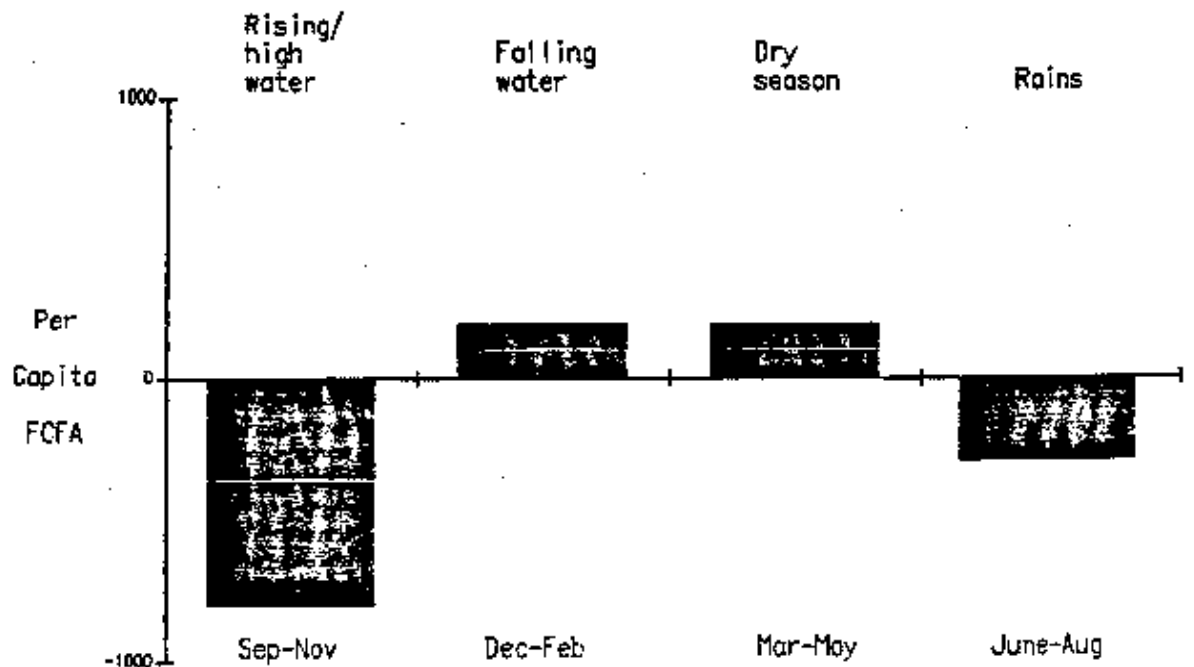
Farmer fishermen in 1980-81 spent significantly less (as a proportion) on food than in 1985-86, considerably more on energy, less on clothes, and considerably more on small luxuries (Figure 40 on Page 149). Whereas in 1985-86 they were spending over 80% of their total expenditure on essential goods, in 1980-81 they devoted just over 70% of their expenditure to this end.

Figure 40: Proportion of Per Capita Expenditure on Different Items, Fishermen Farmers 1980-81



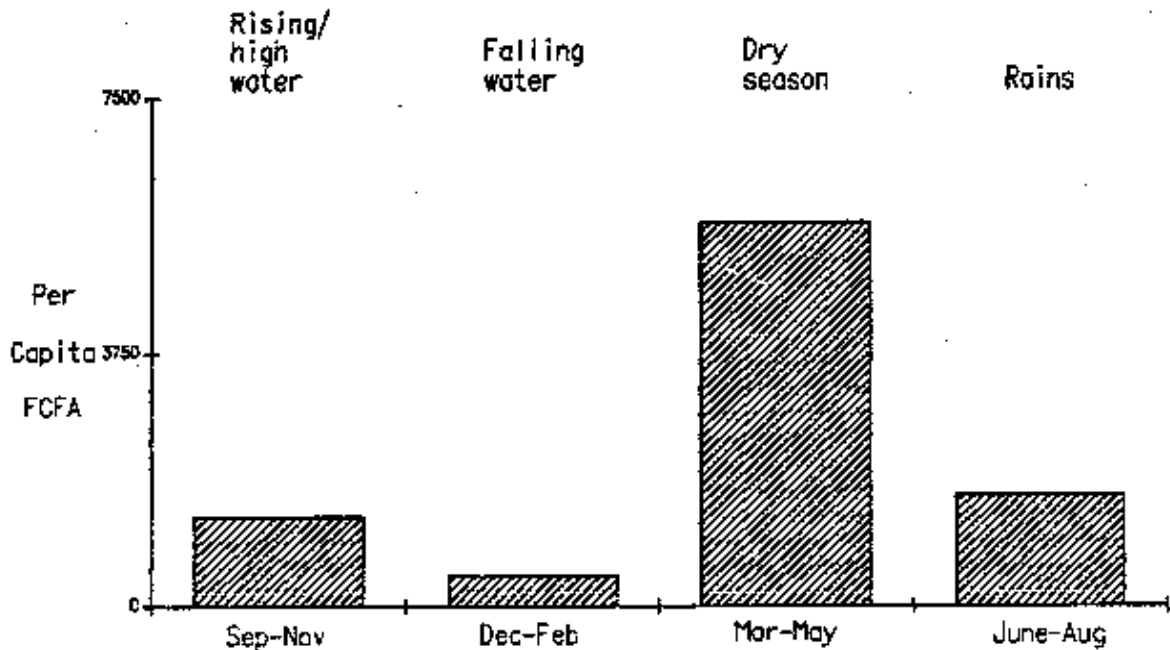
It might seem surprising that in two seasons of the year in 1980-81 they are in deficit, and as Figure 41 on Page 150 shows, and that overall they are in deficit for the entire year. This situation, however, is not as serious in its implications as in 1985-86, simply because of the secondary role production for exchange takes in their economy in 1980-81, and the size of their rice harvest.

**Figure 41: Balance of Per Capita Revenue and Expenditure,  
Fishermen Farmers 1980-81**



That said, Figure 42 on Page 151 shows they invested significantly in cereals in 1980-81, most of all in the dry season, when their income from the collective fisheries provided them with their greatest inflow of cash. In 1985-86, it will be recalled, cereal acquisition rose continuously through the year, from the rising/high water season through to the rains.

Figure 42: Per Capita Expenditure on Cereals, Fishermen Farmers 1980-81

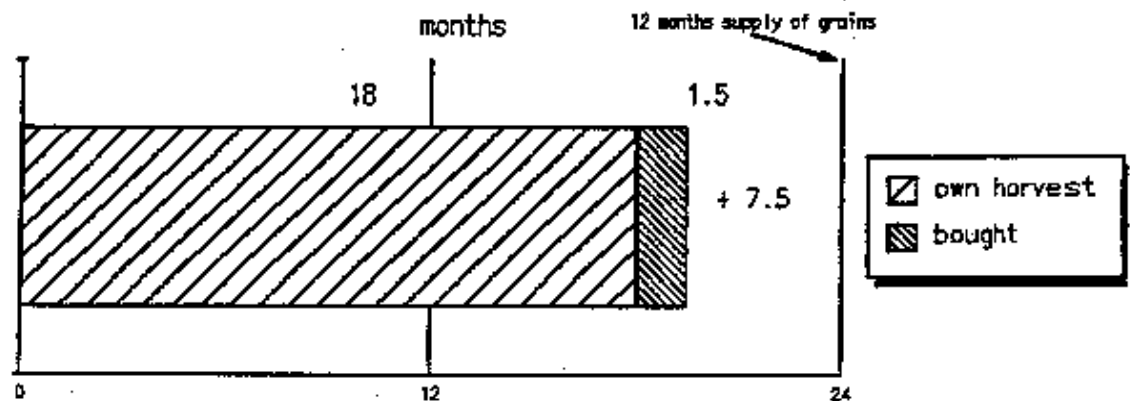


#### 4.6.1.4. Access to cereals and wild grains

In their access to cereals in 1980-81 one of the clearest distinctions can be drawn between conditions pertaining in this year compared to 1985-86. Farmer fishermen in the first period on average grew a year and a half's supply, and added a further one and a half months supply through the market (Figure 43 on Page 152), so that at the end of the study period it can be estimated they had at least enough grains to take them through another six months, if not more.



Figure 43: Per Capita Access to Cereals and Wild Grains, Fishermen Farmers 1980-81



Some households in the sample harvested over two years supply of rice in 1980-81. Households reported that in good years they like to stock up to two years supply as a hedge against future harvest failures. On average they bought 10% of what they produced themselves. In 1985-86, it will be recalled, half of what they acquired they bought, and they produced only 14% of the total from their own fields.

#### 4.6.1.5. The economy of farmer fishermen in 1980-81

This review of the farming and fishing economy in the 'pre-drought' period has provided clear evidence of how between 1980-81 and 1985-86 these rural producers went from being farmer fishermen to fishermen farmers, and the backbone of their economy shifted from a reliance on farming rice to fishing. In the process they moved from a subsistence-based to a market-orientated livelihood, and the resources that were of most value to them changed from being 'open' and 'restricted' to 'concentrated' in nature.

In addition to the attributes of their resources changing, so has the timing and the span of their activities. Whereas before their subsistence-related activities were concentrated on their rice production, culminating in the harvest in December, in the 'post-drought' period they were exploiting wild food resources in the rising and high water season as well as migrating to outside harvests in the falling water period. With regard to their exchange-related activities, whereas before the period of greatest productivity lay in the dry season when collective fisheries took place, in 1985-86 the most productive period lay in the falling water season, in line with the manner in which water drains from the Delta more rapidly with the advent of lower flood levels. Significantly, they have intensified their fishing effort in the rainy season and, concomitantly to this process, more intensive equipment is being used to capture their prey. At the same time other sources of income including trade, agricultural labour and Maraboutage have taken on increasing importance. Fishermen farmers have become more food insecure - although they did produce or gather enough in 1985-86 to meet their yearly needs - and arguably they have fallen more into debt.

#### 4.6.2. Farmers and Farmer herders

For lack of specific data on the inhabitants of the borderlands of this sector of the Delta for this year, the following discussion of resource use by these producers is perforce more generalised. It can however be said with some certainty that in years of better rainfall the larger part of the value of what farmers and farmer herders produced came from what they grew on their own millet fields, and from their flood rising and retreat fields. They relied to a far less extent on small stock in years of better rainfall and invested in cattle which they gave to the Fulani to herd. In the rainy, rising and high water season they would have principally been involved in weeding and then harvesting of the millet crop and in growing some rice in rainfed and flooded pools. In the falling water and dry seasons they were concerned in the cultivation of flood retreat crops

(manioc, cotton, sorghum, peanuts etc.) with some production from taking part in the collective fisheries near their villages.

As such farmers would be principally concerned with production from 'restricted' agricultural resources for the greater part of the year with some secondary interest in 'open' forest resources for their provision of woodfuel, and materials for handicrafts, and a limited, short-term involvement in 'concentrated' collective fisheries in the dry season. Both their production for subsistence and exchange would be based on 'restricted' resources - millet and flood pool rice for subsistence, and their garden products for their production for the market. They would also have some interest in pasture resources in the drylands and on the floodplains exploited by transhumant herders to whom they confided the cattle they owned, which they used both for traction to prepare their fields for cultivation, for dairy products and as savings. In interviews with farmers they reported that in years of higher rainfall they gathered little wild food, migrated less to the floodplains, and left their communities to a much lesser degree in search of wage labour. Overall cereal production on their own fields would secure their access to grains and they would spend what they earned from the sale of garden products to invest in cattle, buy capital equipment such as ploughs, and to pay for social expenses such as marriages, baptisms, circumcisions and for hospitality to visiting officials and dignitaries.

Many farmer herders in the 'pre-drought' period would have been herder farmers, that is, with the bulk of the value of what they owned and what they produced deriving from the cattle they held. One part of the household transhumed with their animals on a cycle very similar to that of full time transhumant herders, while the other remained in their settlements of origin to cultivate the millet crop, moving onto the floodplains to meet their herds on their return from transhumance in the falling water season.

These herder farmers would therefore have their principal interest in the 'open' and 'restricted' millet fields between the onset of the rains and December, and in the 'concentrated' and then 'open' floodplain pastures in the falling water and dry seasons. Production for

subsistence would dominate their activities in the rains and high water season and production for exchange - through barter initially, then through cash transactions - in the falling water and the dry seasons. Their access to grains would be assured from their own crop and from the rice they bartered and bought, while the cash they generated from the sale on dairy products would be invested in more animals and social expenditures, as explained for the farmers above.

The farmers and herder farmers of 1980-81 had re-orientated their activities by 1985-86 to exploit principally 'concentrated' resources for subsistence in the rainy and rising water seasons - but with a significant shift towards exploiting wild food on 'restricted' assets to make up the shortfall in grains they earned or cultivated. Perhaps more importantly, both groups had moved into goat herding and had further increased their exploitation of forest resources through handicraft production and the sale of woodfuel - all activities aimed at cash production in order to buy food. Farmers and herder farmers who previously had interests in floodplain resources primarily for the pasture they provided for their cattle, in 1985-86 now migrated into the Delta principally for the access it afforded them to wild food and the rice crop. Maraboutage and remittances sent home to the community had become significant sources of income, particularly in the dry and rainy seasons, and many members of the community had left in search of wage labour. Overall, they were unable to meet their grain requirements.

#### 4.6.3. Transhumant fishermen

These producers customarily appeared in the Cercle of Youvarou after the onset of the falling water period - January/February in a good year. They fished the upper reaches of the Niger and Bani rivers and the floodplains to the south of the lake before moving down onto the lakes of Walado and Debo as the falling water levels revealed sand banks upon which they could erect their grass huts. Many transhumant fishermen remained there right through to

June/July, although others, as seen above, migrated further into the Issa Ber and Mayo Ambiri rivers north of Youvarou. At the end of the falling water period and the beginning of the dry season they all took part in the collective fisheries supervised by the administration of the Cercle.

As the rains approached, these fishermen turned for home, often carrying with them substantial quantities of processed fish which they sold in Mopti on their way back. They spent the latter part of the rainy season and the rising and high water season in their villages of origin in the upwater areas of the Delta, cultivating their own fields there, and fishing, before leaving on their transhumant cycle once more.

Transhumant fishermen therefore exploited 'restricted' fish and rice field resources through the rains and the rising and high water period and then the 'open' and 'concentrated' fisheries (first their own, later those belonging to other communities) for the remainder of the year. Research carried out by the IUCN project (IUCN 1986) indicated that the camps they stayed in on their way down the main waterways remained broadly the same in periods of high water levels, and that they had long-established links with communities they visited each year. Evidence suggests (IUCN 1986, ORSTOM, 1988) that these fishermen, while relying on their own harvests for the provision of staple grains, produced more in value terms from the 'concentrated' and 'restricted' fisheries which they exploited in order to raise cash than they did from their cultivating activities aimed at subsistence production. They were substantially better equipped than downstream fishermen with boats, outboard motors and fishing gear, and were acknowledged by inhabitants in Youvarou to be more specialised in their craft than local fishermen. Evidence has been produced in the preceding section to show how this specialisation in production for exchange has increased in latter years, while at the same time their reliance on 'concentrated' assets has become fundamental to their livelihoods.

#### 4.6.4. Transhumant herders

In years of good rainfall Yaalalbé herders began to prepare for their transhumant cycle as soon as the first rains fall (June). With the first reports of pasture growing in the drylands they left - 'following the rains' - on three principal axes: up to the forests behind Niafunké to the North East of Youvarou where salt licks were available (accompanied generally by most of the livestock from the eastern borderlands on the Cercle); to the Méma, an area west of the Office du Niger; and, if the year was particularly good, as far as the 'Sahel', pastures in southern Mauritania north-north-west of the Delta (see Map 6 on Page 159).

They remained in their respective dry land pastures as long as water sources and pasture held out (though the dates set by the administration for the first crossing back into the Delta are important in determining when they turn for home irrespective of the quality of pasture in these areas - see Chapter 6), and then moved down through the western borderlands of the Delta as the moment of their re-entry into the floodplains approached. In November - December they crossed once more into the Delta and followed a similar pattern of movement down through the pastures as described for 1985-86.

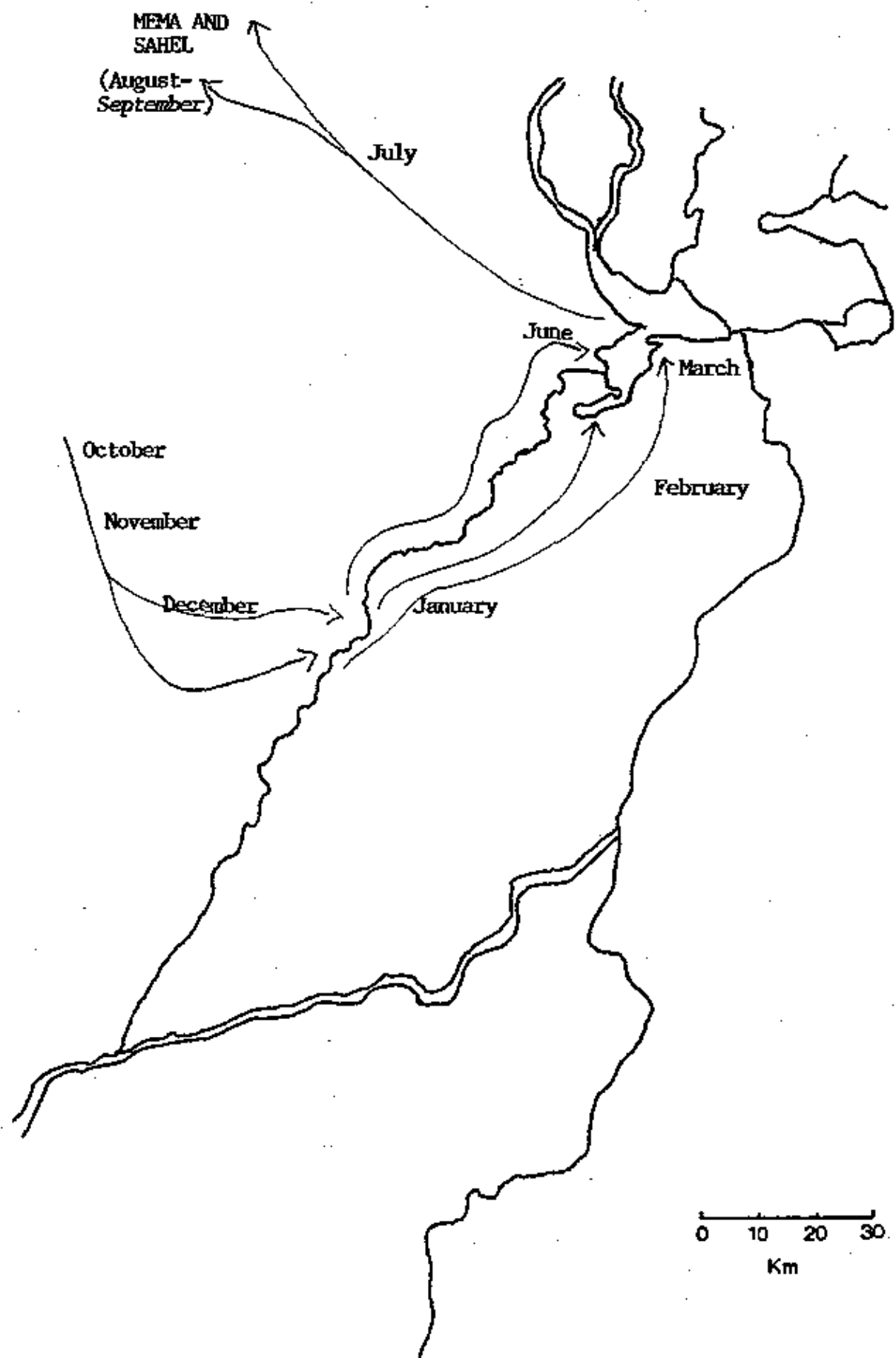
The Yaalalbé divide their herds at two strategic moments of the year. Just before they leave on transhumance they form a set of milk herds that remain close to their villages during the wet season, feeding on parts of the floodplain that remain out of the water, and which supply members of the household that do not go on transhumance with dairy products. These herds, known as 'dumpti' rejoin the main herds that have been away as they approach the Delta once more just before the falling water season (November - December). At this point the herds are divided into three groups: a new milk herd is formed to supply their villages with dairy products with animals returning from transhumance that are healthy and in milk, known as 'bendi', a further milk herd is constituted to follow a route near to major rice producing communities in order to barter dairy products for grains, known as 'piiti' and lastly a herd

composed principally of male animals is formed, known as 'gaarti'. This herd includes the animals that have been confided to them by farmer fishermen and farmers of the area, and are returned to their owners for a short period at the beginning of the rains so that they can labour their fields.

In terms of the attributes of the pasture they exploit in years of better rainfall and flood levels, during the period from the onset of the rains until the beginning of the falling water season their most important resource was 'open' in nature, with a small proportion of their herds (the 'dumpti') remaining in the Delta and utilising 'concentrated' pastures. In the period December - May, during which time the major movements of herds through the floodplains take place, they are using 'concentrated' assets, while in the dry season the pasture they graze is 'open' once more. Thus, for herders in 1980-81 the principal resource they relied upon was 'open', while by 1985-86 it has been shown they relied principally on 'concentrated' resources on the floodplains, where they kept more animals in the transhumant season, and on which they spent a longer period in the year.

In 1980-81 their production for subsistence came from primarily 'open' resources, especially during the period when they were away from the Delta. Between June and December their production for exchange, composed mostly of barter transactions, involved the exchange of dairy products produced from 'open' resources for cereals produced on 'restricted' fields. From December to February products deriving from 'concentrated' resources were exchanged - again through barter - for rice produced from 'restricted' fields. In the dry season the exchange was between 'open' pastoral products and 'restricted' cereals. As the preceding section has shown, in 1985-86 they bartered less, sold more for cash, and exchanges were dominated by transactions of 'restricted' and 'concentrated' goods in the rains and rising water season, and between 'concentrated' goods alone in the falling water and dry seasons.

Map 6: Pre-drought Yaalalbē Transhumant Routes





#### 4.7. The Intensification of Resource Use

It will have become apparent to the reader that most resources dealt with here are exploited either by different production systems at different seasons of the year (e.g. floodplain pasture), or by different production systems in the same season (e.g. floodplain fields, wild food), or by the same production system in the same season, but by members of the system that come from outside the area (e.g. fisheries, floodplain pasture). Resource use in the Cercle of Youvarou has intensified in two different ways: through being used for new activities, and through being exploited by more people. Table 8 on Page 161 summarises how the major resources have been put to new use in the Cercle.

Table 8: The Major Users of Natural Resources in the Cercle of Youvarou in 'Pre' and 'Post-drought Periods.

Resources	Production Systems				
	Dryland Farmers	Farmer Herders	Farmer Fisher	Trans. Fisher	Trans. Herders
<b>PRE-DROUGHT</b>					
Dryland Pasture		■			■
Dryland Forest	■	■	■	■	
Flood fields	■				
Rice Fields			■		
Floodplain Pasture		■			■
Floodplain Forest			■	■	■
Fisheries			■	■	
<b>POST-DROUGHT</b>					
Dryland Pasture	■	■			■
Dryland Forest	■	■	■	■	
Flood fields	■				
Rice Fields	■	■	■	■	
Floodplain Pasture	■	■	■	■	■
Floodplain Forest	■	■	■	■	■
Fisheries			■	■	

This table cannot show the intensity of exploitation of these resources, therefore it is necessary to comment on each asset in question. Dryland pastures, which formerly were used exclusively for livestock herded by herder farmers and transhumant pastoralists, are now exploited by farmers and farmer herders for wild food. The

latter group no longer have a primary interest in the asset as pasture, as they now raise goats. This puts them into competition with transhumant herders, whose animals use the same resource at the same time (the rising and high water period) as feed. Chapter 6 describes the nature of conflict between these groups in greater detail.

Dryland forest resources, formerly used for woodfuel and some handicraft production by farmers, herder farmers, farmer fishermen and transhumant fishermen is now used for forage for goats in addition to its customary use by farmers and farmer herders. Even though this resource has become of strategic value to these producers it has not led to conflict between members of different systems, principally because each use exploits a different product from the forest: woodfuel uses dead wood, goats eat the green leaves of Acacia trees, handicrafts are made principally from goats wool and the leaves of doum palms. It has, however, enmeshed farmers and farmer herders in considerable difficulties with the administration, which are also described in Chapter 6.

Floodland fields have not attracted the attention of other production systems, but they now produce vegetables such as lettuce, tomatoes and tobacco rather than the cotton, peanuts and sorghum they used to grow before. Here conflict has arisen principally within communities for access to the lower-lying pools that it is now possible to cultivate.

Farmer fishermen had their principal interest in floodplain rice fields in the 'pre-drought' period. Nowadays, as this chapter has shown, farmers and farmer herders have an interest in this resource as an outside harvest they migrate to, in order to earn cereals through helping to bring in the crop. Transhumant fishermen have a further interest in the asset in seeking their own rice fields in the Cercle when they settle in the area.

Wetland pasture was formerly exploited to a minor degree for forage for animals kept in villages and for making huts by farmer fishermen and transhumant fishermen, and also by transhumant herders for

feed for their cattle. In the 'post-drought' period floodplain grasses are now used for wild food by farmers, farmer herders, farmer fishermen and transhumant fishermen who, (although it does not appear in the household data) also cut pasture in the high water season for sale as animal feed. The former use is un-competitive with transhumant herders as it takes place when the animals are on transhumance and because it leaves the plant intact. The latter use of this resource has raised sharp conflict with pastoralists, who see the wetland resource they most depend upon being taken from them when they are not there, and by people to whom it does not belong. Further conflict also takes place between transhumant herders from the area and outside herders who come in from the dry lands each year, in search of scarce dry season grazing.

Wetland forests were formerly exploited by farmer fishermen and transhumant fishermen for woodfuel (and for nesting wildfowl) and by outsider herders who kept smallstock (the Twareg) for forage. Nowadays farmers and farmer herders also use this asset for their goats. Floodplain forests have shrunk in size dramatically in recent years.

Competition for access to fisheries is the greatest source of conflict in the Cercle of Youvarou at the present day, principally pitting local farmer fishermen against transhumant fishermen both visiting the area, and seeking to settle in the Cercle. The economic basis for this conflict has been made evident in this chapter.

There are thus three main sources of conflict over access to natural resources in the Cercle of Youvarou in the post-drought period:

- 1) Between members of the same production system and the same community (i.e. floodpool fields).
- 2) Between different production systems (i.e. dryland wild grains, floodplain pasture).
- 3) Between members of the same production system but different communities (i.e. floodplain pasture, fisheries).

#### 4.8. Summary

This chapter has shown the economic value of natural resources to households making up the different production systems that exploit the dryland and floodplain resources of the Cercle of Youvarou both between seasons and between 'pre' and 'post-drought' years. In the 'pre-drought' period agricultural resources consisting in millet, rice and flood rising and flood retreat pools were of the greatest value to the more sedentary farmers and farmer fishermen of the zone. Transhumant herders and farmer herders took opportunistic advantage of dryland and wetland pasture as it became exploitable in different seasons of the year. Transhumant fishermen - the majority of whom are strangers to the Cercle - relied upon the great seasonal productivity of the lakes and floodplains in the falling water and dry seasons to make their living, and returned to their communities of origin with the onset of the rains.

All rural producers oriented their activities principally towards subsistence production during the growing season in the rains and the rising water periods, and more towards exchange in the remaining two seasons of the year. Revenue from cash oriented activities provided the means for growth and insurance against bad years, through investment in equipment, valuables such as gold, and livestock. Production for subsistence also contributed to insurance in this area of great climatic variability: producers who cultivated aimed to stock two years supply of grains rather than sell their produce on the market. Overall, for every production system apart from the transhumant herders, production for subsistence was more important than production for exchange.

By 1985-86 many of these customary insurance strategies had broken down, the resources rural producers depended upon had changed, and the seasonality of their exploitation had altered. Rainfed and floodfed fields were no longer the most valuable assets to farmers, and pasture resources were no longer the backbone of herder farmer's livelihoods. Both these groups had by now invested heavily

in goats, taken up trade in woodfuel, and intensified handicraft production, making the dryland and wetland forests the most valuable assets they exploited. Their millet harvest being far from sufficient to meet their needs, they had taken to gathering wild food from the drylands and migrating to the floodplains to collect wild grains and to take part in the rice harvest. In this process herder farmers came closer to being farmer herders. Rice fields were no longer the primary assets of farmer fishermen, rather the fish they caught dominated all other economic activities, so turning them into fishermen farmers. Like farmers and farmer herders they took up collecting wild food and migrating to outside harvests in search of grains.

Herders no longer spent half the year on the drylands but kept many of their animals on the floodplains all year round. They travelled shorter distances on transhumance and only spent 2-3 months outside the Delta, so making floodplain pasture their most strategic resource. Transhumant fishermen no longer depended on their cereal crop for their subsistence, and in many instances had ceased returning to their villages of origin: the value of the fisheries, particularly in the falling water and rainy seasons in the region, now made them the most valuable assets they exploited.

Of fundamental importance has been the shift away from production for subsistence to production aimed at exchange in order to generate cash with which to buy essentials - especially grains they were unable to gather, earn or cultivate themselves. Transhumant and farmer fishermen have turned almost exclusively to fishing to meet this need, farmers and farmer herders to goat herding, wood selling and handicraft production. Transhumant herders have been obliged to sell more animals and to exchange their dairy products for cash rather than through barter.

At the same time, the technical and physical attributes of natural resources in the Cercle of Youvarou have profoundly changed so that assets that were previously 'open' and 'restricted' have become 'restricted' and 'concentrated'. The growing exclusivity and divisibility this implies is particularly true for floodplain resources,

as dryland assets have become less exploitable due to the lack of water.

This study of the economic attributes of natural resources has enabled the major 'actors' involved in the exploitation of key assets to be identified. Their seasonal interests in utilizing resources have been demonstrated both in the yearly cycle of their economy and in relation to each other. Floodplain pastures and fisheries, as well as dryland and floodplain forests, have been pin-pointed as the strategic resources of the area and are used by groups of different producers who have varying stakes in their exploitation. The classification of these clusters of interests, coalescing around specific resources at particular times of the year, is the main contribution this analysis makes to the first part of the Oakerson framework. Further, it provides the context within which the tenure systems of the zone can be assessed.

Traditional property systems and the manner in which they allocated assets to different rural producers are the subject of the following chapter. The chapter will show, through an analysis of the 'decision-making arrangements' found in rural communities, how entry rights were allocated to members and seasonal visitors and how non-members were excluded. It will also demonstrate how there existed linkages between production systems that allowed rural producers practicing different livelihoods but sharing the same resources to allocate access between and within production systems exploiting the Delta.

## CHAPTER 5

## 5. COMMON PROPERTY IN THE PAST

The previous chapter has set out the value of resources to rural producers exploiting the Cercle of Youvarou, and has shown how they made use of floodplain and dryland assets to earn their livelihoods, in 'pre' and 'post-drought' periods. A central feature of the analysis was the identification of the strategic assets different production systems used during different seasons of the year. These resources had distinct technical and physical characteristics according to their seasonality and the agro-ecological areas they were found in. In broad terms the production systems using the Cercle of Youvarou had primary interests in three major resources: agricultural land, fisheries and pasture. The combined or exclusive manner in which rural producers exploited these assets depended upon the livelihoods they practiced. In the 'pre-drought' period the principal resources they exploited in the Cercle of Youvarou are shown in Table 9 on Page 167.

Table 9: Resources and their Use by Production Systems in the Cercle of Youvarou, in the 'Pre-drought' Period

Resource	Production System
Millet fields and floodpools	Farmers
Millet fields, pasture	Herder farmers
Dryland and floodplain pasture	Transhumant herders
Rice fields and fisheries	Farmer fishermen
Fisheries	Transhumant fishermen

Chapter 3 has shown how in the 'pre-drought' period the technical and physical attributes of these three resources changed through the year. The general argument was that while at two moments of the



year (the falling water and the dry season) fisheries and floodplain pastures became 'concentrated' this exclusivity rarely became such as to imply they were entirely 'joint': rather that resources that were 'restricted' and 'concentrated' in nature should be considered as those which had the attributes of 'common goods'. On the basis of this judgement, it demonstrated that agricultural land was a 'common good' for all the time that it was exploited. Floodplain pasture had 'common' attributes between January and March and was non-exclusive between April and May, while fisheries had common attributes between January and September, and were non-exclusive between October and December. Dryland pastures were non-exclusive over the whole period they were used.

This chapter sets out to 'fit' the attributes of these resources to the management and tenure systems rural inhabitants evolved in the Delta. In the past rural producers followed a set of clearly defined rules which governed both how they exploited resources in different seasons of the year and identified to whom they belonged. This chapter examines how these rules evolved historically from the 13<sup>th</sup> century down to the eve of independence in 1960. It demonstrates that local management regimes existed to promote the social and economic reproduction of the community and worked through a set of institutions that coordinated expectations of other producers behaviour. These communally-generated and administered rules worked to mitigate rural producers vulnerability to the vagaries of the climate through redistributive mechanisms, and assured them access to different ecological areas within the Delta and on its borders. The chapter will concentrate on the production systems of the Cercle of Youvarou.

While this section deals with an immense span of time, the salient changes that took place in property rules in the Delta were relatively few, and concerned a fundamental shift from the allocation of access based on kinship to one of allocation through political linkages. While this led to the establishment of a management system in the 19<sup>th</sup> century that attributed resources between and within production systems across the whole Delta, it contained the seeds of its later disintegration. The French colonial administration of the

Delta between 1893 and 1960 created the instruments of power and set the objectives of economic policy that have been maintained by the post-colonial state. They have undermined customary management regimes in the area, without replacing them with effective, alternative systems of control. The manner in which the post-colonial state has gone about dismantling local tenure systems, and the consequences of this policy, are discussed in Chapter 6.

The arguments presented here are structured by the 'decision-making arrangements' and 'patterns of interaction' categories of the Oakerson (1986) framework. The reader will recall from Chapter 2 that the former category deals with the incentives and penalties a management system generates in seeking to persuade its constituent members to follow communal regulations. It argues that entry and exit rules to resources should work to promote communal interests and that regulations should match the partially-joint and exclusive nature of the resources being managed, in line with their technical and physical characteristics. Further, it stresses the need for communal regimes to be supported by wider external institutions that promote the communal system of allocating access. These conditions inform producers' choice of behaviour as to whether they will support the communal system through 'reciprocal' strategies, or will take advantage of it through 'free riding' on communal rules.

The chapter is divided into two sections: the first covering the period from early history up until the turn of the century, which saw the evolution of progressively more comprehensive tenure systems culminating in the Dina state, and the second the period of French rule, during which customary institutions managing the access of rural producers to their resources began to be eroded.

## 5.1 From Early History to 1900

### 5.1.1. Fishing property rights

It will be recalled from the last chapter that fishing territories consist in areas of floodplain, secondary channels and pools, and low water 'reserves' in the main river courses. A customary fishing cycle can be presented as follows: as the water begins to rise in the Delta, fishermen set traps and block off the main secondary channels with barrages to exploit the movement of fish out of the main river to the floodplain. As water levels continue to mount producers follow the fish out onto the marshes, setting their gear near the leading edge of the floodwater where fish populations are most concentrated. When the flood retreat season begins, and sandbanks and islands are revealed by the shrinking water level, fishermen leave their villages and move into camps dotted over the floodplain, in which they cut channels in the marsh grass to entice their prey to where their gear is sited. Halfway through the falling water season fishermen return to their settlements, exploiting the secondary pools and channels once again. With the final migration of fish into the rivers (greatly increased in numbers after spawning on the floodplains) they concentrate their efforts on the main waterways themselves. With the arrival of the rains followed by the floodwaters, the cycle begins again.

Fishing was split in the year between individual and collective techniques. When the resource was spread over the floodplains at high water, and at the end of the dry season, fishing was practiced either individually or with two - man canoes; as fish concentrated in secondary channels and pools so more cooperative techniques were practiced, for the most part made up of harpooning and trapping parties, and through the exploitation of barrages built and exploited by whole communities. In the low water season collective techniques - often involving hundreds of fishermen from several different settlements - exploited 'reserves' in the main river, sited around 'holes' in its floor where fish congregated for refuge as the area of water shrank.

The oldest, or more 'archaic' forms of fishing were those practiced by the Sorogho, including a panoply of traps, harpoons and barrages intimately adapted to shallow water conditions and changing water levels. Their means of capture was akin to hunting, inasmuch as it relied on their specialist knowledge of where fish were to be found at different seasons of the year, and the nature of underwater topography.

The original Sorogho communities living on the 'Togguaré' of the floodplains each had a territory that incorporated these elements of the fishery. They were managed by a patrilineage, deemed to have founded the community and thus to own the natural resources by being the first comers to arrive (the Sorogho believe they spring from two great holes in the Delta). This lineage, known as the Kayama, was led by its oldest male member, who fulfilled the functions of 'master of the water' and who was, in effect, a resource manager. He (infrequently she) performed the sacrifices for collective fisheries: set the dates for when barrages should be put in place in line with water conditions each year, and the dates for when particular parts of the main river should be 'reserved' - i.e. not fished using collective methods, though individual means could still be utilized. In this manner fish would concentrate in specific sites in the river, near the 'holes', which would be exploited later collectively, at a date which the 'master of the water' would also set.

Masters of the water allocated fishing rights to individuals and households within the community with different levels of control depending on the season. At high water, when fishing was spread out across the floodplain, the master of water granted or refused access to his territory to outsiders but did not allocate specific stretches of water for individuals to fish in. An individual was free to fish where he liked provided he did not interfere with another persons' gear, either by placing his own in the same place, or in a place which directly affected another's catch (just upstream, for instance). In the seasons of collective fisheries the master of water was responsible for overseeing (or appointing a representative to control) its often complex operation, with each household within the community having its appointed place in the collective fishery

according to their position within the settlement's hierarchy. While in the high water season stranger fishermen merely paid a symbolic contribution to the master of the water for leave to fish, in the falling water and dry seasons they were expected to pay a third of the catch.

The authority of the elder of the founding lineage was absolute. He was greatly feared for his supernatural power, stemming from the belief that he had a close relationship with the water spirit of the zone (and each territory had its own spirit). Among the powers that were (and are) most often cited, was the ability to disappear into the water in order to converse with the spirit, and the power to intervene with the spirit to cause harm to a fisherman who did not obey the rules. The master of the water was the final arbiter for disputes within the community.

Not all fishing territories were composed of one lineage alone: evidence points, in richer fisheries and on the main waterways, to the settlement of several different Sorogho lineages on the same site. These new lineages either married into the founding lineage or were given permission to settle by the master of the water. Thus the characteristic structure of these communities consisted in founding lineages which provided the resource managers, consanguine lineages, and long-term residents who had been given permission to settle.

This basic fishing unit evolved over time towards a more complex system for the allocation and management of access, both through the implantation of new communities of fishermen into the Delta, and the assimilation of new producers into established settlements.

As has been already described in Chapter 3, the assumption of control over the Delta by the Mali empire saw the formation of Somono communities and their positioning on the main waterways of the zone. They were allocated water rights on the main rivers, and appointed 'masters of the water' to manage their fisheries, which they exploited initially with wide mesh nets made of 'Da' (Hibiscus

asper), fabricated by the whole community, and adapted to deeper water fishing than Sorogho methods.

Two fundamental changes in how fisheries were managed resulted: Firstly, there developed a distinction between the powers to manage and organise the fisheries and the ritual practices that surrounded their operation: a new function, called *Namu-tuu* came into being, responsible for the *sacrificial rites of a particular fishery* (Gallais 1967). Thus while the Somono were given the powers of 'master of the water' over their fishing grounds, the sacrificial rights remained with the Sorogho, and with the original heads of the patrilineages, who were linked with the water spirits of the zone. To what extent these new Somono fishing territories were based upon old Sorogho entities, and to what extent they were led by the original founding lineages that only called themselves Somono because of the change in their activities (from full-time fishing and hunting to part time fishing and river transport) and allegiance to the empire, is not known.

Secondly, the management of the fishing territory in the Somono grounds no longer depended upon kinship links to a founding lineage but to membership of a political authority, as part of a heterogeneous group of not necessarily customary fishermen (the Bobo and the Dogon who were assimilated into the Somono were cultivators from the borders of the Delta). The cohesiveness of communities living on the main waterways was political, and depended to a significant extent on the collective fishing techniques necessary to exploit the deeper waters. On the floodplains and in the remoter areas of the Delta (to which many of the Sorogho fled, according to one source, to escape the proselytising of the empire), more individual techniques were used to exploit the shallow waters, but the cohesiveness of society was cemented by kinship links to the Kayama lineage (Gallais 1967).

In the 19<sup>th</sup> century, a further layering of fishing rights took place. Under the Dina system, the fishing territories as they had existed since the empire were codified; inhabitants were obliged to settle down, or at least denote a settlement of origin, and the sites of

fishing barrages were recorded. At the same time new communities of Rimaïbé were implanted onto the floodplains, and given access to some dry season fisheries. These communities were less directly dependent on the fisheries - being cultivators first and foremost - and, like the Somono, owed their access to the resource to their political relationship with the Fulani pastoralists.

By the last part of the 19<sup>th</sup> century fishing communities were therefore either composed of Sorogho or Somono ethnic groups each with their own masters of the water managing defined territories, though sacrificial rights remained with the former, indigenous, inhabitants. Within these communities a master of the water managed the fishery. The structure of the community consisted of founding lineages, consanguine ones and later arrivals - 'strangers' who had been given permission to reside in the community. Added to these were seasonal visitors who came to fish in the area each year. Rimaïbé cultivators also had some dry season fishing rights.

The institution of master of the water worked through horizontal relationships of consensus between lineages having the same management system (i.e. other masters of the water) and vertical linkages of kinship and consanguinity based upon the pre-eminent right of the first comer. This system substantially constrained the ability of individuals to act alone, especially if their acts led to costs to other members of the community, through rules about where and how fishing gear could be used and the control over collective fisheries that were organised at certain moments of the year.

Remedies for the abuse of the system, as well as the capacity of communities to impose their will on potential 'free-riders' were administered through the authority of the master of the water, founded in the belief in his supernatural power. In Sorogho communities made up of one founding lineage, consanguine lineages and outsiders, 'veto positions' did not exist outside the founding line, and within that line the power of close kinsmen to the master of the water was advisory.

Jurisdictional boundaries between fishing territories were clearly set out, each master of the water, through his intimate knowledge on the topography of the zone, knowing precisely where the frontier to his terrain lay. Within the territory, smaller areas of floodplain, secondary channels and pools, and stretches of the main river were partitioned, in which certain types of fishing were allowed at particular times of the year. Within these areas fishing was managed in favour of jointness, either through the exclusion of outsiders, or the charging of rents (subtractive management), or by organising collective fisheries which were the most efficient means (in terms of productivity, as well as equity) of exploiting the resource (non-subtractive management). Entry and exit rules governed access to the fishery by outsiders, and the setting of dates for the beginning and end to collective fisheries.

Over the period under review here the most significant changes that took place in terms of how fishing communities managed their natural resources were in the field of their relationships to external structures. Originally the Sorogho were the sole exploiters of the resource and were able to act independently within their own territories. The Malian empire saw the imposition of control over the main waterways by an outside power, accompanied by the formation of a new group of fishermen with access to waters of their own, and the separation of sacrificial and organisational roles.

With the advent of the Dina in the 19<sup>th</sup> century a centralised administration covered the whole surface of the Delta. All production systems became subject to Fulani sovereignty, and a further group of producers were given access to some fishing rights. While Sorogho and Somono communities paid annual fees to the Fulani and provided them with water transport, they retained a measure of independence in how they organised production, in contrast to the Rimaibé who were entirely in their control. The significant changes lay in local communities legitimate use of force to police operational rules, particularly those of exclusion: whereas before settlements defended their access on the grounds of being the first comers to the area, now they needed the additional legitimation of support from the



Fulani - whose primary interest lay in pasture and grains, rather than fish.

### 5.1.2 Property rights in agricultural land

The customary means of allocating access to agricultural land will be discussed here in two different areas: millet and floodpool fields on the borderlands of the Delta, and rice fields in the farmer fishing communities on the floodplains.

In the more populated borderland areas in the north eastern sector of the Delta a complex farming system was practiced which, it will be recalled from the last chapter, produced both flood-retreat and flood-rising crops as well as dryland millet. As with other communities, originally the land belonged to the 'founders' of a settlement, those who were the first to clear the land in a particular locality and who had a particular relationship with the land spirit. Over time new settlers moved in (it is unclear in many areas of flood and dryland combined farming who the original ethnic group were): Marka in the 14<sup>th</sup> century, Sonraï in the 15<sup>th</sup> and Bambara in the 16<sup>th</sup> and 17<sup>th</sup> centuries and the Fulani in successive waves probably over most of this period, who were allocated land or took it by force. An initial form of land tenure thus existed in which the founding lineage allocated land to other lineages in the community, provided the 'master of the land', and collected rents from strangers who came to the area in search of fields to work. The master of the land equally distributed millet fields to herder farmers (who might be from a different ethnic group).

Early on two forms of allocation of cultivating land was practiced: that over dryland millet fields, and over rain and flood fed pools. The former was allocated to lineages within the community on a long-term basis. On the death of a lineage head his successor customarily was confirmed in his use of the same fields, although symbolically he needed to ask permission from the master of the land, and the fields could not be sold. Floodpools, however, were re-allocated more often both because of its greater value and because either repeated

innundation, or a long dry spell, destroyed the markers of where holdings were, and changed the site suitable for growing crops. This re-allocation was carried out by the master of the land using a customary measure, and according to the number of workers a lineage contained (local interviews).

From a comparatively early date this part of the Delta was influenced by the trading empires and later kingdoms that successively controlled the zone. While on the floodplains the reach of the Malian and Sonraï Empires was almost entirely confined to the main waterways, in the Guimballa political 'eminent' ownership of resources was present since the earliest times, as the area was administered by the Malian and Sonraï Empires, the Bambara kingdom and finally by the Fulani under the Dina. These administrations successively allocated land to their followers, and settlements paid a tithe in the form of a proportion of the harvest each year, to the authority in power.

Thus not only were these communities composed of mixed ethnic groups from an early period, and incorporated members of different production systems, but also the position of the master of the land as founder of the community lost its pre-eminent position based upon kinship and supernatural relations with the land spirit of the area.

Management institutions diverged at a fairly early date from fishing regimes, mainly in the manner that power was devolved onto component lineages that made up farming and herder farming communities. In contrast to the fisheries, relatively little production involved the coordinating of the activities of the whole community: the unit of production and consumption was the lineage, whose head held considerable independent powers to organise work parties, arbitrate disputes, decide on what crops were grown where and when, even to grant or refuse access to outsiders to his land.

Farming communities were less vertically stratified by relationships of 'founders', consanguine lineages and long-term resident outsiders, and the grouping of lineages relied upon political alliances expressed

in a council of elders that backed the power of the master of the land, whose position was rather more appointed than inherited.

The master of the land 'in', so to speak, the council of elders, nonetheless held some power to impose collective decisions on the community (e.g. when to clear new land), arbitrating disputes between lineages, overseeing the integrity of the communities' territory and in the frequent division of flooded agricultural land.

The successive control of wider political and economic entities was of fundamental importance in the enforcement of operational rules for the management of communal resources. The 'eminent' control of the north-eastern sector of the Delta by the Sonraï, Bambara and Fulani was decisive in who was appointed master of the land: to this day conflict and division within these communities over who is entitled to manage access to the settlements' land are linked to whom held power when, and their linkages to the present day Malian state.

In spite of the importance of external structures in the appointment of resource managers and the status of lineages within these farming and herder farming communities, they still administered their land as common property. They considered themselves to control a defined area consisting of woodland, millet and floodpool fields whose boundaries with neighbouring settlements were clearly marked. Within this area, zones were demarcated for millet production and for flood pool fields, and within each of these areas resource managers allocated assets: in the case of the flood fields on a frequent basis. Equally, masters of the water chose the timing and the site for clearing land when millet fields became exhausted (some communities claimed every 7-10 years).

The ability of individuals to act alone was constrained principally by the lineage head, and the capacity of a lineage to act alone was limited by other lineages represented on a council of elders. Clearly, in view of the disparate membership of communities, and shifting political alliances with external structures, the possibility of 'veto' positions existing within the decision-making structures of these groups was higher than within fishing settlements composed of

founders, consanguine lineages and resident outsiders. While this provided scope for internal dissent within communities over the allocation of assets between co-owners, members came together over the exclusion of outsiders, or the terms on which they should be allowed entry. Land that had either been rented or lent to strangers was maintained in that temporary status by the symbolic gift of a part of the crop to the master of the land each year or, if it had been rented, by the insistence on payment for the rent.

Farmer fishermen had access to rice fields in two ways: through the master of the water or through the head of the Fulani clan in whose area the fishing territory lay. It should be mentioned here that the farmer fishermen among whom this field work was carried out took up rice cultivation comparatively recently - in the middle of the last century, and most importantly after the 'Kitangal' drought of 1913-14 - before which they were primarily a fishing, hunting and gathering society.

In some cases the Fulani Dioro (see below) left the indigenous masters of the water to allocate areas for cultivation to their own people, but also implanted their own settlements of Rimaibé on the floodplains; in other cases they retained the right to allocate all land for cultivation in line with their interests in pasture. In the former case masters of the water allocated fields using a customary measure to the lineages of the settlement, demarcated the area in which crops were to be grown, gave access rights to newcomers, and carried out sacrificial rights on the land, so subsuming the right to allocate fields into his older fishing responsibilities. In the latter case these functions were initially in the hands of the Ardo, who delegated them early on to the Dioro (see below).

Gallais (1967) mentions an earlier form of allocation for rice fields on the floodplains practiced by the original cultivators of the zone, the Nono (who were not present in the Cercle of Youvarou). The master of the land in original Nono communities was analogous to the Sorogho master of the water: as the oldest member of the founding lineage, he was considered to have supernatural powers through his relationship with the local land spirit, and was responsible for the

allocation of fields between members of the community, authorised bringing new land into cultivation, arbitrated disputes, accepted or refused access to outsiders, and perceived rents. After the Mali empire extended its control over the Delta, and the Nono were joined by other lineages from outside ethnic groups, the position of 'sacrificer' over land uncultivated by them could be said to be comparable to what happened when Somono communities joined the Sorogho as fishermen, though in the case of the Nono, they were assimilated into a new social grouping rather than remaining a distinct and independent people.

Under this system Nono lineages in Marka communities were 'founders' and the oldest member of the original lineage was 'sacrificer' to the community, while one of the other lineages that joined the original settlement often performed the offices of master of the land. Each community had its own territory and lineages were apportioned fields within it, their use of these fields being sanctioned on the death of the lineage heads by renewal of their rights with the 'master of the land'. Strangers to the community were given access in return for the payment of some kind of rent. Within Marka society land allocated to lineages remained with those lineages for long periods of time: the custom of asking the master of the land for permission to continue cultivating the same field on the death of the lineage elder became a formality, and lineage heads were able to pledge or rent their own fields to outsiders.

Like the fishermen, the floodplain Marka were to some extent independent in their internal administration during the period of the Dina, though they paid a tithe in grain to their overlords. Though subdued by the Fulani, their mercantile traditions opposed them to the religious zeal of the Dina state which forbade usury and, it is said, led the Marka to become the focus of opposition to this theocratic administration (Gallais 1967).

### 5.1.3. Property Rights to Pasture

The inland Niger Delta provides some of the richest dry season pasture in the Sahel and it is significant that of all the production systems that use the Delta, it was the pastoralists who were the only group before the colonial period to unify the area into one administrative region. In terms of the evolution of property rights to pasture, the period before the establishment of the Dina system in the Delta can be characterised as the period of the Ardubé, the legendary shepherd guides said to have led the Fulani to the area. As has been mentioned above, the first Fulani began to arrive in the Delta in the 13<sup>th</sup> century, and progressively migrated into the zone in the next five centuries. Their primary place of settlement was the Macina region on the western borders of the Delta (Gallais 1967, Ba and Daget 1962).

At the outset the Fulani moved continually on transhumance. Access to pastures was through the clan head, the Ardo, who claimed direct male descentance to the founder of one of the four Fulani clans of the Delta: the Diallobé, Ouroubé, Fittobé or Ferobé. Their rights to pastures were seasonal: that is, when the floodplains were covered in water, rights to exploit the zone belonged to the Sorogho (later in places the Somono ) and the Marka, who considered the resources their property during this season. During the dry season the Ardo decided the dates of entry of herds into their pastures, perceived rents from and authorised strangers access to the zone, fixed the dates of exit. Access to pasture was therefore subject to kin links or to payment, and the Ardo was the sole authority empowered to grant entry. It would further appear (from oral accounts) that pasturing territories during this time were largely independent. While there were reciprocal rights to pasture, each territory was managed as an autonomous unit, and permission from the Ardo had to be sought each year for entry into his pasture.

As waves of migrants continued to arrive, and the Fulani began to intermarry with local people, a more detailed management system for pastures evolved. Settlements of Fulani were established in which the 'black peul' lived - known as Ouronké - within more closely defined

pasturing territories. At the same time their Ardo established farming communities of 'slaves' (the Rimaibé) to provide them with cereals. During this period (circa 14<sup>th</sup> to 17<sup>th</sup> centuries) power devolved onto two different groups within each clan: the Ardo, with overall power, but particular responsibility for the pastoral interests of the clan, and the head of the Ouronké, known as the diom-ouro or dioro for short, with responsibility over the cultivating communities and for village pasture land where milk animals were kept when the other herds were on transhumance, known as harrima (Gallais 1967).

The Dina system of the 19<sup>th</sup> century basically codified this system, but at the same time subordinated the independence of each territory to the collective interest of a Delta-wide state, and in so doing defined formal linkages between Fulani clans, and between other production systems using the area, where they had been few and informal before.

The major transformation brought about by the Dina was the forced sedentarisation of the Delta's inhabitants, and the definition of the resources they had access to. The way in which farming and fishing management systems were affected by the Dina have already been alluded to above. In the case of the pasturing resources, the Delta was divided into approximately 37 pasturing territories, known as leyde. These territories were for the most part allocated to their traditional Fulani clan managers, but with important differences as the power of the Ardo was broken by military force at the outset of the Dina. Former leaders of the Macina kingdom on the western border of the Delta were bereft of much of their power and settled at Ténénkou, on the Diaka River. In areas of the Delta where Fulani clans were animist (Dialloubé, for instance), pastures were given to religious authorities - marabouts - on the frontiers of the territories of these groups, as surveillance posts. In pasturing territories formerly managed by Ardo, Marabouts were often installed as political leaders, leaving Ardo lineages the responsibility of managing pastoral activities.

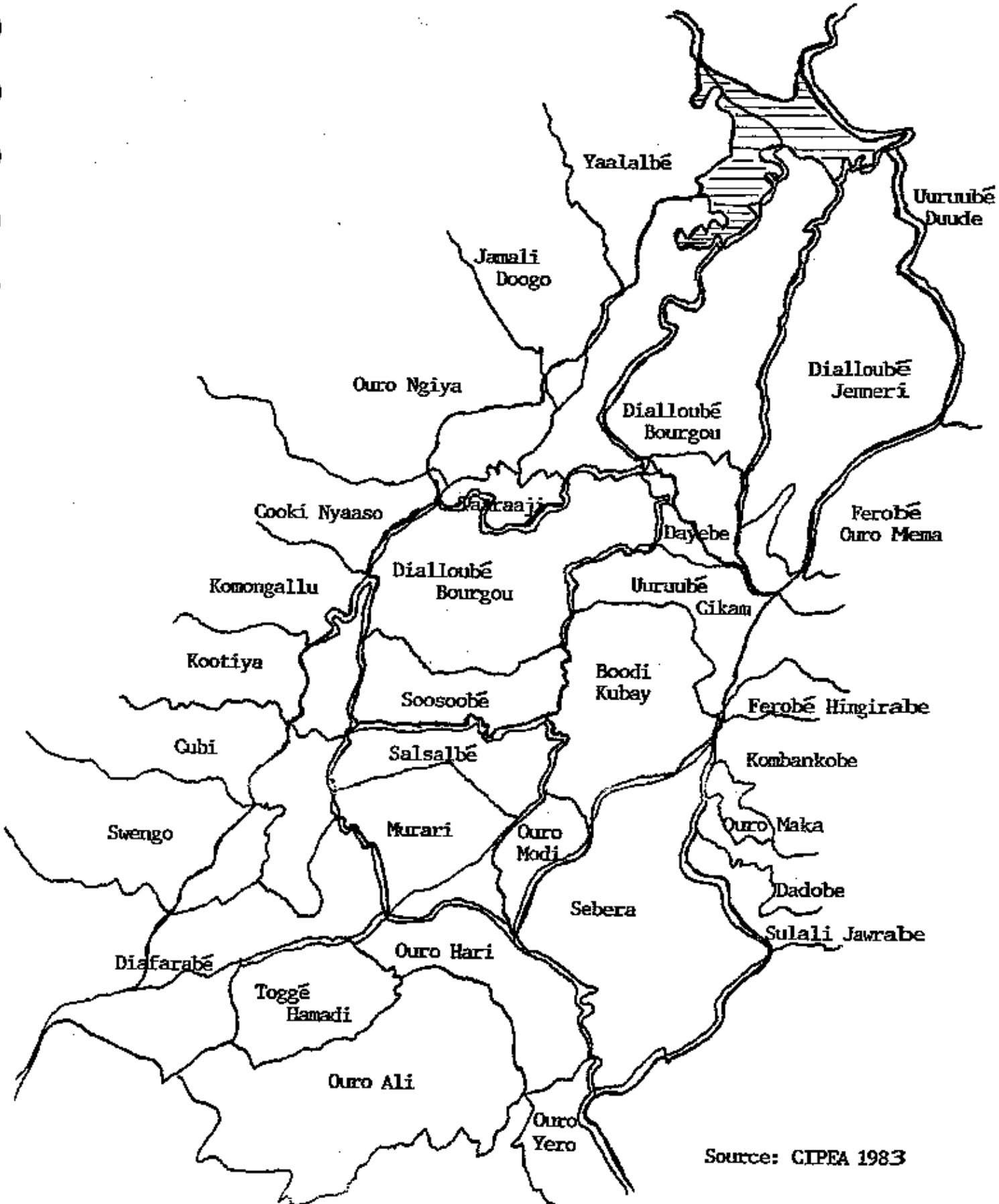
The Dina system codified the transhumant pastoral system in far greater detail than before. Routes into and out of the Delta were delimited; dry season itineraries on the floodpastures and camping sites were defined, and the membership of herd associations within clans for the dry season transhumant cycle were established. At the same time the dues payable by Rimaïbé to their masters were fixed, as were levies on independent farming and fishing communities. Rules governing the management of herding over the whole Delta were created: the order in which herds crossed into floodland pasture, and the places in which these crossings were to take place were fixed; pasture in the whole area was decreed open-access when the 'bal-mal' constellation of stars in the Islamic calendar appeared each year (mid-march).

Under the Dina system herds belonging to the same territory were divided into transhumant groupings known as Eggirdé (sing: eggirgol) (5-10 for the Leyde in the north of the Delta) with each Eggirgol (10-60 herds in each one) led by the head of a sub-lineage of the founding clan, the herds belonging to its constituent members. Eggirdé were created essentially as protective herding units against the depredations of the Bambara and Twareg found in the wet season pastures neighbouring the Delta, and formed up to leave when the rains started each year. Clan territories had reciprocal access agreements with other territories in the Delta, thus allowing clans from downstream pasturing areas access to upstream and central territories and vice-versa. Each territory had one - sometimes more - entry points (most often crossing points on a river, known as deggé). On their return from transhumance at the end of the wet season Eggirdé would form up in the waiting zones according to their access agreements beside the two great crossing points leading to the first pastures upstream to be revealed by the shrinking floodwaters. When the Dioro in the first territories gave the order, they moved into the pasture in strict sequence, with the owners of the pasture first, followed by the animals of other territories with whom they had reciprocal agreements, followed lastly by the animals of strangers to the Delta who had to wait for some days before they were allowed in. The Eggirdé of each clan, and herds within Eggirdé, moved into the pastures in a specified order.



At the end of a series of déggé as the waters fell, the herds debouched onto the lake beds in the north of the zone. Some three weeks after the last crossing, pastures all over the Delta became open-access.

Map 7: The Pasturing Leyde of the Inland Delta



Source: CIPEA 1983

The evolution of the Dina system can be seen as a shift of power away from permanently mobile groups (represented by the Ardo) towards sedentary communities (represented by the Diom-ouro and Marabouts), within a hierarchy that made the pastoral economy predominant over fishing and farming interests. For the first (and only) time in its history, the Delta was a unified state, divided into pastoral territories containing herders, dependent farmers (Rimaïbé), and more independent fishing and farming communities (Marka, Sorogho, Somono). Every square metre of the Delta and its neighbouring lands had an owner and manager. At the level of the settlement each community had its head, whether appointed politically (Somono, Rimaïbé) or through the kinship system (Sorogho). At a regional level the pastoral manager was the leader of the zone (again appointed through political or kinship systems), who represented the area at Hamdallahi; the capital of the Dina state.

At the outset of this period, access to pasture was through the Ardo, the head of the Fulani clan occupying a given independent territory in the Delta, much as access to fisheries and farming land was through the masters of the water or the land. The presence of the herders on the floodplains was ephemeral, as the entire pastoral community moved with their herds.

As the Fulani increasingly colonised the zone, they took up more permanent residence on the floodplains. By the 18<sup>th</sup> century the Fulani controlled access not only to pasture during the dry season, but to wet season pasture (the Harrima) in areas the floodwaters did not reach on the floodplains, and to the rice fields of their cultivating slaves, the Rimaïbé. The management of the herding territory on the floodplains became increasingly the responsibility of the Diom-ouro, based in a floodplain village, who monitored the area while the herds were away on transhumance, both in the interests of cereal and of pastoral production.

With the advent of the Dina, the power of the sedentary Fulani authorities became more important, at the same time as the independence of herding territories was subjected to the interests of

the Dina state, extending over the entire Delta. At this point, a new manager appears: the Marabout to whom pastures were allocated. Through the Marabout and the Dioro, the state drew revenue from its component parts in order to maintain a standing army, police transhumant routes, and administer its territory. As mentioned above, in line with this centralisation of political authority a number of rules were elaborated covering access to pastures over the whole extent of the floodplains.

Between the 14<sup>th</sup> and the 19<sup>th</sup> centuries common property in pasture on the floodplains was clan pasture managed at first solely by the clan head, the Ardo, later by both Diom-ouro and Ardo, incorporating cultivating areas which were the collective property of the clan. Under the Dina three forms of collective property existed: *beit-el*, basically state land, either administered by Marabouts, or directly in Hamdallahi's interest, and which included property of those who died intestate as well as resources allocated for the payment of administrative costs by Hamdallahi. Village pasture for the provision of feed to milk herds left behind when the others were on transhumance (*Harrima*), cultivating land, and collective pasture of the clan reserved for transhumant herds' use were managed by the Diom-ouro.

It can be seen that in its early form the management system of the Fulani pastoralists in the Delta approximated in many respects those of the master of the water and master of the land. The Ardo, and later the Ardo and the Dioro acting as 'founders' administered entry and exit rules to the clan's pastures, which they managed to promote jointness through setting dates for access, partitioning areas for cultivation, and controlling the entry of strangers. The pasturing territories of the Delta, apportioned between Fulani clans, had clear boundaries, and were managed as discrete units.

By the end of this period the autonomy of the Leyde had been subjected to the Delta-wide administration of the Dina state. Clans opposed to the Dina were subdued by force and state officials - Marabouts - appointed to run them. While broadly speaking customary rules of access were maintained under the Dina system,

and everyday management was still carried out for the most part by traditional managers (who had not opposed the Dina), the ability of a Leyde to act alone was circumscribed, the final remedy for abuses now lay with Hamdallahi, and the state held at least 'veto positions' on decisions made by local managers.

Moreover the Dina in several significant respects administered the area in favour of the jointness of the collectively of the Leyde rather than for any particular territory. This was managed through the maintenance of a standing army to protect the states' boundaries paid for by fees and taxes levied on each territory, and the organisation of defensive groupings of Fulani herds (Eggirdé) while animals were on transhumance in the drylands. Further, the codification of fishing, farming and herding territories and the establishment of 'state' land (Beit-el) provided a comprehensive set of rules for access to resources in the Delta, while defining the boundaries of each territory more closely than ever before.

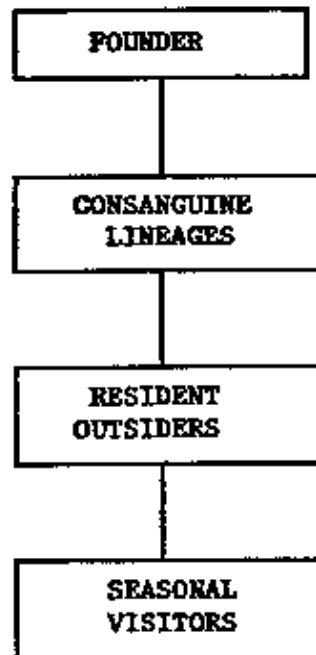
#### 5.1.4. The evolution of management regimes.

The foregoing discussion allows the evolution of management systems in the Delta until the end of the 19<sup>th</sup> century to be characterised as a three stage process, in which progressively more complex and comprehensive systems took over the control of access to the natural resources of the area. In this process, while agricultural land, fisheries and floodplain pasture all remained as common property, both new users and new managers appeared and an important division evolved between communal and state property. For the sake of clarity the three stages are presented below as discrete entities, but it should be borne in mind that their evolution took place neither uniformly nor at the same time in the production systems of the Delta.

The basic building blocks of common property management systems in the Delta are composed of the oldest and simplest structures of

communities that first inhabited the zone, and can be presented schematically as:-

Figure 44: The Original Management Hierarchy of the Delta



Allocation of resources within communities was based upon kinship, consanguinity and long-term residence, which assured users access to income streams commensurate with their status. Founders and consanguine lineages received preferential access to resident outsiders who in turn had better access to income within their adopted territory than seasonal visitors to the zone, who often paid a form of tax or rent in order to qualify for entry. The supernatural power of the manager (Master of the Water/Land, Ardo) provided a powerful additional incentive for individual users of the resource to cooperate, which underwrote links of consanguinity and kin, which in turn was legitimated by one of the most pervasive principles of natural justice found in ancient societies - that of the right of a first comer to claim 'ownership' over a resource. Within the community the consequences of breaking the rules thus meant going against a set of interlocking and self reinforcing beliefs, threatening sanction from the supernatural spirit on the one hand and expulsion from the community on the other, which would almost

certainly mean a dramatic loss of access rights to resources through loss of status.

Between communities reciprocal institutions existed which acted as essential insurance mechanisms against failure of production within their own territory. Seasonal visitors to settlements were granted access to resources if they came from neighbouring areas often free, or for a 'pepper corn rent', while those from further away, or those who arrived for the first time, had to pay higher amounts. The valuable flexibility this gave to rural producers facing uncertain climatic conditions would be denied to them if they broke these access and production rules. Within communities redistributive mechanisms further provided insurance against failure: rents and taxes generated from welcoming seasonal visitors to the communities territory each year were used for social expenses (marriages, festivals, hospitality to visiting dignitaries), and were also distributed to those in need within the settlement. Among pastoralists extensive sharing and gift mechanisms allowed herders to rebuild their stocks after bad years.

In the context of the natural resources examined in Chapter 3, and their economic value reviewed in Chapter 4, it can be seen there existed a 'congruence' between their physical and technical characteristics in the 'pre-drought' period and the 'decision-making arrangements' and 'patterns of interaction' that governed their use. Fisheries, while being communally owned throughout the year, were managed with different degrees of control in the successive seasons of the year in line with their exclusive and joint characteristics. In October to December, in the high water season, access to the fishery was freely given while the resource was spread over the floodplain. In the falling water season, as fish congregated in the secondary channels, the first collective fisheries were organised by the masters of the water, and in the dry season productive activities were rigorously controlled by the resource manager when the great collective fisheries took place. Barrages and other forms of communal production were equally monitored by the masters of the water as the waters rose once more.

With regard to the resources found on the borders of the Delta and on the drylands, management systems were confined to those resources in more restricted supply and which provided the basis of subsistence and exchange, particularly over the floodpools. Dryland pasture, extensive and non-exclusive in nature, attracted little or no control, while access to floodplain pasture was allocated among co-owners, particularly in the falling water season when the retreating floodwaters revealed limited quantities of valuable green grazing.

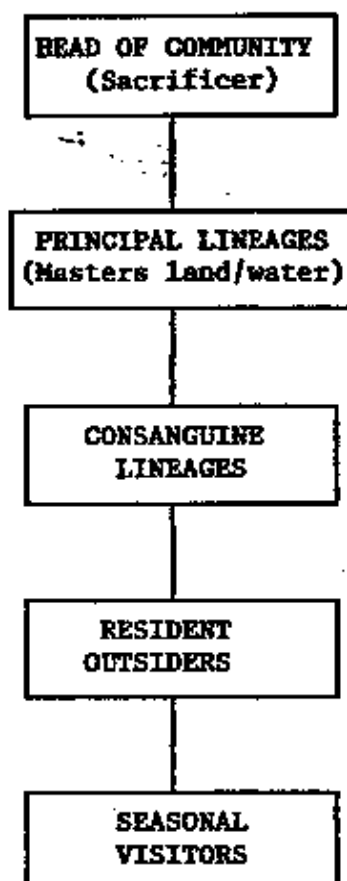
At a later stage in the history of the Delta a more complex structure evolved among communities, as new producers occupied the zone (Marka, Somono) and wider political and economic structures (Mali and Sonraï Empires) impinged upon the local management and allocation of resources.

This development saw a move towards a more political management of access to resources with a set of principal lineages taking over the day to day management, while the position of sacrificer was held by the original first comers. Field work would seem to indicate that this position evolved into a political appointment made through consensus between principal lineages and the wider social and economic structure, the eldest male members of these principal lineages forming a council of elders that handled most operational issues that arose.



This can be presented schematically as:-

Figure 45: The Evolved Management Structure in the Delta.

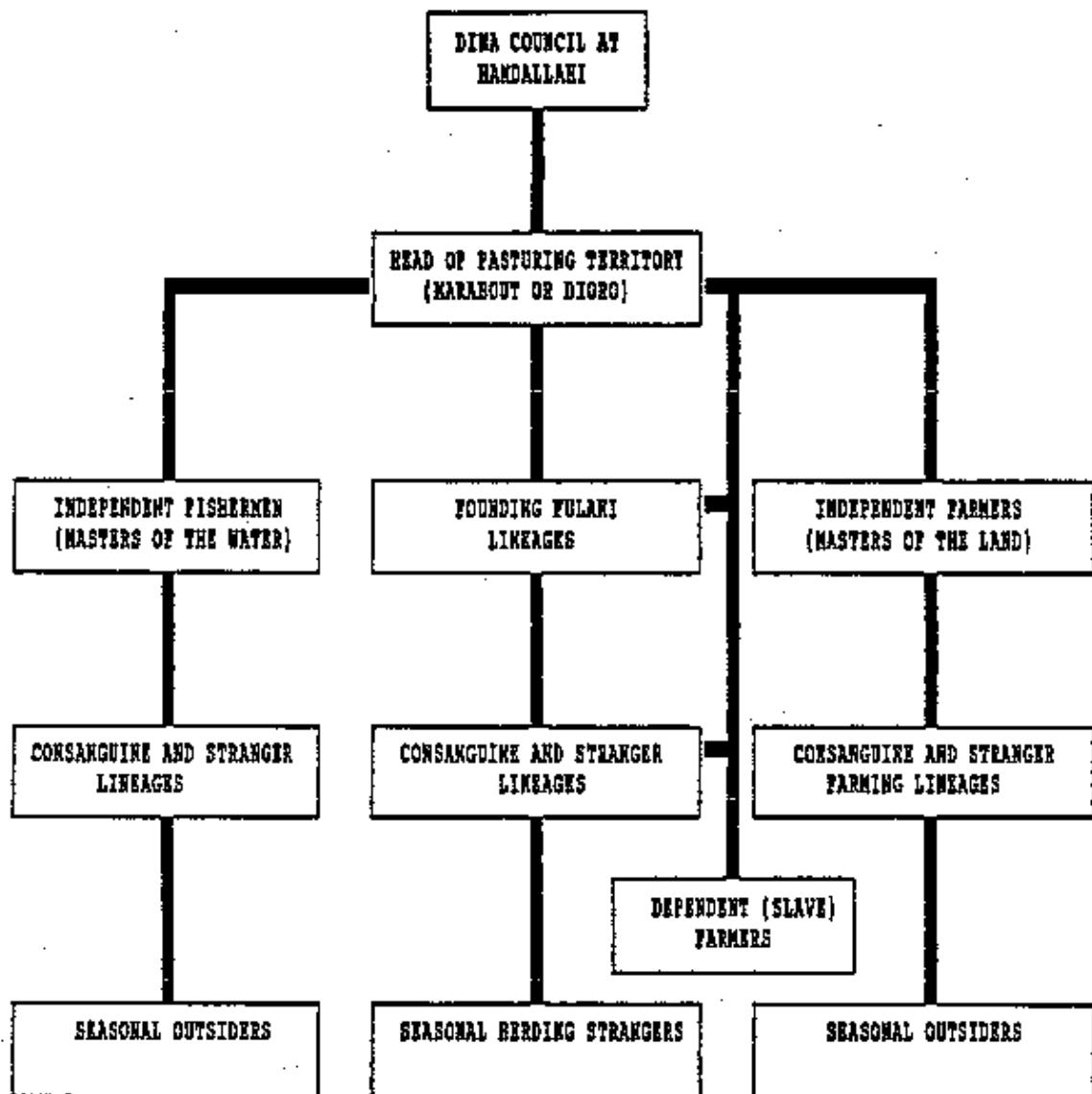


Within these communities lineages became the main allocators of resources, though the chief retained powers to admit seasonal strangers and, in areas of flood and dryland cropping, to re-allocate flooded resources. Redistribution of revenue from rents paid by seasonal outsiders was used communally as in the older system, though revenue from resident outsiders allocated resources by principal lineages in farming and herder farming communities in their own right remained with them. Reciprocal access to resources in other communities remained at the level of the village chief. Within lineages many of the same incentives to cooperate and deterrents to 'free-ride' that existed before remained, though the pagan beliefs in water and land spirits were losing ground to religious authority as the region increasingly fell under Muslim influence. The principal

lineages within the community provided not only the village chief (possibly the former sacrificer) but also the community's Imam: indeed it was not uncommon to find all three positions held by the same individual.

An important development during this period was that major disputes between lineages and their retinues could now be referred to an outside third party, in the form of the head of the community, and disputes between principal lineages themselves could be referred to an outside political and economic structure, which could also allocate resources to producers, as well as veto decisions made by individual communities. This 'opened' some degree of management of entry and exit rules to wider powers and saw the nascence of state property in the region. The great bulk of operational rules governing the management of communal resources remained however, at the level of the community, for the trading empires controlling the area up until the 19<sup>th</sup> century were concerned with river transport and commerce, and therefore were not directly involved in production in the region, so that their influence extended little further than the main waterways of the Delta.

With the advent of the Dina the management of access to communal resources in the Delta was subordinated to the pastoral, Islamic interests of the Fulani rulers. The Dina system brought the progressive integration of resources into a larger management regime - that had been evolving for some time - to its greatest point of incorporation, linking pastoral, agricultural and fishing activities across production systems and ethnic lines, and can be presented schematically as in Figure 46 on Page 194.

Figure 46: Political and Administrative Structures in the 19<sup>th</sup> Century

Over the whole extent of the Delta and its borders the relative autonomy of herding, farming and fishing groups was replaced by dependence on the Dina state. While on the one side this undermined local managers final authority to manage resources in the interests of their single community, introduced a new set of managers (Marabout/Dioro) who had the power to override community decisions, and implanted new producers into the area with access rights (Rimaïbé), on the other hand the Dina system imposed a set of rules on local producers which provided clear jurisdictional boundaries and a series of rights as well as duties they had to

fulfil. This provided a consistent set of regulations concerning access to resources within which local communities operated, and provided a remedy for the abuse of these rules in the last resort through the maintenance of a standing army by the Dina state.

As a general principle, where the Dina was not opposed, it administered its territory through customary authorities, that is, the heads of communities, sacrificers and councils of elders that already existed on the ground. These communities' ability to accept or refuse seasonal visitors, and charge rents to outsiders which were redistributed through the settlement, reciprocal access to other areas of the Delta, and rules of distribution of resources within the community were largely unaffected, and thus the 'congruence' between physical and technical attributes of resources and local management regimes remained operational. Indeed, in defining which resources belonged to whom, and when, in a more detailed manner than before, and in policing this system, the Dina clarified the boundaries of communal resources. In many ways this provided opportunities for reciprocal strategies between production systems that had not existed before, when jurisdictional boundaries between communities were based, in effect, on their ability to use force. In sum, the Dina provided a measure of the 'mutual expectations of positive performance' (Oakerson 1986) through institutions that coordinated expectations of other producers behaviour, which were the foundations for reciprocal strategies that promoted the social and economic reproduction of rural communities in the Delta.

#### 5.2. The Colonial Administration and the Monetisation of the Economy: 1900-1960

It will be recalled that the last four decades of the 19<sup>th</sup> century saw the Delta consumed by internecine warfare between the Macina and Toucouleur Fulani, that only ended with the arrival of the French in 1893. During this period thousands of Delta inhabitants were forced to move out of the floodplains because of the scorched-earth nature of the conflict, and many of them were settled in the Kounari, on the eastern borders of the Delta.

With the re-imposition of peace by the colonial authorities these people moved back onto the floodplains. Fieldwork in the northern sector of the Delta indicates that while the majority of rural inhabitants returned to settlements they had occupied before conflict broke out, there is evidence that some producers from upstream areas joined communities in the northern sector when they moved back into the Delta, often as a result of alliances built up while they were in exile. These newcomers joined their new communities as lineages of resident outsiders.

As a general rule the French accepted the boundaries that had existed under the Dina system, and administered the Delta through a set of Cercles (Issa Ber in the north, Macina in the west, and Mopti), divided into 'Subdivisions' (Macina, Tenenkou, Mopti, Djenné) and, at the lowest level 'Cantons' (about 35 in all). While the Cercles and Subdivisions included territory the Dina system never governed, the Cantonnements in the Delta broadly reflected the centres of local power in the 19<sup>th</sup> century. From the point of view of local producers the hierarchy of power remained for the most part the same up to the Subdivision level: that is, local independent masters of the water, land and village chiefs liaised with the 'Chef de Cantonnement', who looked in turn to the head of the Subdivision and the Cercle. Generally, the heads of Cercles and the Subdivisions were expatriates; those of the Cantonnements traditional chiefs. By way of example, in the northern sector of the Delta, in the present day district of Youvarou, local communities were administered by the Cantonnement of Tiouki, which had been the seat of local administration for the Dina system. Under the French, the head of the Cantonnement reported to the expatriate Commandant de Cercle at Niafunké (there were no Subdivisions in this Cercle).

While the French accepted in some measure to rule through indigenous structures, the centralised power of the Dina system, based on Hamdallahi, was dismantled. Of great symbolic and some economic significance was the formal abolition of the status of 'slaves' negotiated between the French, the Dioro and Ardo of Macina and the Rimaïbé in 1903. Reports from the time speak of thousands of

Rimaïbé leaving their original settlements and moving to other communities after the treaty was signed (Gallais 1967).

#### 5.2.1. Colonial land tenure law

Though customary managers were left in place by the colonial authorities, their ability to enforce access rights and to manage the full range of resources they traditionally presided over were significantly undermined by the French, whose policy with regard to land rights was to lead directly to the insecurity of tenure that characterises the region today. In a similar manner to many other colonial regimes in Africa, the French were convinced that land left under long-term fallow, and other resources only used seasonally (interstitial areas between neighbouring communities) were being under-utilised, and could be more productively developed. In line with the practice in their own country, the French believed the best means of bringing this about was to allocate what they termed 'vacant lands' to individuals as private property. In order to be able legally to do this, the French state had to own these resources. Thus, in 1904, the French colonial administration brought in legislation that decreed that all vacant lands were henceforth the property of the state (*domaine privé de l'état*). In 1935 this was reaffirmed by a decree whose first article included:

*'En Afrique occidentale française, les terres vacantes et sans maître appartiennent à l'Etat..... Il en est de même des terres qui, ne faisant pas l'objet d'un titre régulier de propriété ou de jouissance par application ..... sont inexploitées ou incultées depuis plus de dix ans.'*

[AOF 1925]

(In French West Africa vacant land, and land left without a master, belong to the state.. the same status will apply to land which has no clear title of ownership...and which has remained unoccupied or unused for more than ten years)<sup>6</sup>

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6 My translation.

In a second step, the same decree set out the terms and conditions by which concerns or individuals could gain title to this state land, including drawing up a detailed plan of how the concession was to be developed, how many people would be employed on it, who local people living on the concession were, the areas to be set aside for their crops etc. (article 5). When the administration deemed the work to be carried out under the development plan completed, the concession became the property of the owner.

For land already in production and subject to customary control, the colonial administration allowed a looser form of registration whereby rural inhabitants could make an oral or written request to local administrators claiming title to resources. If as a result of a public meeting, and at the end of a three month delay no-one had come forward to oppose the application, the administration issued a 'livret foncier' establishing the claim, though it did not have full legal sanction (Decree of the Minister for the Colonies, 8 October 1925).

The effect of this legislation was to set up two parallel forms of land tenure: the one customary, governing areas under continuous production (as defined by the French), and managed by customary authorities; the other written, conceived as being 'progressive', covering vacant lands to which private title could be gained sanctioned by colonial legislation and law. This distinction was informed by a Eurocentric notion that 'vacant land' encompassed land that was not cultivated (including fallow land that had been left to regenerate for longer than ten years), and thus, with regard to the resources under study here, embraced forests, fisheries and pastures. It will be shown in the following chapter that this interpretation has been explicitly adopted by the post-colonial state, which has nationalised these assets.

With regard to resources of particular importance to the colonial state (whether or not they were in continuous use by local people), they were simply taken out of rural producers hands. In particular this was true for some forests - to provide fuel for the Dakar-Bamako rail link, and steamboats plying the Niger - and the major waterways, which were placed under the control of the Waters and

Forests Agency (*Service des Eaux et Forêts*) created under the tutelage of the Agriculture Service in 1935, and made an independent technical arm of the colonial administration in 1938. Although the range of their activities before independence was very limited (surveillance of classified forests and management of woodfuel depots on the steamship and rail links), they nonetheless formed the nucleus of what was later to become the most important agency of the post-colonial régimes' environmental department, and established the principle that their personnel should have para-military status: the first African foresters were recruited from demobilised troops of the colonial army, and policemen taking up retirement (*République du Mali et Confédération Suisse 1987*).

While on the surface this dual legislation seemed to offer some guarantee to customary rights of access to resources (because it was only land that was empty and without a master of the water/land/village chief that became state property) in practice it took away from local communities ability to control access to and management of the resources they customarily owned. Until 1955 it was the responsibility of local people to prove they had customary title to resources (and the criteria acceptable to the colonial administration as proof of title were not made explicit), rather than for the administration to prove they were vacant. Moreover, there was no wish on the part of colonial administrators to take on the additional work of hearing claims to customary title (under the decree of 1925, see above), and the argument was often advanced by them that it was technically impossible to register the claims of people who were not covered by the French Civil Code: legally, local producers were not French citizens.

Local producers - certainly up to the master of the water/land/village chief level - remained largely ignorant of these legislative measures (as they remain about land tenure legislation to the present day), but were also suspicious of the colonial regime, not least for religious reasons. It was generally held in the Delta that the French were 'infidel', and that contact with them, particularly with regard to the schools the colonial authorities were endeavouring to set up, was contrary to Muslim religious belief. The



structure of power that had existed under the Dina was also transformed by the French policy of working through the 'commandement indigène' by which they considered cantonnement chiefs not as representatives of local communities with whom the latter had kinship and historical links, but as arms of the colonial administration, almost as French civil servants. They thus became the creatures of French rule and were seen to be principally useful for forced-labour recruitment and the collection of taxes, in the process becoming identified in local producers eyes, with the most disliked sides of the colonial administration (Jones 1976).

The 'dialogue of the deaf', that characterised many of the relationships between local managers and the colonial state went far beyond leaving Delta inhabitants alone to organise production as they customarily were used to do. Of seminal importance for the future was the fact that the final arbiter of disputes was now an entity that was foreign to the Delta, and to the region as a whole, whose primary objective was to extract revenue (taxes), goods (rice, wool, hides etc.) and services (military personnel) for the colonial state (see below). Whereas under the Dina system the area was administered by a political and economic structure based upon the Delta and rooted in its history and customs, the French administered the zone as one small (and fairly unimportant) part of Afrique Occidentale Française (AOF). Of real practical importance was the separation of resources into those managed and owned by the state, and those remaining in local peoples hands, which led to some local communities, and groups within settlements, having a vested interest in promoting state ownership over customary rules, as this afforded them new access to the more productive resources denied them under the former system.

The colonial state actively intervened in re-allocating resources under customary management in two important ways in the northern sector of the Delta. As a consequence of the 'Kitangal' famine of 1913-14, colonial administrators perceived a need to restrain production on certain resources during the high water season and for part of the falling water period (November-January) so that they would be available in greater abundance to take rural producers

through the dry season each year. In the case of the fisheries fieldwork has revealed that in the northern sector of the Delta cantonnement chiefs, working on the orders of their French superiors, set up a series of 'subsistence zones' and 'reserves' on the main watercourses. The former could be exploited continually, while all fishing in the latter was prohibited for two or three months in the falling water season, before being thrown open at set dates between February and April.

This both transformed and paralleled a customary 'reserve' system practiced by the Sorogho masters of the water in the area. Customarily a ban on the use of senne nets extended over the whole river in a particular masters' territory beginning when the waters began to rise (July/August) through to the falling water season (7-8 months). Other forms of fishing (including harpooning, trap fishing and gill net fishing) were however allowed. On a given date the master of the water would declare the river open to collective fishing and invite outsiders (many of them Somono, who specialise in senne net fishing) into his territory in return for a third of the catch. Collective fishing concentrated on 'holes' in the river bed in which fish had taken refuge as the water levels shrank.

The system introduced by the French made three fundamental changes to customary access rules. First, it divided the main river into two different parts and applied restrictions of use only to the reserved area, which were sited at the 'holes' mentioned above. Second it sought to exclude exploiters entirely from reserved areas rather than control the rate of exploitation through bans on equipment and technique. Third, and most importantly, colonial rules did not differentiate between fishermen, and in particular between strangers and host communities. This was understood by stranger fishermen to give them a right of access both to subsistence and reserved areas beyond that accorded them by the master of the water.

A more far reaching intervention concerned the pastures, as colonial administrators considered the downstream grazing lands around the lakes as a strategic reserve for cattle when pasture in other areas of

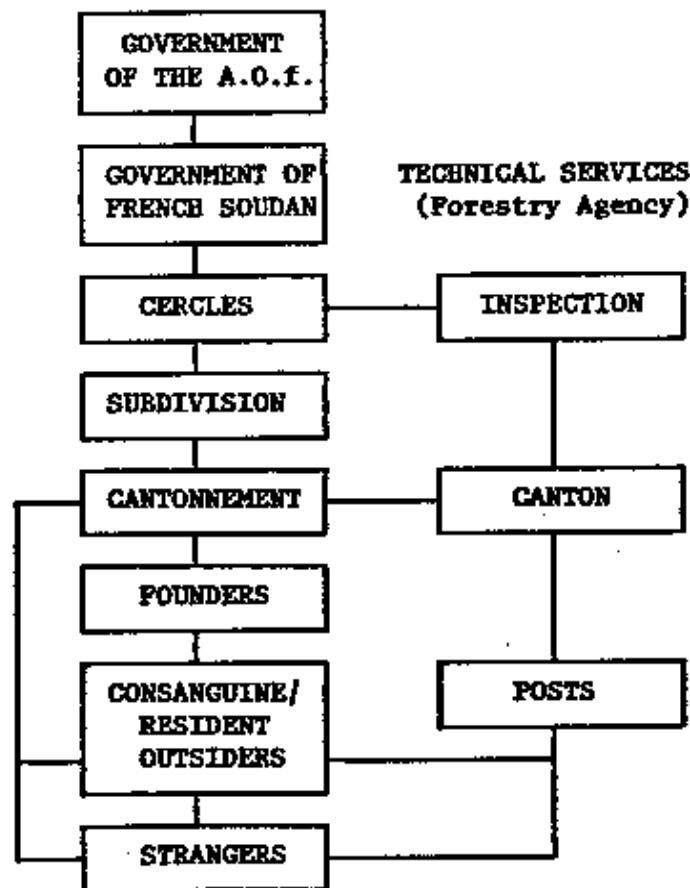
the Delta had dried out or been eaten, and that premature entry into these pastures would jeopardize the ability of livestock to survive at the end of the dry season, particularly in drought years. During the colonial period the first elements of a system were put in place whereby the administration coordinated and fixed the dates at which animals entered the different pasturing territories of the Delta on a broad axis south-west to northeast as the waters fall, in conjunction with the local Dixo. The object of the intervention was to stagger the crossings in such a way that livestock could be retained in the central area of the Delta until well into the falling water season (March-April), so that when they arrived on the floodplains around the lakes, there would be sufficient pasture to take them through to the onset of the rains, when they could leave on transhumance once more. The means adopted to achieve this was to set the dates of entry of some thirty principal crossings that traditionally controlled access to different territories.

Once again, the French attempt to manage these crossing dates paralleled the customary system, though its effect was not in the short-term to transform the system as their intervention in the fisheries had done. According to herding managers in the Youvarou area its principal effect was to take away from the autonomy of each territory, as under the Dina system each Leyde had decided individually as to when entry to their pasture was to be effected in line with pasture conditions each year: they informed their neighbours and the other clans with whom they had reciprocal access agreements to be sure, but they were not bound to link their dates with those of the others. The French initiative attempted to unify this system, so that the delays between crossings were fixed, once the initial date of entry at the upstream end of the Delta had been decided.

Thus access to resources now became possible by two means: either the customary way, through linkages of consanguinity, long-term residence or habitual seasonal right, or through direct connections to the colonial structure incorporating both technical and administrative arms. Rules for entry to state land relied on criteria foreign to customary institutions: commercial importance, education in

the French system, taxation. As Figure 47 on Page 203 shows, this broke the chain of command that had existed under the Dina by which access to resources depended on the relationship of an household to the founding line of a community. In this situation the capacity of a customary manager to impose a collective decision over all other users and to enforce entry and exit rules - especially with regard to strangers - was weakened by the presence of a substantial 'veto position' held by the colonial administrator who could call on considerable force in extreme cases to back his decision. Formerly subservient components of rural communities could appeal directly to this wider structure which, from the Subdivision level up, was staffed by personnel who were entirely strange to the area and whose knowledge of local customs and history was perforce minimal. A detailed account of how subordinate groups have forced access to resources through state institutions will be presented in Chapter 7.

Figure 47: The Colonial Administrative Structure



### 5.2.2. Disinvestment and the monetisation of the Delta economy

The factors underlying the emergence of local interest groups intent on using the colonial administration as a means of forcing more preferential access to productive resources denied to them before, owed much to the progressive economic links established during this period between the Delta and the outside world. In 1904 the railway from Senegal reached Bamako, connecting the Niger in effect to the sea, and European merchants were soon looking for a trading base in the Delta. Early on Mopti - until then a fairly unimportant fishing and herding settlement involved in some trade with Djenné - attracted their interest due to its strategic position on the confluence of the Niger and Bani rivers, its accessibility to Bamako by steamboat for 6-7 months of the year, and its communications with downstream areas (Gao, Tombouctou) and the Diaka river on the other side of the Delta. Between 1905 and 1910 its strategic importance was further underlined by the construction of an all-weather road across 10 kilometres of floodplain to link it with the mainland and the network of roads extending south to present day Burkina Faso and to the west and east. Between 1910 and 1924, using forced labour, the French built a stone port joining the three islands that made up the settlement, thereby providing the foundations for the future capital of the region (Gallais 1967).

The seeds of what was later to become an increasingly exploitative economic system were sown early in the 20<sup>th</sup> century and were actively promoted by the colonial authorities. Between 1900 and 1950 the area was thrown open to a trade that was basically extractive in nature. In a first period extending to 1930, European trading houses with representatives in Mopti bartered manufactured goods for rice, leather hides, wool and some gum Arabic. Demand for Delta products came from Europe (leather, wool and gum Arabic), and the coastal regions of the AOF, in particular for the rice which made up the bulk of trade (in 1910 nearly 1,400 tons were exported) with Senegal. The European slump of the 1930s combined with the arrival of rice from Indo-china on the coast, and the first years of rice production from the Office du Niger severely affected this commerce, leading to the departure of some European traders from the zone.

Two examples of how this barter trade degraded resources in the Delta are provided by Gallais (1967). At the beginning of the century the demand for egret feathers to supply the salons of 'La Belle Epoque' in France induced traders in the Delta to hire hundreds of hunters to kill these birds (Mopti and Djenné exported 750 kg of feathers in 1905). By 1907 they were becoming so rare that hunting was banned. Traders responded by setting up reserves for these birds in order to exploit them more sustainably, but by this time fashions in Europe had changed, and this line of trade was discontinued. Secondly, part of the reason for the decline in traffic in gum Arabic in the '30s was due to a fall in supply, directly linked to the cutting of the Acacia trees that supplied the gum where they were found close to the main waterways, in order to fuel the steamboats (owned mostly by European merchants) to take freight to Bamako.

Between 1930 and 1940 the fish trade became the most important commercial activity in the Delta based on demand from the coastal regions of the French Soudan and from the British colony, the Gold Coast. During this period sea fishermen and merchants from these regions began to appear in Mopti every year to take part in the collective fisheries between January and July. They either hired or owned trucks, and reports from this time estimate that during the fishing campaign 5 tons of processed fish a week were leaving the town for the south. Later they were joined by Lebanese merchants, many of them based in the present day Ivory Coast, but in 1940-41 with the outbreak of war in Europe, fuel and spare parts became scarce, and this trade declined.

Commercial relations in the early years of the '40s were dominated by the European war. Forced recruitment was introduced to provide troops and rice was requisitioned - 11,500 tons in 1945 - for export to Senegal.

For Gallais, the period 1900-1945/50 was characterised by net export from the Delta culminating in economic stagnation. European and other traders (many Lebanese) repatriated their profits, while the level of investment by the colonial administration was both well below

what was exported, and below the level of taxation exacted from the rural population. The 'Kitangal' famine of 1913-14, the continued threat of its reappearance up until 1922, the European depression of the 1930's and the repressive regime of the war years combined to create deep-seated feelings of distrust between the rural population and the colonial administration. The boom-and-slump nature of barter trade between European merchants and local producers, low and uncertain productivity, and the withdrawal of expatriate firms, left rural producers involved in commerce only insofar as it paid their taxes, with money scarce, many transactions still carried out in cowries, and the major part of their activities given over to their own subsistence.

It was during the period from the end of the 2nd world war up until the eve of independence (1960) that a monetised economy - based on the French Franc - spread throughout the Delta and rural producers other than fishermen began on a large scale to produce for the market. A revolution in transport - the motorisation of the Delta canoe, in this form known as a 'pinasse' - the building and improvement of roads, and the widespread introduction of lorries, allowed merchants to reach the remote settlements and fishing camps in the Delta in a much shorter time (a journey that normally took two days by boat being reduced to eight hours) and led to a much wider diffusion of goods and a faster turnover. This was accompanied by the opening of ten new markets in the area between 1930-1960. Between 1950-1958, 8,000 tons of cereals (millet and rice) a year were traded through Mopti. Fish exports from the zone, responding to the rise in demand from the growing plantation economies on the West African coast, and the growth of urban centres within Mali, rose to over 12,000 tons a year by the end of this period.

It is Gallais' thesis that the period 1950-1960 saw a qualitative change in direction of flows of revenue in the Delta. He argues that there was a net inflow of wealth into the region at this time for three reasons: the growth of the fish trade controlled by Mopti merchants which distributed wealth into the local economy; remittances from workers who had migrated to the coastal regions to

take part in the plantation economies; and investment by the colonial administration in the form of employment of functionaries, higher rates of pay, employment of other labour to carry out public works, and aid flows from France to build roads, hospitals, administrative buildings etc.. These flows, he argues, were well above tax levels extracted from the zone.

This thesis argues that in fact this investment, and the administrative structure that accompanied it, was in the long-term to turn out to be inimical both to the customary management systems that existed, and to the conservation of natural resources in the zone. It is contended here that the basic extractive nature of economic development remained unchanged during this time from the point of view of the vast majority of rural producers. The greater quantities of money in circulation, and the increase in commercial activity was accompanied by greater expenditure on imports: fishing gear, imported cloth, fuel, motors, spare parts etc.. Administrative expenditure was overwhelmingly urban based (outside of Mopti and Ténenkou there is hardly any relic of the colonial period), used large quantities of imports (fuel, cement etc.), and was almost exclusively invested in the service sector.

Of great significance for the fisheries of the Delta was the commercial structure that evolved around the boom in the fish trade of the 1950s, for it was quickly dominated by a small oligopoly of traders in Mopti who controlled both the acquisition of fish and its export, as well as the distribution of imported equipment. These merchants did not invest in the productive capacity of the fisheries (it should be borne in mind that there was hardly any need to at this time as rainfall and flood levels were high, and so, consequently, was the productivity of the fisheries) but rather in urban property and social and religious expenditure.

Gallais himself demonstrates how until the late 1950s commerce in Mopti, which had become the economic centre of the zone, was largely controlled by European trading houses (Gallais 1967). Kébé (1981) has further shown that since 1920 the AOF had a policy of fixing prices in order to underwrite the profits of European trading



firms and keeping trade within the French sphere of influence. He argues on one side that they did this by maintaining low internal producer prices for exportable goods while setting high export prices for those same goods destined for France (above world market rates, so capturing trade), and on the other side by fixing high import prices and obliging rural people to generate cash (principally in order to pay taxes). The effects of these measures were not only to underwrite expatriate merchant profits and transfer resources to the metropolis but also to extract resources from the rural sector, so preventing any indigenous capital formation.

The monetisation of the Delta economy, and the opening of trade linkages over the whole of West Africa and to Europe had the effect of revaluing some Delta products in terms of their demand from this much wider region, rather than in terms of supply and demand within the Delta and on its borders, as had been the case under the Dina system. This was particularly true of agricultural land and the fisheries, whose produce offered rural producers opportunities for earning cash that other natural resources did not offer. This put a premium on access to good agricultural land and the more productive fisheries, and colonial records show that rural communities responded to this situation by laying more restrictive controls over access to these resources, and by moving into agriculture and full-time fishing. In the process rural communities also became more differentiated.

Fieldwork in the northern sector of the Delta indicates that it was in the 1950s that stranger fishermen, who customarily exploited the zone between January and June each year, began to lay permanent claim to the camping sites they seasonally occupied, and of local fishermen claiming tithes in money. Many fishing communities in this sector, that had customarily combined fishing with hunting and gathering as their principal activities, now switched to rice farming and fishing. In farming communities, several reports speak of the diminishing power of the Master of the Land to manage allocation of new dryland fields, of their jealous defense of the right to allocate flood retreat land annually, and of how rents and other payments customarily due to the Master of the Land by members of the

community were falling into disuse. At the same time these reports are unanimous that local farming communities rigorously implemented rents and payments due from strangers and left them in little doubt that their presence in the community was temporary (Gallais 1958, Gerbeau 1958, Vincent 1963).

The period of colonial rule in the Delta made three profound and inter-related changes in the way customary tenure systems were able to operate. These changes were linked to the manner in which natural resources with distinct technical and physical characteristics were managed.

The colonial administration destroyed (or prevented the re-emergence of) the centralised Dina system based upon Hamdallahi, though it continued to rule through the administrative districts set up early in the 19<sup>th</sup> century. The 'eminent' power in the region was now composed, and worked in the interests of, a foreign nation which did not depend on the area for its products and which - certainly at the outset - was ignorant of its traditions and history. In dismantling the Dina system, it directly broke the link between Rimaïbé rice cultivators and their Fulani overlords, so altering the relationship through which pastoral managers managed floodplain pastures both for their grazing and cereal production. In continuing to work through the Dina Cantonnements, and in obliging their heads to provide forced labour and recruits for the army, the colonial authorities engendered producers dislike for the administration, and in the process discredited their traditional leaders.

Through introducing a form of land tenure law based upon the French code, the colonial regime effectively denied the existence of customary rights of access to pasture, forest and fishery resources in the zone. Access to some resources was taken entirely out of local producers hands. With other assets, the colonial administration took a direct hand in how they were managed at key moments of the year when they were 'concentrated' in nature, so diminishing local managers powers to control access at the moment when these local regimes were at their most effective. Of great importance for the future of these customary regimes, was the fact that the criteria for

allocating access used by the colonial power were quite different from those of local systems: the former was concerned to conserve the resource for whoever used it, while the latter sought to manage the resource in the interests of the community to whom it belonged. The colonial administration, staffed by expatriates, was not in a position to differentiate in a sufficient degree between local customary owners and seasonal outsiders.

Lastly, the economic policy of extracting wealth from the zone, coupled with the growth of a much wider, monetised, market for some Delta products led to a significant increase in the value of some resources, especially at moments of the year when they were 'concentrated' or 'restricted' in nature (i.e. dry season fisheries). This increased pressure on these assets and provided a powerful incentive for producers who customarily had secondary rights of access (seasonal visitors) to promote state methods of management, where the colonial state ignored the premises of local systems, and thus offered them better opportunities of entry.

#### 5.6. Summary

This chapter has shown that the original management unit found in the Delta composed of founders, consanguine lineages and resident outsiders, worked to allocate resources between co-owners of a defined territory and manage access to non-owners, broadly in line with the physical and technical attributes of the resources they used in different seasons of the year. The system not only provided local producers with their livelihoods, but also granted them access to resources outside their own terrain, which transhumant producers needed in different seasons each year, and more sedentary production systems fell back on in bad years in their own territory. The regime functioned through relations of reciprocity, and was underwritten by a system of beliefs that accorded first comers the right to manage and conferred upon them supernatural powers. Preferential access to their own resources on the one hand, and the fear of expulsion and harm on the other, generated the incentives

and penalties which induced producers to cooperate with this communal system.

It has also demonstrated that as the Delta was subsumed into wider political and economic entities, so external structures to the communal management regimes originally found in the area were able to impinge to a greater degree in how they managed their assets. Accompanying this trend there was a proliferation in the number of managers, and in the structures that aimed to control how resources were used. As external structures became more influential, and new groups of producers settled in the Delta, so founder-managers became less able to unilaterally impose customary rules on constituent members of their communities. In this process regimes evolved in which the principal lineages making up the community provided a council of elders, often headed by the ancient masters of the resource, while sacrificial and managerial roles were differentiated. An embryonic form of state property emerged in which 'eminent' ownership of resources belonged to the wider external structure that controlled the region.

A comprehensive form of this system existed in the Dina, which managed the whole Delta for much of the last century. Customary managers and lineage heads making up the council of elders were everywhere subject to the theocratic state based at Hamdallahi. The Dina codified fishing, farming and herding rights over its whole area and coordinated access rights between production systems competing for access to the same resources in line with its primary interest in pasture. A fundamental characteristic of the Dina was the marriage it represented between achieving latter-day political and military power over the area and older, customary management systems it controlled. In effect, while suborning other production systems to pastoral control, it nonetheless left fishing and farming communities considerable latitude in managing access to resources they had been ascribed. It even supported the customary system of management by distinguishing between founders, consanguine lineages, resident and outside strangers among its own constituent herding groups.

This provides a basic distinction between pre-colonial and colonial periods in the Delta's history, inasmuch as under the Dina the Delta was administered by a political and economic structure that relied upon the area for its livelihood and sought to graft its hegemony onto an existing system. The colonial administration of the Delta however, did not rely on the area for what it produced, and was staffed by expatriates whose knowledge of the zone was perforce small. Through introducing land tenure legislation based on European pre-conceptions, it denied the rights of local producers to resources (other than fields they were in the process of cultivating) and confronted local producers with a system of allocation that took little account of customary rules. The growth of new markets for the Delta's produce made some of the area's assets more valuable, and allied the interests of producers who had secondary rights to those resources to the promotion of state means of allocating access. In this manner local forms of management were significantly undermined, particularly in seasons of the year when the allocation of access rights was critical.

These themes are taken up in the next chapter to show how the administration of the Delta and the economic policies that have been followed since independence (1960) demonstrate a remarkable degree of consistency with colonial rule. The ability of the state to intervene at critical moments of the year in the management of resources that are of strategic value to rural producers has been accentuated through the nationalisation of pastures, forests and fisheries by the post-colonial state. Accompanied by conditions of increasing drought over the last 20 years, these processes have led to a situation where the natural resources of the Delta are being managed in conditions of 'structural chaos'.

## CHAPTER 6

## 6. FROM COLONIALISM TO INDEPENDENCE: INSTITUTIONAL DECAY

The previous chapter has matched the technical and physical attributes of natural resources to the evolution of communal management systems in the Inland Niger Delta. It has shown that as local management regimes became progressively integrated into a Delta-wide state, so 'decision-making arrangements' and 'patterns of interaction' were more influenced by the external relationships that rural communities had with wider political and economic structures that controlled the region in which they lived.

The discussion demonstrated the crucial role external structures play in maintaining communal management systems. When the production systems of the Delta were most incorporated into one state under the Dina, primarily communal forms of management governed access to the area's strategic resources. State rules attributed resources to rural producers, and where they re-allocated access, they did so using principles similar to those already known and understood by Delta communities. Moreover, the Dina relied for its economic existence on what the Delta produced. This makes the point that 'congruence' needs to exist not only between the physical and technical attributes of resources and their management regime, but also between the regime and wider economic and political structures that surround it.

The chapter further argued that this 'congruence' between the state and local management regimes began to break down under colonial rule. It showed how colonial legislation created a dual property system (state vs communal property) which broke the chain of access that had formerly existed through founding lineages, and increasingly allowed previously outside groups entry to resources through the state structure, so undermining customary communal rules. It revealed how the monetisation of the Delta economy, a policy aimed at the extraction of revenue, and spreading trade links

with West Africa and Europe put a premium on access to certain resources, and thus created the conditions whereby some groups of producers had a vested interest in breaking down the Dina system. In general, the colonial period laid the structural conditions for the progressive debilitation of local management systems in the post-colonial era.

This chapter develops these themes to show how the proliferation of the post-colonial state structure has created parallel institutions alongside customary management regimes. These structures have overlapping responsibilities and play contradictory roles, so as to leave government natural resource policy bereft of consistency, whilst at the same time undermining local management systems. Of fundamental importance for the creation of insecurity of tenure for local producers has been the passing of post-colonial legislation that has nationalised natural resources, and which has provided technical service personnel, the administration, and the political party with the remit to manage access to natural resources, at strategic moments of the year, in the name of the state.

The policies which the state and its component institutions have followed in the Delta mirror and intensify upon those introduced by the colonial administration. Particularly over the last twenty years, more value has been taken out of the region than has been invested within it, both because of fiscal policy, and because rural development initiatives have had a minimal effect upon the livelihoods of local producers or the welfare of the natural resources they depend upon. Some development projects have had a negative effect on the natural resources of the zone.

These factors - the proliferation of state structures, post-colonial land tenure legislation and rural development policy and practice - act upon one another in synergy in order to produce situations in which rural producers' reciprocal actions supporting the communal management of resources are jettisoned in favour of 'free-rider' strategies aimed at achieving short-term benefits.

The post-colonial period saw the growth of state property as the dominant system for allocating access to natural resources: state institutions have been set up parallel to customary ones and in the process have both undermined traditional means of managing access, and penetrated customary institutions to make them subservient to state policies and aims. While legislation exists on paper and a state infrastructure exists in form for the allocation of natural resources to rural communities and for their management, lack of manpower, training and logistics, bad organisation, and poor salary levels (often paid very late) mean that the consistent application of state rules is impossible. Given the pressing need for revenue at a national level, and the woeful material conditions in which local agents of the state operate, competition for access to resources degenerates into a free-for-all in which state environmental policy is reduced to para-military patrols and repression, and access to resources is achieved by those who can pay most, and who have the best linkages to the state structure.

This can be described as a form of 'structural chaos' in which the state is unable to fulfil its conventional role of standing above the sectarian interests of its component parts and act in the name of the nation as a whole. As far as local producers are concerned, it might be likened to a vast 'founding' lineage wherein personal contacts, through kinship ties and patron-client relationships, are manifestly more effective than following the formal hierarchies of the state structure. For local people, the sole interest of the administration and its component parts is in the exaction of revenue, and they thus perceive environmental policy, as it is presently exercised (primarily by the forestry service), as a means of taxation rather than being related to the conservation of the resources upon which they depend. In these circumstances, customary communal management systems that worked on the principle of ethnic, kinship, consanguine and residential rules are directly confronted by a system that allocates rights to access through membership of the nation state.

The focus of this chapter will be on the external relations of communal systems to larger social and economic power structures in the region, and thus deals again with the 'decision-making



arrangements' category of Oakerson's framework. This leads on to an examination in Chapter 7 of the 'patterns of interaction' characterising present day resource use through several case studies. These demonstrate how conflict over access has come about and been resolved in the Delta in recent times.

### 6.1. The Proliferation of Authority

The period from independence to the present day has seen an accretion of centralised economic and political power over local management systems in two phases: 1960-68, when a reforming Malian administration attempted to impose a 'socialist revolution' from above; and from 1968 to now, during which a military regime has both widened and deepened the ability of the post-colonial state to extract revenue from the rural sector and redistribute access to natural resources between rural producers.

The government that took power in independent Mali in 1960 was made up of the Union Soudanaise - Rassemblement Démocratique Africain (USRDA), which had won elections giving it partial autonomy to govern in 1957. It represented the merchants and the urban élite, this latter group divided between the 'intelligentsia' - many of them schoolteachers - and former civil servants under the French administration. From its inception this urban-based party was split between a radical left wing (the 'intelligentsia' ) calling for the imposition of socialism, and a more moderate wing favouring continued ties with France, with both wings strongly in favour of a federation with Senegal through which 93% of Mali's extra-African trade passed on the rail link with Dakar. It is not the intention here to go into the complexity of the break up of this federation and the tortuous manner in which Mali achieved her independence, for which an incisive account exists in Jones (1976). Of particular importance for the themes of this thesis are that the USRDA at the time of independence was dominated by the radical left wing of the party concerned to break most ties with France, and strip out the vestiges of the colonial administrative and economic structure. These were to

be replaced by a centrally run economy and administration as part of Mali's socialist revolution (Jones 1976, Diarrah 1986, François 1982).

Of immediate import to local producers in the Delta was the abolition of the Cantonnement chiefdoms which were associated in the USRDA's eyes with their political opposition, as it was the Cantonnement heads in the years running up to independence who had supported the alternative political party, the Parti Progressiste Soudanais (PSP), greatly aided by the colonial authorities<sup>7</sup>. At the same time Subdivisions were converted into Cercles, and Arrondissements replaced Cantonnements. Mali as a whole was divided into six Regions. The staff to man these structures was drawn in large measure from the lower ranks of the old colonial service and from (primarily urban) people who had received the rudiments of a French education (French remaining the administrative language). It was the policy of the government to appoint administrators to areas outside their region of origin.

The policies and programmes of the government were overseen by the political party whose structure paralleled and covered that of the administration. At a national level the Bureau Nationale Politique (BNP), composed of the President (Modibo Keita) and ministers, was responsible for the strategic decisions of government, supported by a council of ministers. To oversee and monitor their decisions six political commissars were appointed. At a regional level no permanent political body existed, though a Conference of Cadres met under the Governor every three months. At Cercle level there was the 'Section', at the arrondissement the 'Sous Section', and at the village level the 'Comités'. Ancillary organisations including Youth, Women, Workers (unions) and War Veterans were linked into this structure.

To carry out a program of reducing un- and underemployment, investing in agriculture and regenerating soils, raising production and 'transforming' rural producers attitudes (Diarrah 1986), a cooperative movement was created, backed by the technical services of the state, with representative bodies at the national, Cercle,

<sup>7</sup> For linkages between competing political parties in Mali, the colonial administration, and internal French politics, see Jones 1976.

arrondissement, groupings of villages and village level. The main economic thrust of this hugely bureaucratic organisation was to collectivise agricultural production and encourage exports. At a local level, cooperatives were made responsible for the acquisition of all produce and the distribution of commodities imported by the Société Malienne d'Importation et d'Exportation (SOMIEX). By keeping producer prices low and controlling all exports and imports, the administration hoped to finance the industrialisation of the Malian economy (Jones 1976).

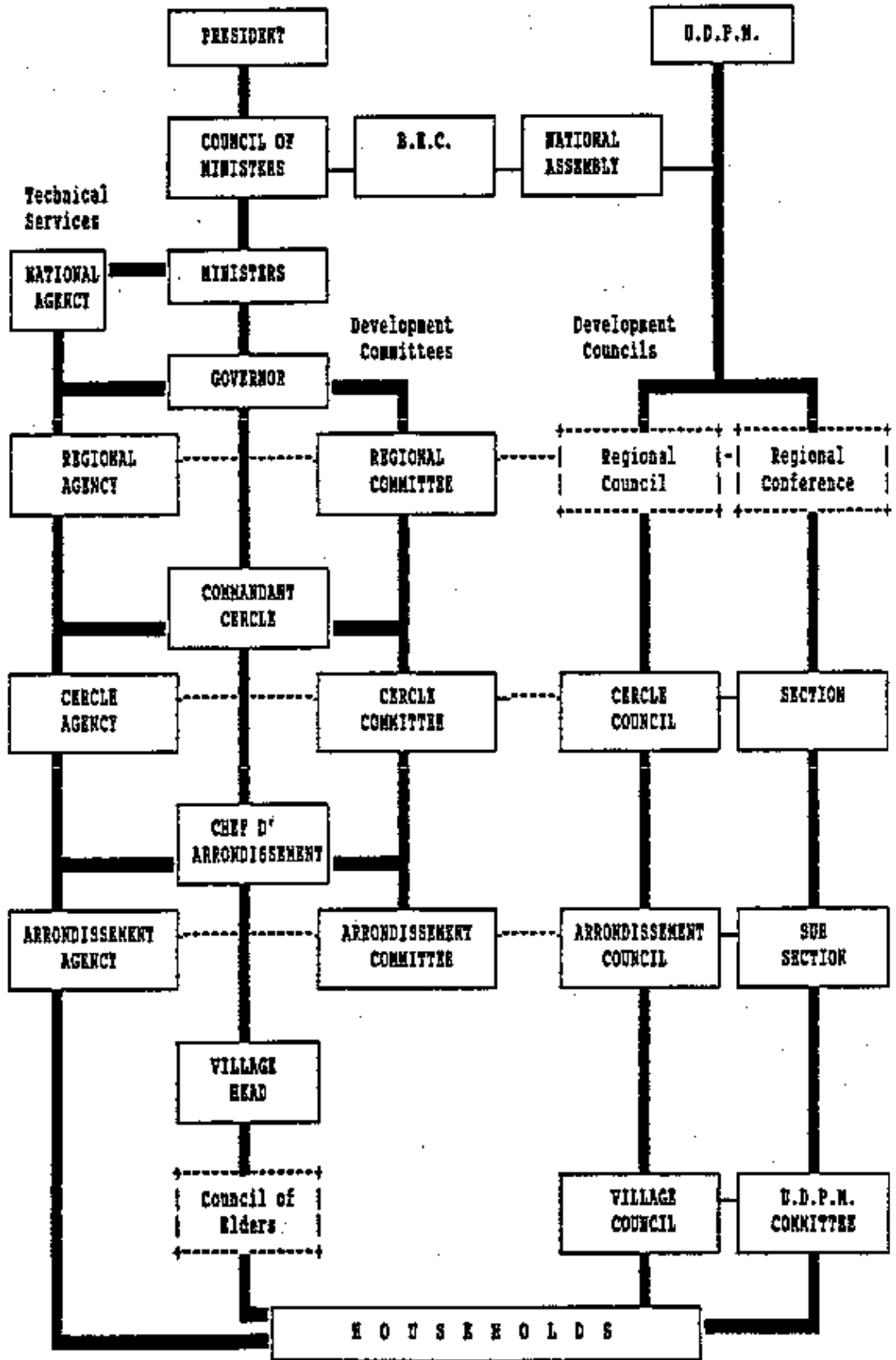
The Keita administration was unable to achieve this, and most of the vast bureaucracy was only 'born on paper' (Jones 1976). State corporations set up to control the commanding heights of the economy rather than make a profit turned in a loss (not least because of over-employment and increases in salaries granted for political reasons) and had to be supported by inflationary credit from the central bank.

By 1968 high inflation, stagnant growth, shortages of necessities, deepening balance of payments problems and considerable unpopularity both from the merchants faced with state monopolies and from rural producers subject to collectivisation, led to a military coup d'état by Moussa Traoré, who remained in power until 1991. The 1968 coup d'état has been described as a victory of powerful merchant interests over the 'intelligentsia' (François 1982). The new regime renewed closer ties with France, lessened its dependence on Soviet and Chinese aid, and called for Western support, but has remained predominantly 'Kettist' in the top-down approach it adopts towards rural development. Further, it has retained the greater part of the structure set up under the first independent regime.

Figure 48 on Page 220 shows the political and administrative structure of present day Mali from the Presidency down to rural communities and demonstrates the proliferation of institutions that are linked to rural households: through the technical services; the civil administration; the village development council; and the UDPM Committee. These institutions may be grouped into three: the administrative hierarchy consisting in the Governor at the regional

level, the Commandant du Cercle, Chef d'arrondissement and village head; the political party, the Union Démocratique du Peuple Malien (UDPM); and the technical services. For the purposes of this thesis the level of the Cercle is the most appropriate for a discussion of the respective roles the administrative and political structures play, as the Cercle is the unit of administration of government development policy, where the great majority of decisions affecting local communities take place, and where administrative and political power is concentrated.

Figure 48: The Administrative, Political and Technical Service Structure of present-day Mali



B.E.C = Bureau Economique Central  
 U.D.P.M. = Union Démocratique du Peuple Malien

The role of the administration is to maintain order, arbitrate disputes and to monitor and coordinate the actions of different public agencies in the Cercle, and is responsible for the development programmes decided upon each year. It is represented at the arrondissement level by a Chef d'arrondissement, and at the village level by the village chief. A further major task - that of raising taxes and other charges - will be discussed later in this chapter.

The political party was created in 1979 (for ten years after the demise of the Keita regime political parties were banned) and was the only political party allowed to exist until 1991. The UDPM is based upon village committees of ten people, elected every three years by the community, who elect in turn a committee of fourteen people to the Sub Section at the arrondissement level. In turn the Sub Sections elect sixteen members to the Cercle level Section, which in turn puts up three candidates for the office of Deputy, one of whom is appointed after a referendum of the whole Cercle population, to represent the Cercle in the National Assembly. In contrast to the planning, monitoring and evaluating functions of the administration, the political party is responsible for the implementation of the area's development program through mobilising and organising local participation.

The main technical services consist in the agencies attached to the Ministries of Agriculture, Natural Resources and Cooperation, of which by far the most important for this discussion is the Ministry for Livestock and Natural Resources (Ministère des Ressources Naturelles et de l'Elevage, MRNE). At a national level this ministry includes two agencies, the Service des Eaux et Forêts (waters and forests) and the Service de l'Elevage (livestock). Under the tutelage of these services in the Mopti region are two development operations, one concerned with the livestock sector, l'Opération pour le Développement de l'Elevage dans la Région de Mopti (ODEM), and Opération Pêche, concerned with fisheries. In addition to these bodies, each service has its regional, Cercle and arrondissement representatives. The primary function of the technical services is to police the adherence of local producers to fishing, herding and

forestry laws, as well as in the dissemination of information on new and improved techniques.

Cross cutting these three primary structures are a set of councils and committees dealing with technical and developmental issues. The Development Councils were established in 1977. Each arrondissement elects three members from its constituency to sit on the council. A further three are elected from the arrondissement councils to make up the Cercle body, and the same number are elected from the councils of all the Cercles to represent them on the regional council. At each level elected members are joined by representatives of other groupings (parent-teachers associations, cooperative movements) who are appointed by law. Development Councils are required to associate local populations with 'grass roots initiatives' at the village, arrondissement, Cercle and regional levels and are meant to review the yearly Development Plans as well as proposing means of achieving them. In this it will be readily appreciated that the Development Councils double up on the Party's role, and it is perhaps for this reason that they have remained - certainly in the Cercle of Youvarou - practically moribund since their inception (IUCN 1989d).

The Development Committees, also created in 1977, bring together representatives of the political party, technical services (including the development operations) and the political party. At every level the committee is presided over by the administrative head. Their principal task is to coordinate, program and evaluate a development plan which is drawn up at the arrondissement level each year in their constituent committees, taking into account local conditions and national priorities established in the capital (IUCN 1989d).

Finally there are the technical committees (arrondissement level) and councils (Cercle level). These bodies are sectorally based (fishing, livestock) and bring together the administration, the political party, the technical services and producer group representatives (fishing and herding delegates). Their principal responsibility is to recommend the dates for herd crossings into the Cercle and to set the dates for putting certain parts of the main rivers into reserve

each year, as well as to fix the days on which they are subsequently fished. They also convene over specific disputes concerning access to resources.

It can be seen from this somewhat bald summary of the administrative and political structure of present-day Mali that the technical committees and role of the technical services parallel the roles of the customary masters of the water, land and pastures as they existed under the Dina. Moreover, they operate primarily in seasons of the year (the falling water and dry seasons) when resources are concentrated and most valuable, for it is then that the herds cross into the floodplain pastures (on a date recommended by the livestock council) and the collective fisheries take place (on dates set by the fishing council).

The ability of local customary managers to affect the decisions made by these latter day bodies is severely constrained, not least by the explicit opposition of the government to what it terms 'feudal' authorities. This is reinforced by the weak representation of local producers in these councils, and also more generally by the dominant position of functionaries on the decision-making bodies of the political, administrative, and technical service structure.

Research in Youvarou has shown that at the village level, the village chief, members of the Development Council and the UDPM Committee are often made up of the heads of founding lineages as, on technical committees such as those for the fisheries and pastures, delegates are the masters of the water and the Dioro. Their influence, however, is considerably limited by their lack of representation on higher level committees where decisions are made and their inability, for the most part, to write or speak French.

At the level both of the political party Section and the Cercle Development Committee most of the members are functionaries. In the UDPM Section committee in 1986, six of its sixteen members were teachers and occupied all the most important posts. On the Development Committee the bulk of the membership was functionaries, many of them strangers to the Delta.



The confusion following upon the overlapping responsibilities of local and state management systems has been greatly fuelled in recent years by a growing rivalry between the political party and the administration, together with a lack of co-ordination between the technical services, the administration and the political party as to their specific duties and responsibilities.

As a general trend, the political party in Mali is in the ascendant. Since 1982, the priority accorded to the development of 'grass roots initiatives' and the implication of local people into the planning process has given the UDPM, with its primary role of mobilising and organising the people, a more central role in government. At the time of writing (1991) the creation of a multi-party state is being mooted in Mali (Jeune Afrique, several articles, 1991<sup>8</sup>). There is a growing wish by the UDPM at the Cercle level to take over all activities to do with development, that is, not only the formulation of development initiatives and their implementation, but also the management of funds and evaluation of projects, currently roles fulfilled by the administration, which is jealously guarding them.

Figure 48 on Page 220 shows that this division is structurally aggravated by the lack of strong institutional links between the two organisations below the national level. While the administration has a hierarchy that goes from Cercle to Governor to Minister to Council of Ministers before reaching a level of co-ordination with the party, the political structure jumps straight from the Section to the central administration in the capital (the Regional Council and Conference rarely meets). In effect this means that local issues (such as conflict over access to resources) that have to pass up the administrative ladder level by level with due form and process can, through the political structure, come to national attention very rapidly. In the present situation, the political party is viewed with considerable suspicion by the administration, which sees it as a partisan watchdog of their actions.

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<sup>8</sup> The relevant articles are cited in the references at the end of the thesis.

A clear expression of this competition appeared in Youvarou in 1990 when, after years of infighting between the political party and the administration who blamed each other for the failure of the development program in the Cercle, Youvarou was placed 'sous tutelle' following a visit by the President. This places the Cercle under military command, and effectively means the area is administered directly from the Presidency in Bamako. Some six other Cercles in Mali are under this form of administration.

At a lower level the technical services - in particular the Agency for Waters and Forests - while formally under the command of the Commandant de Cercle, also enjoy considerable powers of arrest, confiscation and imposition of fines in the conduct of their duties as environmental police. In all matters relating to natural resource use, they are the officials who interpret and impose the forestry, fishing and hunting codes and compile dossiers - together with the police - on who protagonists in a conflict are, and events that have taken place. As the 'eyes and ears' of the administration - and often better equipped with transport than other officials as part of their patrolling duties - they play a key role in framing the context in which decisions are made as to who should be given access to resources in line with government legislation and forestry texts. In the eyes of local people, foresters clearly have the ability and power to influence how natural resources are allocated.

At the level of the community, this throws the allocation of access to resources and the implementation of rules open to the jurisdiction of several authorities. By way of example seasonal visitors to a community can now ask for access rights from the political party, from the traditional manager, from the technical services (primarily the Agency for Water and Forests), or from the local administrator and can play off competing interests against each other. In its most prosaic form this concerns money, either for taxes, other charges or for informal contributions, in conditions where rural producers need access to resources in order to raise cash to buy necessities and repay debt, where functionaries need cash to make up shortfalls in their salaries, and where the state needs revenue to pay salaries and finance state expenditure, but where dry conditions are

narrowing the natural resource base upon which they all depend. Case studies in the next chapter will provide examples of how protagonists use all these structures at different levels to achieve their competing ends.

## 6.2. The Nationalisation of Natural Resources

Since 1959, but most clearly enunciated in the present land tenure code, the state has declared ownership over all land, whether or not it is subject to customary title, is in constant use or has an owner. This is most explicitly formulated in Article 127 (under Law N° 86-91 of 1 August 1986):

'Les terres non-immatriculées, détenues en vertu des droits coutumiers exercés collectivement ou individuellement, font partie du domaine privé de l'Etat. L'exercice desdits droits coutumiers est confirmé pour autant que l'Etat n'ait pas besoin des terres sur lesquelles ils s'exercent'

('Unregistered land which is held by customary right either by individuals or collectively is part of the private domain of the state. Customary rights can continue to operate on this land only for as long as the state has no need of it')

Either individual or collective customary rights can be converted into written rights (concession rurale) where buildings or other works (mise en valeur) have been carried out by customary holders but, crucially, only where the terrain has been initially registered in the name of the state, and customary rights have been explicitly abandoned. Traditional managers can only lay claim to what they personally exploit and can in no case use their position to claim greater rights to land (Article 129). Thus customary rights disappear in the process of registration and traditional owners acquire simple use rights to their land (Article 132).<sup>9</sup>

The actual process of registration has been aptly described as '...organisé avec un grand luxe de détails' (République du Mali et

9 The Articles come from République du Mali, 1987.

Confédération Suisse 1987). Any registration of land over ten hectares has to pass through the council of ministers at a national level (Article 44), all registrations have to be published in the official gazette (Article 46), registration is initially only temporary, a development plan for the land in question has to be drawn up (Article 48), and an annual fee has to be paid (Article 49). Only if all these conditions are met, and the works to be carried out in the development plan accomplished (evaluated by a commission appointed by the Council of Ministers) is registration into definitive title allowed (Articles 62/65). The state can at any time reclaim the land, though it is obliged to pay compensation once final title has been granted.

In practice neither the pre- nor post-1968 state has made any serious effort to uphold those articles of land tenure law that in theory allowed customary users of resources to register their title, either by upholding customary users' right to register land that outsiders wish to claim (Article 130), or by encouraging them to register in the first place. It has already been explained why this was the case under colonial rule; the latter day state, if anything, has further discouraged rural people from beginning the process of claiming title by making the fiscal payments for 'concessions rurales' too high, and requiring development plans that are beyond rural people's means. Even the basic premise that local people have a right to the resources they customarily own has been weakened by the summary transfer of ownership of all resources into the state domain, and in cases where a clear title to resources is of pressing importance to local people - where, for instance there is repeated conflict over access - the judicial system, responsible for adjudicating land tenure questions, rarely intervenes both because of local people's ignorance of their rights and the distance of courts from rural areas, and the infrequency of their meetings (République du Mali et Confédération Suisse 1987). It almost goes without saying that almost no land registration has taken place in rural areas.

This legislation actively promotes a situation of insecurity of tenure for rural inhabitants. While continuing to exploit resources customarily belonging to the community, they perceive that the state

has both the will and the power to over-ride customary rules of allocation and exclusion. For the most part not understanding French, nor aware of their rights, local people are constantly reminded that resources do not belong to them by agents of the administration, who use this legislation to impose a centrally-planned management system that ignores the basic premise of the traditional regime: right of access according to kinship and residency rules. This insecurity has been linked directly to rural producers' unwillingness to participate in long-term strategies aimed at sustainable production, in favour of short-term exploitation that yields immediate results (République du Mali et Confédération Suisse 1987). In effect, this legislation provides the foundation for the penetration of all the state's component institutions - the political party, administration and technical services - into local management rules for access to and allocation of natural resources.

### 6.3. Development Policy and Practice

Since independence the Malian state has sought to take an active hand in resource allocation and management in three main ways: through the direct re-allocation of resources between rural producers; through seeking to change the manner in which resources are exploited; and through changing the way in which the value of rural production is distributed. Each of these categories is discussed below.

#### 6.3.1 The re-allocation of resources

One of the principal ways in which customary fishing, farming and herding territories have been transformed is through the delineation of new administrative boundaries. As late as 1977 new boundaries between administrative areas were being created in the Delta. In that year the Cercle of Youvarou - formerly an arrondissement of Niafunké - was brought into being by truncating one former arrondissement from the Cercle of Ténenkou and allocating 4 arrondissements from the Cercle of Niafunké and one from the Cercle of Mopti to Youvarou. In the process farming, herding and fishing

territories - particularly in the truncated arrondissement of Dogo/Togguéré Koumbé - were divided. In these areas local authority for the management of resources has been taken over by offshoots of the original customary managers or by other neighbouring communities who claim rights of access or management primarily through the fact that they now live in a different circumscription to the traditional owners. This has provoked endless conflict over exactly where the division of the Cercle lies, as the Cercle limits are only partially surveyed and are done so only where conflict arises (see Chapter 7).

Within the Cercle, resources have been re-allocated by the administration both between different production systems and within them. Within them, former strangers and consanguine lineages have been given rights of access to land that owners wish to reclaim: 80% of conflicts reaching the Cercle level come from within communities, and many concern land that was rented or loaned to outsiders in the past. In fishing communities, seasonal strangers have been given rights of access and use that are specifically contrary to customary rules. Between production systems, farmers have been given rights over fisheries they never formerly held, but are deemed to have a claim to because the site of their village is beside the main river.

In other areas the state has removed natural resources from local producers' hands - as in the case of the classified forests and national parks - or has removed them from customary control and re-allocated them according to external criteria. This is particularly true of the Opérations de Développement Rurale (ODR) - para-statal development agencies - where, for example, 27,000 hectares of prime fisheries and rice growing land in the central and western parts of the Delta have been converted to rice polders which, following the onset of dry years, have had a very uncertain success.

### 6.3.2 Organising production: collectivisation, the 'Ton', and rural development policy.

The administrations that have governed Mali since independence have been characterised by the prejudice that rural producers should be taught 'progressive' methods of exploiting resources and organising production. This was most explicitly the case under the Modibo Keita regime. In 1961 Modibo Keita called for each 'family' in Mali to cultivate one hectare of land as a collective field which, given that average holdings were about 3 hectares, amounted to a third of all land under cultivation (Jones 1976).

This land was to be worked by the village Ton - affiliation groups in Bambara villages - and the produce was meant to be handed over to the state commercial system through the village Co-op (Groupement Rural de Production et de Secours Mutuel: GRPSM). 'Families' were further obliged to make contributions to the Co-op, making them eligible for three to four times that amount in credit from the Agricultural Credit Bank. The political party at the village level was meant to oversee and promote collectivisation through the village committees, which were to progressively take over the functions of the customary council of elders.

Jones (1976) has convincingly shown how this political and economic plan did not succeed, and how it was strongly opposed where it impinged upon traditional social and economic structures. He demonstrates, using data collected in a number of villages in Central Mali, how at the level of the customary power structure the imposition of political committees did not change matters fundamentally, as villagers merely appointed traditional heads of lineages (Lu) to them, mirroring the customary council of elders. With regard to the collectivisation of fields, though villagers were obliged to provide them, they cultivated them last and desultorily so that productivity was very low, partly because the Ton was an unsuitable group to carry out collective work, as traditionally it was an entertainment association that worked for payment to raise funds for festivities rather than as a communal work force. With regard to the Cooperatives, Jones (1976) shows how on the one hand they were unable to provide extension services and on the other how the

initial payments by households to them almost never resulted in access to credit, nor to repayment as their accounts at the Credit Bank were frozen. Overall, collectivisation was seen by villagers as similar to the French *corvées* (i.e. forced labour parties), and collective fields were dropped immediately after a new regime came to power in 1968.

Jones (1976) goes on to demonstrate that while the political party, the cooperative movement and the technical services may not have had a profound effect on communal institutions in the early years of independence, they did provide a formal structure parallel to the customary one right down to the individual producing and consuming unit. Evidence that these new structures were being grafted onto the customary system is provided by Jones when he describes how cantonnement chiefs became activists in the party in order to retain their position of influence, how their rivals also adopted this strategy, and how traditional rivalries between the sons of different mothers were often transplanted onto the level of the political party.

Independence established in power a governing class that was urban based and commercial in nature, that considered itself progressive in relation to the rural sector which it believed was conservative and backward. As Jones (1976:278) comments:

'Perhaps the politicians' tendency (sic) to think of rural Malians in terms of "peasant masses" led them to underestimate the importance of institutions which differentiate and structure the economic roles of rural Malians. Many politicians thought of these differentiating institutions as "feudal" or colonial hangovers destined to wither away rapidly in socialist independence; many were simply townsmen and had little understanding of rural Mali. In any case overlooking village structures made it impossible to adapt them for (the Five Year) Plan purposes and often guaranteed that village solidarity would work at cross-purposes to the Plan'.

This lack of understanding of the rural sector has been compounded by the subsequent regime through policies governing the appointment of officials. The government appoints outsiders to the Delta to



higher administrative and technical positions, and this leads them to look up the administrative ladder rather than to villages in the execution of their tasks, but has also meant in the case of the Delta that they have come to a complex area in ecological and production system terms without prior training or knowledge. This is further emphasised by the policy of keeping senior staff (Commandants, head foresters etc.) in their posts for a comparatively short time - two to three years. The people officially the most empowered to make decisions affecting allocation of resources are therefore often kept unaware of local events, have little means of interpreting them, and are sent somewhere else at the moment when they begin to understand the area they administer. The period a successor spends with the previous incumbent is normally very short and the written information left behind is often scant.

The regime that governed Mali from 1968-1991, while abolishing many of the more overt aspects of collectivisation, nonetheless retained its emphasis on the Ton, and on the imposition of 'progressive' development initiatives on rural producers. Both the political party and the administration promote development plans that are based upon sedentary activities, use high inputs of technology, and involve 'collective' methods of production to all intents and purposes unaffected by the special conditions in the Delta. Their plans reflect the national development policy which falls into three major initiatives: the fight against desertification, including creating a 'green barrier' against the advance of the desert, the promotion of village reforestation and training programmes for local people; national food self-sufficiency through the management of water resources, irrigation schemes and promotion of counter-season crops (i.e. grown in the dry season); and the devolution of greater responsibility to local people for the promotion and implementation of rural development policy (République du Mali 1987a).

On the ground 'development' in Youvarou in 1984-88 amounts to: small scale irrigation projects involving motorised pumps and the building of dams and barrages to control water supply in the rising and falling flood seasons; digging wells; setting up village woodlots; restricting access to forests and some fisheries; obliging households

to use improved woodfuel burning stoves; and encouraging village Ton. These have been accompanied by various high status projects such as the building of a pied-à-terre for the President and an 'Olympic village' to play host to a regional youth week (eventually cancelled) as well as by the construction of school and administrative buildings.

They have not had much success. At a technical level spare parts are not available for the pumps, nor is money for petrol, nor does expertise exist for repairing them when they go wrong. Insufficient tests have been made as to whether soils are suitable for irrigation, or whether particular pools are suitable for constructing dams and barrages. Efforts at encouraging woodlots have broken down because of disputes over who should manage them (the political party, the foresters or the village council). Of particular interest for this thesis has been the almost total lack of support for these initiatives from local people. This was demonstrated in 1986 when, on the eve of a Presidential visit, the entire civil administration was closed down by the Governor of the Region, the functionaries ordered out to work on construction projects, and teams of labour were brought in from villages all over the Cercle to Youvarou to try and finish work on buildings (unsuccessfully) before the President arrived. As cash funds for projects have declined (in large part because drought conditions have prevented rural producers from paying their fiscal dues - see below) so the Cercle Development Committee has turned to contributions in labour to fulfil targets, which has arguably pushed the political party close to providing corvée labour parties, as in colonial times.

To these development initiatives and approaches the post-colonial state in Mali has added a panoply of measures aimed at controlling rural producers' hunting, fishing, grazing and gathering activities. Allusion has already been made above to the technical services role in managing access to pasture and fisheries at strategic moments of the year: administration and technical service personnel now attend cattle crossings and collective fisheries to monitor their execution; police and technical staff reconnoitre the pastures to be sure no

animals either enter before the appointed date, nor remain after a certain day each year fixed for their departure.

In addition, technical service staff monitor a range of measures aimed at regulating the use of resources. These regulations cover: the type of equipment that can be used (net mesh sizes, types of nets, guns, methods of hunting, fishing, cutting timber etc.); species of flora and fauna that may be exploited and those that are protected; how reserves and protected areas are to be created; the permits that are needed for cutting woodfuel, for hunting and fishing; and the fines that accrue to those who break the rules (République du Mali n.d.).

Foresters charge local producers for exploiting natural resources in the form of fines and permits they pay for fishing, hunting and for woodfuel and browse. Though the cost of these permits is not large - between £5 and £10 - fines for breaking forestry rules can be very severe: three months jail and payments of up to £600-00 (the value of four years' per capita production for an average producer in the Cercle of Youvarou), though they mostly amount to around £40-00 (about half an individual's yearly cash income). Foresters, who are paramilitary and armed, are widely feared for these powers. While they fine individuals, it is generally the whole community which pays the fee as it is almost always far above what a single person or household can afford. Rural producers perceive these fines as taxes, rather than being related to abusive use of the environment.

This section has provided some insight into the gap that exists between rural populations and the administration. Parallel institutions present a radical program to customary ones: access to resources according to citizenship; an end to traditional authority; collectivisation of production whereby the fruits of collaboration are 'equally' distributed among constituent members rather than accruing to participants in terms of the work they provided and their status. Rural producers' experience of collaboration with the administration leads them justifiably to doubt the benefits of such action, and explains the hesitancy with which they take part in government

schemes. Further, it has graphically illustrated how government notions of development are at great variance with the strategies local producers are finding useful in the face of increasingly adverse climatic conditions, discussed in Chapter 4.

#### 6.4. Disinvestment and Fiscal Policy

The preceding sections have described how customary communal institutions for managing access to and the use of natural resources have been undermined through nationalisation; how parallel institutions of the administration and the political party impinge directly on the ability of local institutions to function; and how rural development policy is at odds with customary management rules. This section further explores the relationship between rural people and government by describing how producers generally lose out in their relationship with state institutions, how fiscal demands contribute to short-term production strategies, and how state rural development policies encourage degradation of the environment. Lack of investment has exacerbated the conditions in which communal resources are more intensively used, so adding to the conditions promoting 'free-rider' strategies.

At the forefront of the government's rural development policy in the Mopti Region are the Opérations de Développement Rurale (ODR), which were set up between 1972 and 1975, largely in response to drought in the early 1970s. They are sectorally based: Opération Mils Mopti (OMM) and Opération Riz Mopti (ORM) manage agriculture, Opération Pêche Mopti (OPM) the fisheries and l'Opération pour le Développement de l'Élevage dans la Région de Mopti (ODEM) the livestock sector. Between 1970 and 1985 something in the region of \$US 75 million was invested in the ODR, nearly 90% of which was provided by foreign aid (IUCN 1989a).

This considerable sum was invested in infrastructure (roads, buildings), the provision of recurrent expenditure, services (salaries, maintenance funds, transport etc.), and the amount actually invested in production (capital works, wells, irrigation

schemes, equipment etc.). Under half reached this latter sector. What is more, the great majority of investment was in fixed capital works - for instance the rice polders built by Opération Riz Mopti - which have been removed from the ownership and management of local producers, and in some cases distributed to functionaries. Investments have been made above all near urban centres: the capital of the Region, Mopti, or in Ténénkou on the western border of the Delta. For the greater part of the rural population who live outside these areas the ODR are government schemes which offer them little benefit.

Indeed, for many fishermen and herders ODEM and OPM manage state access rules inasmuch as their agents are concerned in setting the dates for collective fisheries and livestock crossings. This costs producers as the ODR levy fees for issuing certificates certifying the quality of processed fish (without which it cannot be exported by wholesalers in Mopti) and on each herd taking part in a crossing. ODEM is nevertheless perceived as useful for the dissemination of vaccines and OPM for the credit schemes it manages, though these activities are of minor importance compared to overall investment (IUCN 1989a).

Government and parastatal policy, as demonstrated in the actions of the ODR and rural credit schemes, until very recently either did not address the issue of conserving natural resources, or in their attempts to do so have been largely unsuccessful, or have actually contributed to degrading the environment. The millet and rice agencies (OMM and ORM) have concentrated their efforts on improving productivity with the former agency, actually removing woodlands in some places on the floodplains in order to make way for polders. The fishing agency (OPM) has had some success in introducing improved fish smoking ovens but has been singularly unsuccessful together with the foresters in controlling the use of banned fishing equipment (cast and other small mesh nets), both because illegal equipment is not seized by customs and because fish merchants are politically and economically powerful.

The protection of pastures is one of the primary aims of the livestock agency (ODEM); through its policy of making water points in the drylands adjacent to the Delta in order to keep livestock out of the bourgou; through setting dates together with the administration for crossings into the floodplains; and through the promotion of floodpasture cultivation. In the case of the crossing dates, however, administrative agencies have had important problems with preventing the entry of animals into the Delta before the appointed time, and with making them leave, leading in some cases to police being attacked and killed by herders.

Further, it is a moot point whether the policy of keeping the animals out of the pastures until the water has withdrawn in the northern reaches of the Delta is good for the resource. Bourgou regenerates best from its stems rather than by seeding. When the animals entered the floodplains under the earlier system, the pastures were still partially flooded so that the hooves of the animals implanted many of the stems into the mud, conserving pasture (in that they could not graze it all) and providing the circumstances for its regeneration at the same time. Finally, it has been argued that setting the dates for entry into all pastures has made herders concentrate in the waiting zone adjacent to the upstream end of the Delta early, thereby degrading forage resources in that zone (CIPEA 1983). Evidently, all these measures directly replace some of the principal functions of the Dioro.

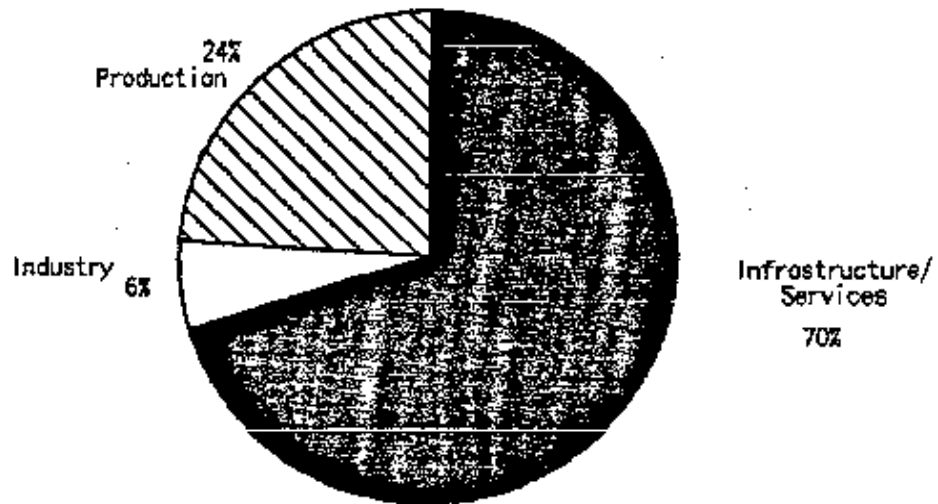
The sectoral organisation of the ODR has made it difficult for them to work effectively with rural producers who, as explained in Chapter 3, have diversified their production systems to cope with climatic risk. ODR tend to guard their patch jealously and have weak links with each other. This was demonstrated graphically in 1985-86 when the Office du Niger, which manages a dam upstream of the Delta, raised its sluice gates on a number of occasions in the falling water season in order to float grain convoys off sandbanks where they had become grounded in the Delta. The effect of this was to destroy the fisheries for a specialised group of fishermen who need constantly falling water levels to practice their craft. At no point

did OPM liaise with the Office du Niger before this decision was made.

A further clear example of development policy being at odds with conservation is the case of credit schemes offered to fishermen for the acquisition of new equipment. In 1986-87 the Banque Nationale pour le Développement de l'Agriculture (BNDA) distributed some 206.2 million FCFA for equipment (US\$700,000 approx) for fishermen to intensify their exploitation of a resource that is clearly in decline, as explained in Chapter 3 (ORSTOM 1984). Ironically, as the fishermen themselves did not have the cash to pay the 10% down payment needed to get access to these funds, it was often the fish merchants who advanced the sum, and then distributed the gear to the fishermen. As will be explained in greater detail in the next chapter, there is a strong connection between fish merchants who advance credit to transhumant fishermen, the fishermen themselves who are in severe debt, and the destruction of communal management regimes in the more productive areas of the Delta so that fishermen can get access to the resources they need to repay their loans, and in the process degrade the fisheries.

Over this same period about \$US26 million was invested in the Delta from local and national sources (regional and national budgets, contributions from the population in cash, labour and kind). This has been even more unevenly distributed than ODR funds as Figure 49 on Page 239 shows, with under a quarter being allocated to production. It will be noted that it is from this source alone that some industry has been funded.

Figure 49: Local and National Investment in the Mopti Region,  
(amounting to \$US 26 million) 1970-1985

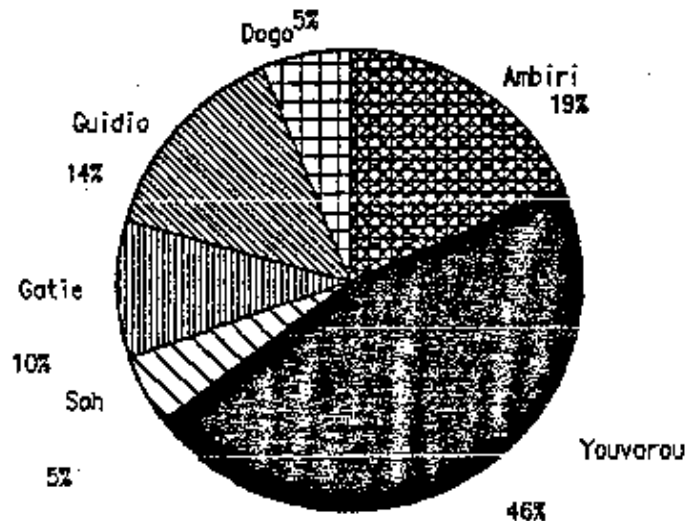


SOURCE: IUCN 1989a

Research at a more detailed level in Youvarou bears out the main thrust of this argument for 1987, with only 29% of investment going into production (small scale irrigation, flood water management, pasture regeneration, forestry, well digging) while the rest was spent on in infrastructure and services. Overall, nearly half the value of this investment was provided by local people's direct labour. Further, the investment is highly concentrated in the central arrondissement of Youvarou where the headquarters of the administration lies, which, in 1987, received nearly half of all investment in the Cercle as, Figure 50 on Page 240 shows (IUCN 1989c).



Figure 50: Investment in 1987 by arrondissement, Cercle of Youvarou  
(amounting to \$US 550,000)



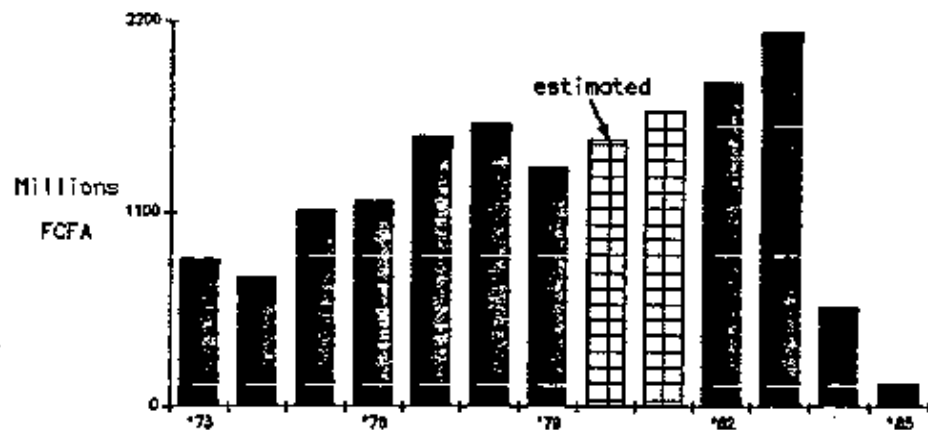
SOURCE: IUCN 1989d

It is these circumstances which explain why the majority of rural producers perceive little benefit from government rural development initiatives. Their perception of their losses in their relationship with the state are, however, immediate and far reaching, beginning with the knowledge that the state is the owner of the resources they exploit and underlined by the government's fiscal policy.

Of over-riding importance for the administration is the collection of taxes and other charges. This has intensified in latter years as the government's revenues from export crops at a national level - especially cotton - have fallen significantly due to declining world prices. Until the middle of the 1980s, 90% of the Malian budget was spent on education and the civil service leaving 10% to pay for the maintenance of infrastructure and to contribute towards development initiatives that were for the most part paid for by foreign aid. Dwindling revenue from the export sector and rising costs of imports in the 1980s have seen the government facing increasing difficulties in meeting its wage bill, leading in turn to a renewed effort to collect taxes from the rural population.

All Malians of tax paying age (15-50 years old for women, 17-55 years old for men) have to pay the 'minimum fiscal' a basic fee of 1015 FCFA in 1986 (about US\$ 3.40). To this are added obligatory contributions to the political party, the parent teachers' association and the cooperative movement which amount to the same figure; exceptional contributions of as much again for particular projects (such as the war with Burkina Faso, or special 'development levies'); and taxes on boats, guns and livestock. Apart from the charges on livestock, boats and guns, which make up about a fifth of the total, these taxes fall in the same measure on the rich and poor alike, and were estimated to encompass 60% of the population of the Cercle of Youvarou in 1986 (IUCN 1989). The increasing effort to raise taxes (information on some obligatory contributions was not available at the level of the region) is shown in Figure 51 on Page 241, demonstrating a steady rise until 1983, when the drought reduced the rate of recovery to only 13% of what should have come in if everyone had paid.

Figure 51: Fiscal Revenue, Region of Mopti, 1973-85, in millions of FCFA



SOURCE: REGIONAL TAX OFFICE, TREASURY

The relentless pursuit of tax revenue - which can amount to up to 10% of per capita cash income (see Chapter 4) - has become symbolic of the administration's policy for rural producers in the Delta. It has

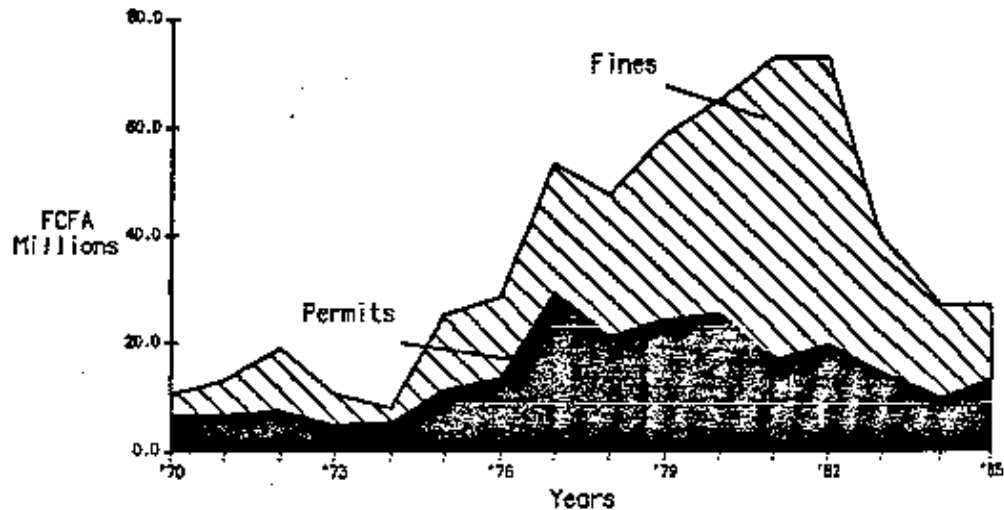
been estimated that over 70% of taxes gathered went on payment of civil service salaries in Youvarou in 1986 (IUCN 1989d). With almost all government investment being in services and infrastructure concentrated in the Cercle and arrondissement towns (see above), most rural producers consider payment of taxes and other charges, ostensibly for development and the national good, as in fact a net gift to the administration with no prospect of benefit to themselves.

Moreover, the payment of taxes is now often made the condition for access to other benefits. In 1985 and 1986, for example, in the Cercle of Youvarou, distribution of food aid was made conditional on rural producers meeting their fiscal responsibilities. Access to resources was treated in the same manner: appeals to the authorities by local communities when conflict broke out over fishing, farming and herding rights were immediately accompanied by a review of whether the community had paid their dues. In a number of cases, administrative heads authorised collective fisheries specifically on the understanding that those allowed to fish would pay their taxes from revenue from the sale of the fish.

Taxes are gathered in the Cercle of Youvarou by the police if they are not paid in time to the arrondissement head, often using repressive methods and, bearing in mind the low recovery of taxes in 1984-85, it is worth noting that the administration has the right to collect arrears for up to ten years after they fall due (IUCN 1989d).

Further charges on rural producers arise directly from their exploitation of natural resources in the form of fines and permits they pay for fishing, hunting and exploiting forests (both for woodfuel and browse), levied by the forestry agency. Figure 52 on Page 243 shows receipts for the Forestry Agency at a regional level for the period 1970-85. The proportion of revenue accruing from fines has steadily increased from around 50% in the early 1970s to over 65% of revenue in 1985, while overall revenue rose by a factor of seven between 1970-82, and has since declined to double the figure at the beginning of this period - in spite of the fact that the drought of 1982-87 was far more severe than that of 1972-73.

Figure 52: Revenue of the Forestry Agency,  
Region of Mopti, 1970-85



SOURCE: BUREAU DES EAUX ET FORETS, MOPTI

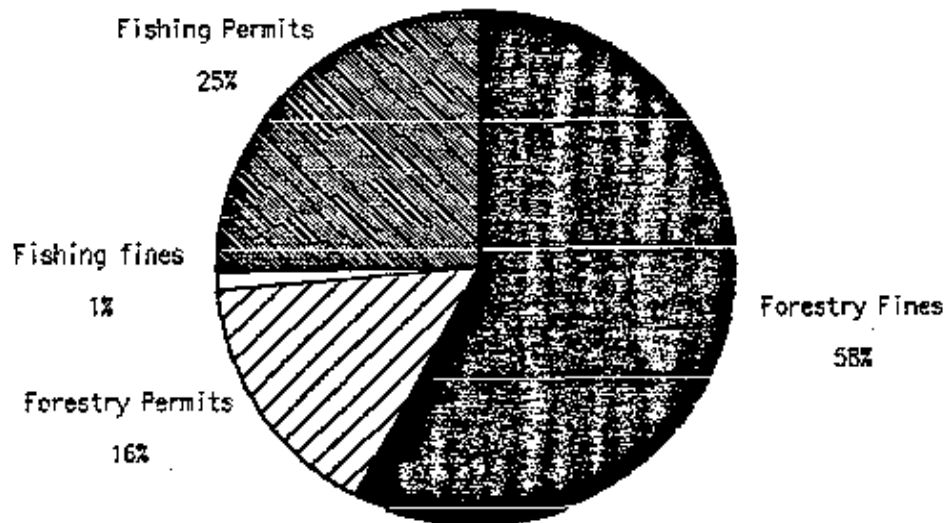
Table 10 and Figure 53 on Page 244 show a detailed breakdown of the Forestry Agency revenue for the Cercle of Youvarou in 1984 and 1985. In these two particularly bad years of drought nearly 60% of revenue came from fines. Fully three quarters of overall receipts were from penalties and permits issued to rural producers exploiting forest resources and over three quarters of revenue from forestry alone came from fines. Figure 54 on Page 245 further shows the seasonality of Forestry Agency revenue, demonstrating that most income was generated in the falling water season (January-April) and at the end of the dry season (July-September). The first period coincides with the arrival of smallstock in the Delta (primarily goats) and the most productive fishing months, and the latter period the time when livestock is moving out of the Delta at the onset of the rains. Smallstock owners and fishermen are disproportionately penalised for their exploitation of natural resources. Further, as Chapter 4 has shown, these fees are levied at a time of year (the end of the dry season) when smallstock owners are most in need of cash to buy food, as it is the middle of the 'hungry season' when

last year's stocks of millet have run out and the new harvest is still one to two months away.

Table 10: Revenue of the Forestry Agency in Youvarou Cercle, 1984-1985, in 000s of PCFA (500PCFA = £1 Approx.)

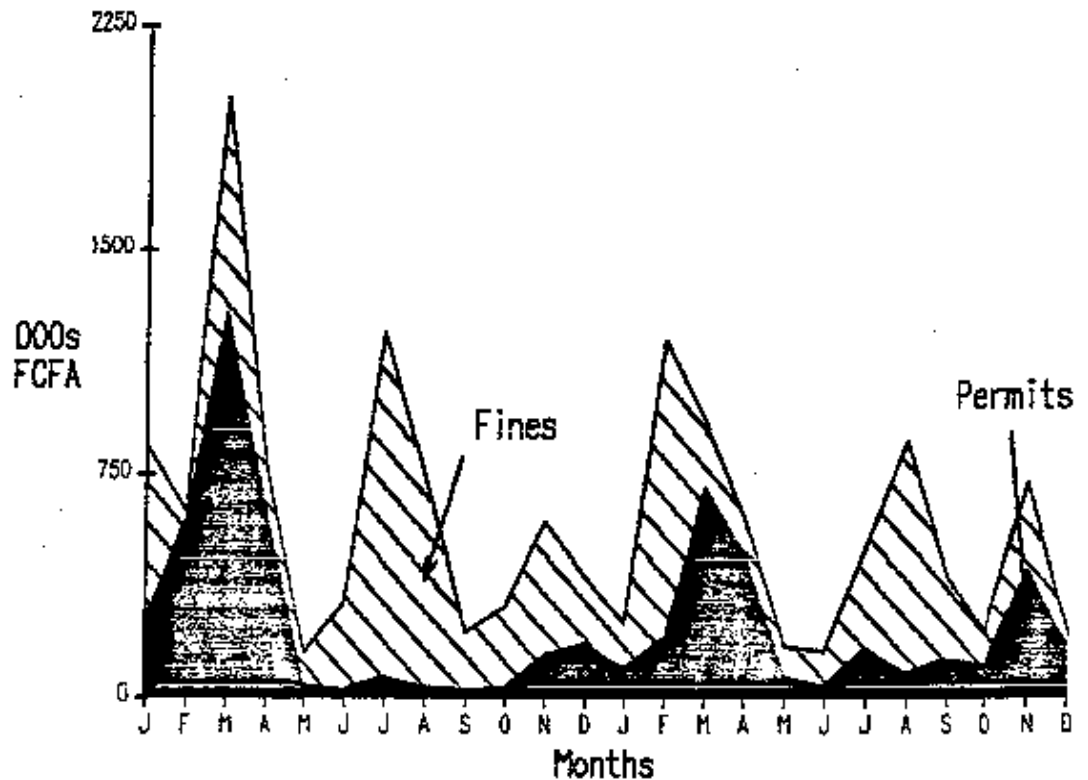
	FORESTRY	FISHERIES	TOTAL	PERCENT
<b>FINES</b>	8365	143	8508	58%
<b>PERMITS</b>	2282	3643	5925	41%
<b>TOTAL</b>	10647	3786	14433	100%
<b>PERCENT</b>	73%	26%		

Figure 53: Proportions of Revenue of the Forestry Agency, Youvarou Cercle, 1984-85



Source: Eaux et Forêts, Youvarou

Figure 54: Revenue of the Forestry Agency by Month, 1984-85, Youvarou Cercle



Source: Eaux et Forêts, Youvarou

There is an inbuilt incentive for foresters to fine, as a proportion of the penalty accrues to them personally. In 1984-85, 5% went to the regional director of the Forestry Agency, 5% to the head forester in each Cercle, and 15% to the foresters that actually imposed the penalty. Frequently the foresters on patrol would share a part of the 15% with informants who came forward with evidence of a breach of the rules. Almost none of the remaining revenue after these deductions remains in the Cercle, but is transferred to the National Forestry Fund from where it is often drained into the national exchequer to meet short-term national administrative needs. In principle, it is meant to be spent on forestry projects.

Added to these official taxes and charges of the administration, political party and technical services, are informal payments made by rural producers to officials. It is impossible to say with certainty how much these amount to, and the figures suggested here must be treated with great caution as there is no evidence of what was actually paid. Informal payments are a matter of everyday life in Mali, the principal reasons being the low rates of officials' pay, the tardiness with which salaries are paid (up to three months late) and the fact that in 1984, when Mali joined the FCFA zone, civil servants took a severe cut in salary.<sup>10</sup>

Informal payments exist wherever the administration has contact with rural inhabitants, from the issuing of identity cards (where you pay for the administrator's signature) to payments to avoid confiscation of equipment, for the appointment of village chiefs by the Cercle Commandant and honorariums to Deputies and senior administration officials to have a particular side to a conflict considered, often in disputes over access to resources (see Chapter 7). Rural producers refer to tens of thousands of FCFA in their dealings with arrondissement level authorities in connection with land tenure issues, hundreds of thousands at the Cercle level, and millions where regional and national level officials are concerned.

Herders in the Delta mention deals struck with the Ministry of the Interior officials in Bamako, that are calculated as a function of entrance fees that can be charged through the customary system for access to particular pastures, as a condition for supporting one particular herding manager (Dioro) over another in a conflict over succession. It is estimated some herding territories can earn up to £20,000-00 a year from entrance fees. The head forester of one Delta Cercle estimated that in most months he could double his salary from the proportion of fines he received and from informal payments, and in the productive months (i.e. January to April and July to September) he could triple or quadruple it. Taking the more

<sup>10</sup> This came about because when the conversion rate of Malian Francs to FCFA was fixed at 1 Malian Franc for 0.5 a FCFA, civil service salaries remained the same (that is 0.5 times the Malian Franc rate) while prices for many basic necessities (sugar, cloth, cooking oil) did not, and indeed remained the same price in FCFA, and thus effectively doubled.

conservative estimate of this latter figure, and assuming proportionately the same for other foresters in the Cercle, this would imply the total revenue of the Forestry Agency in Youvarou was in fact somewhere in the region of 20 million FCFA in the period 1984-85, of which just over a quarter (5.6m FCFA) came from informal payments.

Research has shown that if all investment - that is, in the productive, infrastructural and service sectors, and including the value of labour contributed by local people - is aggregated over the period 1970-85, its value is greater than what has been extracted from the Mopti Region: \$US 100 million, as against \$US 68 million. If, however, only those investments which were made in the productive sector are included, then the region has been a net loser with \$US 68 million taken out and \$US43 million invested (IUCN 1989a). The vast majority of rural people did not benefit from the infrastructure and services put in place by the ODR and the administration over this time, which are sited mainly in urban centres; nor for the most part have they benefited from investments in the productive sector since they have been largely unsuccessful. Given the taxes and other charges they have to pay and the way this revenue is subsequently exported from the zone, it is not surprising that rural communities view the development initiatives of the administration and political party with considerable scepticism, often going as far as seeing these initiatives as merely another way of raising taxes.

Fiscal policy raises rural producers' cash needs and this can be linked to productive practices that threaten to degrade the environment, in that their need to raise cash has placed a premium on the exploitation of resources that are marketable. With the failure of harvests in recent years, and thus a need to buy cereals, disproportionate pressure has been put on fisheries and woodland for fuel, which can be directly sold, and on browse resources which sustain goats, to which many rural producers have turned in increasingly drier years, as Chapter 4 has shown. Rural producers have also cut forage - bourgou - and harvested palm tree leaves to make into mats for sale.



In the practice of all these strategies they have run foul of the forestry department. They are taxed on boats and nets for fishing and for collecting wood for sale, and fined for stacking wood for smoking their catch (on the argument that they are selling their stocks and therefore should have a wood-trading licence). Goat herders are fined for breaking the branches of trees so that their animals can reach browse. There are also fines for cutting the leaves of palm trees.

Fines further raise cash needs, and the only means of raising this cash is to pursue the same strategies they are taxed and fined for. In this situation, rural producers are obliged to continue acting in ways which the government deems destructive of the environment in order to pay for the charges the government levies to protect the environment. This amounts to the mutually reinforcing processes leading to environmental degradation as described by Elaïkie and Brookfield (1987:193) in which a higher rate of use of a resource leads to its degradation, prompting in turn a yet higher level of exploitation.

#### 6.5. Summary

The information provided in the preceding sections of this chapter can now be looked at in terms of the parts of the Oakerson framework that make up the category of 'decision-making arrangements' in communal management systems. This chapter has shown how the nationalisation of Mali's natural resources legitimates all actions undertaken by the post-colonial state administration, political party and technical services in local communities with regard to their use of natural resources. In terms of the 'operational rules' that formerly governed communal resources, nationalisation has deprived local communities of their customary jurisdiction over their territories, and promotes their management in the name of the state. In this manner the 'fit' between local management systems and the specific properties of the resources they controlled has been broken, for the law applies to the whole of Mali, and does not differentiate

between ecological zones, or the production systems that exploit them. In terms of the 'conditions of collective choice', land tenure legislation establishes citizenship of Mali as the basis of allocation, denies the right of customary managers to function, and legitimates the final veto of state officials over communally generated customs and rules.

The new administrative boundaries put in place since 1960, the abolition of *Cantonnements* and their chiefs, the policy of appointing outsiders to senior posts and their rapid circulation have together, in the field of 'operational rules', cut across the customary frontiers of territories in the Delta, and made outsiders responsible for resource allocation. These outsiders have little knowledge of the characteristics of natural resources in the area, or of the people who exploit them. Evidently, this underlines the gap between the physical characteristics of the resources and how they are managed. In the field of the 'conditions of collective choice' these administrators, through their power to intervene in disputes, weaken local managers ability to constrain individuals acting alone, and undermine their capacity to provide a remedy for those who have suffered losses as a result. They also provide 'veto positions' to communally generated rules.

The political party in many ways doubles up on the administrative structure, and is run by people from the same socio-economic group: urban-based functionaries who have had a French education. While at the village level customary managers are represented on the UDPM committee, they are not influential because, in spite of the emphasis on 'grass roots' initiatives in latter day policy, in reality the post-colonial state follows a top-down approach to development, imposing 'progressive' initiatives on local producers. Further, at a local level, the UDPM committee provides a forum for dissent to the customary structure, in that customary rivalries (for instance, between traditional managers and their younger brothers) are reflected in diverging political tendencies within the committee. The political party can be seen as acting to break open the customary system from the inside, with dissenters to the communal status quo adopting

the official party line of state ownership and management of resources in order to gain power.

In these instances the political party acts on the 'operational rules' and 'conditions of collective choice' in much the same manner as the administration. It is important to note, however, that in fulfilling this role the political party rapidly begins to compete with the administration. The rivalry that ensues provides rural producers with yet another structure that claims to manage access to resources, so further debilitating the former unified structure of power that existed in the community based upon kinship and residency rules.

It is through the actions of the technical services and the manner in which fiscal dues are collected that communal management systems have been most affected. This chapter has shown how technical service personnel represent external structures to local communities as tax-men, and are explicitly against the exercise of what they deem 'feudal authority'. The permits they charge for, the fines and fees they exact, and the dates they set for access to pastures and fisheries are entry and exit rules which are not managed in the interests of the 'jointness' of the community, nor entirely in the interests of the state, inasmuch as a significant proportion of them are informal payments to the agents personally. In terms of the 'conditions of collective choice' the technical services represent 'veto positions' to local managers. In according access to those who can pay most, they promote the ability of individuals to act alone with a disregard for the costs that incur to others. Nor do they provide a remedy for those who suffer as a result, because the fines and fees are not reinvested locally, and they clearly do not dissuade local producers from continuing to abuse their environment. The reasons for this have been made clear in Chapter 4.

Fiscal policies, especially in the conditions described for the 'post-drought' period in Chapter 4, directly operate on the 'conditions of collective choice' through obliging individuals (or households as the fiscal unit) to act alone in exploiting resources for cash. This becomes a vicious circle because the assets they exploit to generate

money are often - especially in the case of farmers and farmer herders - those resources that attract fines and fees from the technical services. In this respect fiscal policies directly effect the technical and physical attributes of the resources themselves.

Small scale projects carried out under the tutelage of the administration, political party and technical services have been shown to present a radical alternative to local producers' customary systems of managing and exploiting resources, and to the strategies they have adopted in the face of drought. Where customary 'operational rules' define exit and entry regulations in terms of kinship, status, ethnic group and residency rules, state projects allocate access according to citizenship, promote 'jointness' in terms of the whole nation rather than the community, and claim resources belong to the state rather than to the founding lineage of a settlement.

Where under the customary system an individual's capacity to act alone was severely constrained by peer group pressure and fear of the supernatural power of the resource manager, state projects promote collectivisation in the name of the nation as a whole. But, state structures are composed of a set of competing groups, each of which claims to allocate access (often on the basis of payment). In effect, this promotes individual action. Larger scale government projects have also been shown to promote individual action in the name of the state, whilst taking resources out of local producers' hands and reallocating them (often to functionaries). Flood water and pasture management and fishery credit schemes have contributed both to the hardship of rural producers and to the degradation of resources.

This chapter has therefore shown how profound changes in external relations to the wider post-colonial state have destroyed communal regimes for managing access to resources, whilst also contributing to the degradation of those resources. The state's attempts at regenerating natural resources and managing access have met with little success. It would be absurd to argue, however, that land tenure legislation, structural proliferation and rural development

policy aimed to destroy all management of access and penalise rural producers.

State rules are not inimical in themselves, nor need necessarily to lead to an undermining of communal means of managing resources. It is the manner in which the policy is applied, the obstacles to its proper implementation, and the aims of those carrying it out that subvert indigenous management systems. No effective alternative system is being put in place that links local knowledge to dependence and management of the resources concerned. These are the issues explored in the next chapter which looks at the 'patterns of interaction' between producers and resource managers that govern the choice of strategies rural inhabitants are adopting in the Delta today.

## CHAPTER 7

## 7. CASE STUDIES OF THE MANAGEMENT OF RESOURCES

The previous chapter has shown how the 'congruence' between the physical characteristics of natural resources in the Inland Niger Delta and local management regimes that existed in the 19th century has been lost during the period of post-colonial rule. This has been accompanied, particularly in more recent years, by falling natural resource production in the area as conditions of drought have worsened, and by an increase in the post-colonial state's penetration and debilitation of local management systems.

The chapter further demonstrated how the nationalisation of natural resources, the proliferation of state structures and the imposition of centrally-conceived rural development policy and practice has not resulted in better care for the area's natural assets. Indeed, this process has separated local knowledge and economic dependence on the Delta's resources from the responsibility for their management. It has also arguably directly contributed to the degradation of the resources themselves. Overall, by following a policy of disinvestment, and through the pursuit of fiscal revenue, the post-colonial state has made local producers sceptical of the state's aims, and has increased their need for cash revenue, so promoting short-term production strategies centred on the exploitation of the Delta's more marketable assets.

This situation can be characterised as one of 'structural chaos' in which rural producers are faced by an array of state institutions which often compete in allocating access to natural resources. While local management systems have been seriously undermined by the power of these institutions to affect the 'conditions of collective choice' and the 'operational rules' by which they allocated access in the past, these latter customary systems nonetheless remain operational. This is partly because of the seasonality of state intervention in the rural economy, which concentrates on the moments of the year (the falling water and the dry seasons) when the Delta's resources are most economically productive, giving these

management regimes a free hand at other times. These systems still represent in rural producers eyes a clear attribution of resources according to the widely accepted principle of the right of the first comer to manage. They also continue to function by having grafted themselves onto the various elements of the state structure and learning to play off their competing interests.

This chapter examines the ways in which customary regimes have adapted to the competing interests of the state structure, through case studies on conflict over access to natural resources. This elucidates how the relationship between local management systems and state organisations creates the conditions in which 'Tragedy of the Commons' outcomes are likely. The chapter is concerned with the 'patterns of interaction' category of the Oakerson framework which deals with the strategies rural producers and decision-makers choose with regard to communal rules of access to resources (Chapter 2). Oakerson suggests communal systems can only be sustained when rural producers follow 'reciprocal' strategies, and when producers are assured that everyone will cooperate with a set of rules. He contrasts this with 'free-riding' strategies where rural producers act to take advantage of local rules, on the assumption that other producers will not follow suit. This chapter critically assesses the opposition between these strategies in the light of the coalitions of interest groups that support the imposition of state rules on the one hand and the maintenance of customary control on the other. In conclusion it argues that the conditions which promote 'Tragedy of the Commons' outcomes in the Delta today are being artificially maintained by the post-colonial state.

As mentioned in Chapter 4, two methodologies were used to gather these data. The first consisted in an examination of the archives held at regional level, which provide some documentation of the most serious conflicts in the Youvarou Cercle, mostly in the early 1980s. These were complemented by interviews carried out where the conflicts took place.

Many of the conflicts in Youvarou have been running for years, and are unresolved to this day. This makes the collection of data delicate

and their interpretation difficult. The layers of interest surrounding these conflicts continue to make everyone involved - including administrators, technical staff, the protagonists (and perhaps myself) - partisan to some degree, so that what is presented here is an indication of the direction and themes of the disputes, rather than a definitive account of what took place. The archives themselves are often eloquent in what they seem to omit.<sup>11</sup>

## 7.1. The Fisheries

### 7.1.1. The Diaka and the lakes

The first case study examines an area on the south western shores of Lake Debo and a length of the Diaka river that flows into it (see Map 8 on Page 256). This is the area inhabited by three of the four communities making up the farmer fishing sample in Chapter 4 (Garoeve, Taneredji, Fara Yeni).

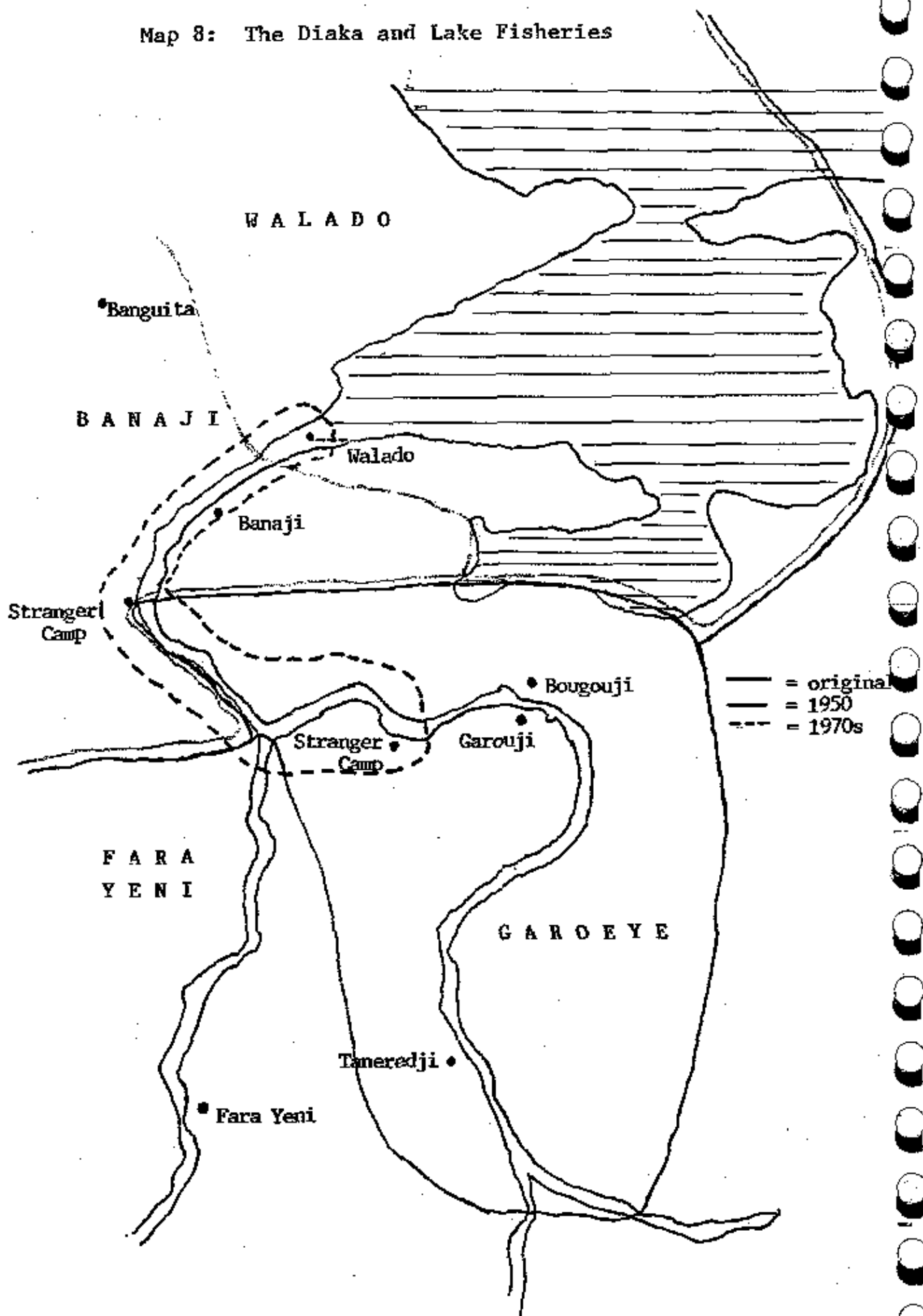
The study concerns two ancient fishing territories belonging to the Sorogho, with clearly defined boundaries and managed by two masters of the water. The events that have taken place in these territories are closely linked. Conflicts in one territory have had a knock-on effect in the other, involving the same protagonists. Government policy, especially in recent years, has treated the whole area as one fishery. For these reasons, the evolution of management regimes in these territories is considered to be one case study, though the complexity of events that have taken place makes it necessary for the characteristics of each territory to be examined individually at the outset.

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<sup>11</sup> The author was helped in sifting the information by having spent fourteen months in the zone in 1980-81, and a further four years there between 1984-88. Over this period the general outline of the major conflicts in the zone and the main protagonists involved were established through frequent contacts with the people involved. Information on many other conflicts in the northern sector of the Delta was gathered at the same time, but has not been included as no corroborating written evidence was available.



Map 8: The Diaka and Lake Fisheries



### 7.1.2. The Banguita-Walado fishery

This fishery customarily comprised Lake Walado, a small part of Lake Debo, the downstream section of the Diaka river and the floodplains to the west of the Diaka (see Map 8 on Page 256)<sup>12</sup>. It was customarily managed by a Sorogho master of the water based at Banguita. Each year, as the waters fell, the fishing community would move down to the western shore of Lake Walado, until the waters began to rise again when they returned to the western border of the floodplains. In years of good flood levels, the Walado camp was inundated and uninhabitable in the rising and high water periods.

In the falling water and dry season, this territory was visited by two kinds of customary seasonal visitors. The first were Sorogho who came to take part in the fishing at the beginning of the falling water season, both for the 'Niger sardine' (*Alestes*) in the main river, and for the barrage fishing in the outlets of the secondary channels draining the floodplains. Generally they exploited the upstream area of the territories for two to three months before moving down onto the lakes for the dry season. The second type of visitors were Somono, mostly from a fishing territory to the south, who appeared late in the falling water season and fished the main rivers and the lake with nets. While there were (and are) reciprocal fishing rights between Sorogho from adjacent territories, the Somono were considered different people, and the tithe they paid was formally set (a third of the catch), while that for the Sorogho was more voluntary. Each year, the master of the water would designate the areas within his territory where these visitors could erect their huts.

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12 The boundaries of the fishing territories shown on this and following maps are approximate. Though the writer visited these boundaries with local managers it was not possible to survey them, as the presence of someone with a compass measuring these territories' limits would have raised undue suspicion from stranger fishermen in the area who, as will be shown, contest these boundaries.

### 7.1.3. The Garoeye fishery

This fishing territory lies to the south and east of the Banguita-Walado domain and comprises floodplain and river fisheries. Customarily the area is managed by the master of the water of Garoeye (see Map 8 on Page 256). Within this territory, and dating probably from the time of the Malian empire (14<sup>th</sup> century), was a settlement of Somono fishermen situated on the other side of the river, at Garouji. These Somono had rights to fish in the area, and organise their own form of collective fishing using a senne net during the falling water and dry seasons, though the overall master of the water and sacrificer in the zone was the head of the founding lineage of the Sorogho community at Garoeye. As with the Banguita-Walado fishery, Garoeye received traditional visitors each year from Sorogho communities based in the upwater regions of the Delta, and identified the camps they were to occupy while they were in the area.

During the Dina a third settlement was established in the territory of Garoeye, made up of Sorogho who had converted to Islam and fought with the Fulani of Cheikou Amadou against the Macina clans. They were given access (initially, according to the master of the water, only to dry season fishing rights) on Cheikou Amadou's request, and settled at Taneredji.

During the years of scorched earth warfare at the end of the last century the people in all three of these communities were forced to move to the Kounari on the eastern borders of the Delta. They returned when peace was re-established. The Sorogho of Garoeye brought with them on their return five lineages they had lived with in the Kounari: all five were Sorogho, and came from neighbouring fishing territories to the south (i.e. upriver).

#### 7.1.4. Conflict over access to resources

The case study examined here is concerned principally with the way in which outsiders have been able to force access to these two fisheries through using the structures of the colonial and post-colonial state. Events leading to the eventual 'nationalisation' of these resources go back to the colonial period and concern initially the Banguita-Walado fishery.

About the time of the Kitangal drought (1912), part of the community of Banguita moved to a new site on the floodplains, to the southwest of their dry season camp, at Banaji, whose site was high enough to be out of the water all year round (though the master of the water remained in Banguita).

In the early 1950s a Somono, a member of a lineage that customarily came to the fishing camp at Walado each year from the fishing territory to the south, but which had attached itself to the Sorogho community permanently for some time, made a bid for the headship of the community when the old master of the water died, and was successful, so pre-empting the traditional rights of the old manager's younger brother. The new officially-appointed manager had been the principal adviser to the old master of the water, not least because of the education he had received in a school run by the colonial authorities, and thus his capacity to speak French. In his bid for the headship, this man was able to enlist the help of the Cantonnement head and the support of the French Commandant du Cercle in Niafunké, culminating in a court case victory. The upshot was that the former dry season fishing camp at Walado was considered by the colonial authorities as the centre of the fishing territory, and the new permanent community set up at Banaji was considered to be the high water camp of the former. On tax lists to this day the inhabitants of Banaji are considered to fall under the responsibility of the head of Walado.

Nonetheless, the rightful inheritor of the master of the water (the younger brother of the old manager) retained control over much of the river and floodplain fishery and settled at Banaji. The new

Somono manager at Walado principally exercised control over the lakes. In this process the original territory based on the Banguita-Walado axis was divided into two, split between Banaji and Walado, while the original settlement at Banguita was not considered to have any waters at all. The exact boundaries between these territories are to this day very difficult to define. Relationships between the younger brother of the original master of the water and the new Somono chief are still acrimonious.

Since the 1920s and 1930s, when the Delta experienced drier conditions and when the market for fish was expanding (see Chapter 5), new seasonal fishing camps had been created on the banks of the river between Banaji and Garoeye, initially with the support of the two masters of the water, and the new manager at Walado. In the 1960s strangers occupying these camps claimed rights to the water in line with the independent government's proclamation that all waters belonged to the state and that feudal masters of the water no longer existed. Not all strangers took this line: many still believed in the supernatural powers masters of the water were said to have, and the masters were not slow in fulfilling the role of representing strangers to the local administration. Seasonal strangers, when they were fined by local authorities, often had recourse to the master of the water, who had contacts with local foresters, policemen etc..

Under the post-colonial administration, issues have polarised around the use of senne nets on the main river. Sennes are used primarily by the Somono and latterly by outside Sorogho fishermen (it will be recalled that migratory fishermen are much better equipped), while local fishermen use gill nets, hook lines and, in the collective fishing season a form of large hand-held net. Their customary collective fisheries are directly threatened by senne net users who wish to do away with the system by which areas of the main river are put into 'reserve' and fished on a particular day, in favour of being able to fish the river the whole time.

The drought of 1973-4 heralded an outright confrontation between seasonal strangers and local fishermen. In the disputes that broke out, stranger fishermen were opposed to the local master of the

water not only at Banaji, but also the master at Garoeye and the head of the village at Walado. Local fishermen's interests were partially upheld by the administration at Niafunké in July 1974, which decreed that sennes were banned in Walado's waters, but in the process there was an official redistribution of water rights to the stranger fishermen in camps beside the river. The waters they were given (in which they could use sennes) came partly from the waters of the master at Banaji, and partly from those belonging to Garoeye. Thus where once there had been two fishing territories on this stretch of river, there were now four: those belonging to Garoeye, to Banaji, to Walado, and now to the seasonal strangers as well.

For a period, an uneasy peace prevailed. Then, in February 1981, conflict broke out, this time primarily between the fishermen from all three communities in Garoeye's territory and local fishermen in the domain of Banaji, arraigned against many of the same strangers with whom there had been conflict before. This time the Commandant du Cercle of Youvarou (Youvarou having been made a Cercle in 1977) decided that fishing in the area was open to all Malian fishermen, if they conformed to local customs. This judgment did not hold however, and in August of the same year the Governor of the Fifth Region intervened after serious conflict broke out between the same strangers and local communities, and sent an ad hoc commission to report on the situation.

Strangers, in effect, were now trying to use senne nets over the whole length of the river, arguing that they were justified in doing so - and conforming to local customs - because the Somono community at Garouji had a senne net which they used. In fact the community of Garouji used their senne (and they had only one) under closely supervised conditions at a specific time of the year (April - July) and fished using traditional methods at other times. The grouping of villages at Garouji, Garoeye, and Taneredji, particularly during the falling water period and in the dry season formed a loose management group, meeting to resolve conflicts at regular intervals. The events described here illustrate this for, according to sources on the ground, each village contributed to a fund in 1981, which was given to the Governor's office as an

informal payment, in order to persuade him to intervene on their behalf. The fund was estimated to be over one million Malian francs (about £1,000). It is more than probable the stranger community was doing the same: certainly, in the regional records, frequent visits from the representatives of the stranger fishermen are referred to, and many letters from them are available.

The decision of the ad hoc committee was something of a judgment of Solomon. The whole stretch of river from its outlet in the lake to the upstream limit of the territory of Garoeye was to be considered as one unit. In this area senne nets were to be allowed from August to April (the beginning of the rising water season until falling water levels in the dry season cut off the river from the lakes). But only five senne nets were to be allowed in the area (one from Garouji) and to be used only twice a week, the dates being set by the local administration's fishing committee, and supervised by the foresters.

The reasons why such a decision was reached are illuminating, for they show the way in which the administration forgets at its convenience the convention on customary access rules. Outsiders are let in to fish because locals commercialise their catch, because there is already one senne in the Somono village, and because the strangers - who have thirty sennes in their camps - 'form a grouping'.

This judgment was singularly unable to prevent conflict. The dry season of 1982 shows the police intervening to stop violence between the strangers and the fishermen of Garoeye and Taneredji. In early 1983 the same thing happened, and the Commandant du Cercle and representatives of the strangers were called to Mopti to see the Governor. Later, the Governor and the regional head of police visited Youvarou and convoked a special meeting of the political party at Section level to discuss the affair where local fishermen, curiously, were represented by the Somono head of Walado and the head of the Somono fishermen of Youvarou. At this meeting, these representatives asked for the leaders of the stranger fishermen to be thrown out of the area, as they were forming an organisation of

strangers intent on destroying customary local rules governing fishing.

The reply of the representative of the strangers was eloquent: that the fishermen representing the locals at the meeting were all strangers themselves; that strangers had paid local customary authorities (masters of the water) large sums of money to fish in their waters; that they were being asked to submit themselves to feudal fishing authorities (by being asked to conform to local customs), who were illegal; that local fishing equipment was archaic; that all stranger fishermen paid for the permits to fish, while locals rarely did and that, therefore, stranger fishermen contributed more to development than others. Interestingly, the Governor of the day did not agree, and accused the representative of the stranger fishermen of not wishing to cooperate with locals, adding: 'The land belongs to those who first occupied it'.

In 1984 a new Governor was appointed, who moved briskly to give access to stranger fishermen to the part of the river they were not allowed to fish in before (i.e. outside of the waters that were distributed to them in 1974). In July 1985 further violence broke out: policemen intervened and found strangers preparing to fish in these waters, monitored by two agents from the Youvarou Forestry service.

On this occasion it became evident that representatives of stranger fishermen were travelling through the camps offering fishermen the possibility of fishing in the waters of Garoeye and Banaji, on payment of between 5,000-10,000 FCFA (£10-20). More than thirty sennes were involved, implying a fund had been raised of about £500. At the meeting between the police and the representative of the strangers, the latter stated he had permission to fish directly from the Commandant du Cercle. Also at this meeting it became apparent that local fishermen were doing the same in allowing strangers to fish their waters if they paid a tithe, though the amounts they dealt with are smaller: £10 a senne, about twenty sennes, coming to £200-00 in all.



Finally in June 1988 a Governors' decision upheld the 1981 finding and opened the whole length of the river to senne fishing between August and April. However, at the end of the year a new regional fishing policy was adopted which banned the use of senne nets entirely in the area. Local fishermen were pleased, but strangers argued they would fight the decision at a national level.

Thus a fishery that began in the Dina period as an area managed by two masters of the water finishes up at the end of this span in time virtually as a free for all, with locals, outsiders, customary authorities and latter day administrative, political and technical structures all intervening, often in contradiction with one another, and accompanied by substantial informal payments and outbreaks of violence. Over this period, while the issue of the senne net has been solved (if it is not reversed at a national level), the underlying issue of who is to be granted access, and who is to effectively manage has not, and it is difficult to believe that if the present run of dry years continues the underlying problem of establishing who owns which resources will not emerge in another guise.

#### 7.1.5. The Floodplains

The second example of how access to resources are managed at present comes from the floodplains in a comparatively remote area of the Delta in the south east of the Cercle of Youvarou. This case does not raise issues of territorial limits but is much clearer on how outsiders, armed with influential contacts in the administration, and superior economic resources, can use present-day structures to break old agreements and force access to a fishery. It is also noteworthy, however, in that the local community concerned was ultimately able to prevent these strangers from establishing independent rights of access to the resource. Further it clarifies how different structures of the post-colonial state which manage access to resources, and different levels within them, often act at cross purposes to one another.

The outsider fishermen in question are from an upstream village in the Delta whose members, like many other communities in their area of origin migrate down the river in the falling water season as far as the lakes. At first, they establish 'barrages' across the river in places where the underwater topography of the channel is suitable to fish for the 'Niger sardine' (*Alestes*). Later, when the water has become too shallow, they adopt senne net fishing techniques. Generally, sites for barrages are specific, and traditionally are in the same place, with customary exploiters coming each year to use them, paying a tithe to the traditional authorities. In recent years, however, as increasingly dry conditions prevail, frequent strife has broken out with regard to: ownership of the barrages; the amount and direction of payments for their exploitation; and their actual positions, as hydrological conditions change.

For at least two generations the outside fishermen in question here - members of a single lineage - have fished the waters of this floodplain community, an ancient Sorogho settlement renowned for its traditional social structure and for its continued animist beliefs. Following the 1973-74 drought, these local fishermen decided to ban sennes and barrages in their waters - the common way of keeping strangers out. When the outsider fishermen attempted to erect their barrage in early 1977, the local inhabitants dismantled it. The outsiders contacted the head of the para-statal fishing agency, OPM, in order to get official backing for their barrage. In 1978 it appeared that everything was peaceful. In 1979, however, the Cercle-level fishing committee (which hardly ever meets) took away the outside fishermen's authorization to erect their barrage (which implies they might have been given permission to erect the barrage as a result of contacting the fishing agency in 1977, but no evidence of this was available).

In April 1980, after contact between the governor and the representative of the outsiders (the head of the lineage), the governor asked for information from the head forester of Youvarou as to whether the barrage was in place. His reply was that it could only be erected when a soldier was present to guard it, otherwise local hostility would destroy it. In August 1980 the locals and

outsiders came to blows, and the police were called in. The complaint of the outsiders was, curiously, that the 1979 decision (of which no record remains) by the fishing council was impossible to implement because of local opposition.

When the police interviewed the local people they were nearly attacked, as local inhabitants believed they were on the strangers' side. In their report, the police showed why the villagers thought this was so, for they feared that if they let one barrage in, a string of others would follow. The reason for this was that the district representative for the fishing agency, and the political secretary of the arrondissement, were trying to introduce barrages into the zone. It is interesting to note that it was the village secretary of the political party who was the community's representative in these meetings, implying a difference of opinion between the local UDPM committee and the arrondissement level Sub Section (i.e. contradictory positions within the post-colonial state).

The story, as it further unravelled in the police report, showed a division within the community between the head of the village and the master of the water (who were not the same person). The latter supported the outsiders, or was at least unwilling to oppose them. When the outsiders arrived in the zone that year, it was the village head who sent a message to the local arrondissement head asking him to evict them, while the strangers themselves sent messages to the Commandant du Cercle. Finally in the report, drawing on an interview with the forester present in the zone, it seemed clear that the arrondissement head, the political secretary of the arrondissement and the foresters themselves were all implicated in introducing barrages in the zone (clearly, in return for revenue). Contacts had also been established with the regional head of the forestry service by the local fishermen, which led eventually to the local foresters being told to desist.

This led in September 1980 to a formal complaint from the chief police officer in Youvarou to his battalion headquarters in Mopti against the fishing development agency and the arrondissement administration, claiming they were allowing contested barrages to be

put in place. Then all was quiet for two years. At the end of this period a new arrondissement head was appointed.

In January 1982 the head of the strangers wrote directly to the Governor saying that local fishermen had bribed the new arrondissement head £200 (three months' salary) to keep them out, and that two soldiers had been sent to put this into effect. The representative in the meantime had also managed to contact the Minister of the Interior in Bamako, the capital. The Governor asked the Commandant du Cercle what was happening, who replied that he thought the outsiders were making false accusations against the new arrondissement head. Later in the year, the Governor dispatched the regional head of the forestry service to look into the situation. After he submitted his report, the Governor's office overturned all previous decisions and instructed the Cercle to give the strangers access, as their barrage was temporary. In 1983, the barrage was in place. In 1984 a new Governor was appointed.

In May 1984, in another letter to the Minister of the Interior, the son of the head of the strangers informed him that since the departure of the old Governor, local fishermen were refusing to let them settle in the zone. This happened after the son had been to see the new Governor, who had sent him to see the Commandant du Cercle, who said in turn that he could do nothing without a letter from the Governor himself. The Minister of the Interior, on receipt of a letter from the son, wrote to the Governor, who passed the matter on to the Commandant du Cercle, who replied that the sheer hostility of the local fishermen meant that either the strangers gave up the idea of using the barrage or that (preferably) the strangers left the zone. In August 1984 the local arrondissement head confirmed this view, saying the installation of this group of strangers in the community was a danger to public order. Thus, after eight years of opposition, this community was able to prevent outside fishermen from breaking their access rules, but with no surety that the fishery belonged to them, and with a strong probability that with another change in the administrative or political structure, outsiders will attempt to force access once more.

#### 7.1.6. Togguéré Koumbé and Dogo

This case study illustrates at one level how the administration of each individual Cercle competes with other Cercles; and at another level how the demarcation of new administrative boundaries has affected fishing and herding territories. At a third level it shows how customary management systems have reacted to boundaries that have been imposed upon them, at the same time as communities that formerly were managed by one master of the water now claim their own rights to the resource as a result of being placed in a new administrative district.

As mentioned in preceding chapters, the Cercle of Youvarou was created in 1977 (see Map 4 on Page 97). In the process four arrondissements from the old Cercle of Niafunké (Youvarou, Gatie Luomo, Ambiri and Sah) were brought together with one from the Cercle of Mopti (Guindio), and a new arrondissement was created at Dogo which split the old arrondissement of Ouro N'Dia, part of the Cercle of Ténénkou, into two. The remains of Ouro N'Dia became part of the arrondissement of Togguéré Koumbé in Ténénkou Cercle.

In the process, fishing and herding territories were sundered between two Cercles. Ouro N'Dia is one of the oldest herding territories in the Delta, being one of the founding Leyde of the Kingdom of Macina. At the time of the Dina, in common with other Leyde that opposed the Islamic state of Cheikou Amadou, a Maraboutic lineage was imposed on the pasturing territory as its political leadership (the Cissé), but the Leyde remained intact. While political and administrative leadership was confided to the Cissé, pastoral matters (organisation of the herds into Eggirdé, crossing dates etc.) remained in the hands of the customary sub-Dioro. One of these was Dogo. When the new administrative boundaries were drawn, the Dogo Dioro became independent, and Dogo is now considered to have its own pasturing territory.

This new delimitation of boundaries also affected the fishing territory of Fara Yeni. The traditional waters of this territory straddle the

boundaries of Dogo (Cercle of Youvarou) on one side, and Togguéré Koumbé (Cercle of Ténénkou) on the other, and since 1977 there has been continuous acrimony between the master of the water at Fara Yeni and fishing communities formerly part of the customary territory, but now part of a different arrondissement in a different Cercle.

The hub of the problem lies with fishermen in three communities in the arrondissement of Togguéré Koumbé claiming the waters for themselves. Two of these villages are composed of strangers who were given rights to fish by the master of the water at Fara Yeni many years ago, and the third is a Rimaïbé community. All these communities are deemed to have rights to fisheries by the administration because they are situated on the banks of rivers.

The rights of the two fishing communities are re-enforced by the younger brother of the traditional master of the water at Fara Yeni, who, following a dispute, moved to one of these communities and set himself up as a new master of the water in his own right. Conflict on several occasions has broken out over who has the right to allow access to strangers to set up barrages and fish with sennes in the falling water season in this area, between the customary master of the water at Fara Yeni, and his younger brother in the different Cercle.

Serious conflict broke out in March 1981, when stranger fishermen crossed from the Dogo arrondissement into Togguéré Koumbé and fished a stretch of the river with senne nets. Earlier the respective heads of the arrondissements had agreed that fishermen from Dogo could cross to Togguéré Koumbé to fish but that they could not use senne nets. For reasons that are not clear in the archives (but which locals insist followed upon substantial informal payments by them to the administration), the deputy head of Youvarou Cercle later wrote to the arrondissement head in Togguéré Koumbé saying this earlier decision was null and void and authorising these fishermen to fish in Togguéré Koumbé waters, with sennes (something that was not formally within his power). When the head of the Togguéré Koumbé arrondissement visited the area after

receiving this letter, he found fishermen exploiting the river with sennes, supervised by policemen and foresters from Youvarou Cercle.

At a meeting convened by the Governor in June with the heads of both the Ténénkou and Youvarou Cercles, it became clear that the master of the water at Fara Yeni had authorised (and had been paid by) a group of outside fishermen to go and fish waters that customarily belonged to his territory, but were now in another administrative district. With regard to the role of the Youvarou administration in authorising the fishery and monitoring it with policemen and foresters, the report diplomatically claims they were 'fooled' by local fishermen.

Again in 1984 the Commandant of Ténénkou Cercle complained to the Governor that the head of the arrondissement at Dogo was authorising the establishment of barrages in Togguéré Koumbé waters. In 1986 further violence broke out, this time between fishermen from Togguéré Koumbé - this time locals, not outsiders - who came into Dogo to fish and were attacked by villagers from the Fara Yeni territory.

The interesting aspect of this case study is that it shows a traditional manager actually using the administration to try and re-establish customary access rights in the eyes of local and stranger fishermen, when the administration denies the existence of those customary powers in the first place, and of his younger brother seeking to legitimate his authority to manage customarily the same way.

It is not unique to this production system or to this area. In the period 1984-1988 that the author spent in Youvarou there were many reports of Youvarou administration officials accompanying traditional managers - in particular Dioro of the Fulani - when they left the Cercle to collect traditional tithes from strangers in their pastures in neighbouring Cercles. In effect, the traditional Leyde of the Yaalabé, Diallobé Bourgou, and Diallobé Djenneri all extend beyond Youvarou into the Cercles of Ténénkou in the former case

and Mopti in the two latter cases. Mopti policemen equally came into the Guindio arrondissement of Youvarou with Dioro from Leyde that had pastures there.

## 7.2 The Pastures

This case has the shortest time scale of all, and describes events that took place on one occasion only. Of all the accounts of conflicts over access to resources in the Cercle of Youvarou it is, however, the most important, as it was perceived by the Malian state as threatening its sovereignty, and led to military manoeuvres in the area of Youvarou.

The events took place in the dry season of 1971. In March of that year an officially-set cattle crossing into the Youvarou pastures from a neighbouring arrondissement took place, clandestinely, ten days before it was meant to. This debouched a set of outside Twareg pastoralists onto the Youvarou pastures before their customary time. On the same day another cattle crossing took place to the west, this one on the appointed day, bringing the customary owners of the pastures - the Yaalaibé - onto their own land. Here they found the strangers (Twareg), who had broken the customary rule of only being allowed to enter the area after the traditional owners had passed through. The clan leaders of the Yaalaibé demanded either that the Twareg move back, or they pay a traditional fee of entry. The Twareg refused, saying the pastures belonged to all Malians (this coincided with a prolonged government campaign to nationalise all natural resources), and that anyway they had the permission of the district police to be there. They were attacked by the Fulani: eight people were wounded and one later died. After this, the Twareg withdrew.

Two weeks later the herds converged on Walado, for the last officially set crossing of the year, which allows access to the dry season pastures on the lake beds. Tensions were running high after the earlier confrontation. On the eve of the crossing there was a meeting between the Twareg, the Yaalaibé, the police and the



arrondissement head to decide on details of the crossing and on who should pasture where. The Fulani asked for the customary ten day delay between their entry onto the lake beds and access being granted to the strangers. The arrondissement head, in line with state policy, refused and demanded they cross at the same time. It was agreed, however, that the Twareg should pasture to the east once they had crossed, the Fulani to the west.

The next morning the Twareg, breaking all customary rules of allowing the Fulani into the pastures first, crossed the river early and headed east. They were immediately attacked by the Fulani. After an initial engagement leaving four dead and twelve wounded, they fell back on Walado while the Twareg formed a defensive square out on the floodplain. Other Fulani flocked to the area: four hundred or so moved up to attack the Twareg again, but seeing the amount of guns they faced (the Fulani were mostly armed with spears), withdrew. At a meeting afterwards with the Administration it was decided both the Twareg and the Fulani would pasture in the same area, six kilometres apart. The Twareg immediately demanded the right to pasture in the area earlier allocated to the Fulani, in order to demonstrate they could move everywhere freely (and that therefore the pasture were open to all-comers). This was refused by the administration who clearly saw the Fulani would attack them again if this happened.

The inquests then began: it became clear early on that there was not only an ethnic division on the ground between the Twareg and the Fulani, but that these differences were reflected in the administration; and this was of crucial importance for understanding the scope of the conflict. The arrondissement head in the area the Twareg had originally come from to enter Yaalaibé pastures was a Twareg himself who, in a series of letters both before and after the incident, made his partisan view of the Fulani very clear, at the same time as he accused his opposite number in Youvarou of representing the interests of the 'feudal' owners of the pasture. It is significant that the deputy head of the regional police, who attended the enquiry after the events was a Twareg, and the Fulani village chief of Youvarou at the time was the younger brother of a

former Minister of Justice under the Keita government, ousted by Moussa Traoré, it will be recalled, only three years previously.

Very quickly, questions of a national conspiracy were raised. The head of the regional police in May 1971 claimed that the Fulani of the area had been planning an 'insurrection' for some time, and that they had received orders from Bamako (i.e. from the former Minister) to defy administration policy of nationalising all natural resources, as an example of their capacity to resist. This view was in reaction to the openly stated concerns of the judge at Niafunké in charge of the case who questioned whether the younger brother of a former Minister of Justice should be imprisoned (the Youvarou village chief had been arrested), and the appearance in the area days after the event of a close colleague of the Minister of Information, a Fulani from Youvarou, claiming he was carrying out an enquiry into the affair at the Minister's behest, who proclaimed publicly that it was the Twareg who had broken customary rules.

It was in these circumstances that later in the dry season a battalion of the Malian army was moved into the area, surrounded Youvarou and fired salvos of machine gun fire into the air, before moving down onto the floodplains where the incident had taken place to carry out manoeuvres with the air force.

In September, the protagonists were judged at Niafunké, where the Fulani were defended by the old Minister of Justice. The Fulani clearly came out the worse, with two people sent on permanent (i.e. life) forced labour, seven for five years forced labour, eight to one year's prison each, and two to two years' prison each, together with fines totalling 1.5 million Malian francs (US\$2500 approximately) - the price of about forty head of cattle. The Twareg received one ten month prison sentence, two six month sentences and the same amount in fines.

Later in the year, at the conference setting the crossing dates for the next pasturing season, the regional chief of police talked of the increased demand for gun permits, and worried that the pastoral population was arming itself. In the event, since then, serious

conflict between the Fulani and the Twareg has not broken out again, and until the mid 1980s the customary (Fulani) owners of the pasture were able to retain significant control over access to their resources.

It is perhaps germane to mention here that in 1988 the Twareg and Fulani appeared in force on the floodplains well before the official crossing at Walado. This time however, this was due to a branch of the ruling lineage of the Yaalalbé clan giving them permission to enter the pastures in return for a fee, which led to serious disagreements between the Yaalalbé and the administration on the one hand, and between different branches of the ruling lineage on the other.

### 7.3. Land

The fourth case study is relatively unimportant but demonstrates the way in which recourse to different state structures is not only true for larger, more violent competition over access, but is also true of relations within the village. In this context it is worth recalling that 80% of all conflicts in which the administration intervenes in the Cercle of Youvarou are conflicts within communities rather than between them (interview with the Commandant, 1985).

This case involves a marsh pool belonging to a millet cultivating community on the borders of the Delta. Customarily the pasture that grew in the pool was the property of the whole community, who used it to feed their livestock in the dry season. In 1981, as the years of lower flood levels began, a number of villagers, with the authorisation of the village chief (who was also the master of the land), created a set of fields on one side of the pool to grow millet and some flood retreat manioc. In 1983, without the permission of the village chief, three other villagers put into production a set of fields on the other side of the pool to grow floodland rice. At first the villagers scoffed as they thought that side of the pool too deep for cultivation, but as the dry years worsened the land became a prime rice growing site.

The village head then called a meeting in which it was decided the pool would be re-divided so that all households had access to some of the land. One of the first cultivators to put the deeper side of the pool into production objected to his field being taken from him and to that end he complained to the local sub-section of the political party at the arrondissement level. The Sub-section, later backed up by the arrondissement head, concurred with the village chief's decision, and the whole pool was divided up into tiny plots for each household.

In the meantime, the cultivator had contacted the political party and the administration at the level of the Cercle. The following year the *Commandant du Cercle* and representatives of the political party at the Section level visited the area and overturned all previous decisions made at the arrondissement and village level, giving back the original fields to the cultivators who had installed them first, on the argument that they had been far sighted enough, and had been the people to take the risks, so as to warrant the benefits.

At harvest time, the village chief authorised all the villagers to go and harvest the dissident cultivators' fields. The cultivator informed the administration, who sent the police, who arrested the village chief and all his councillors, and accused them of rebellion against the state. They pleaded guilty, were fined, released, and the cultivators who had first put the deeper parts of the marsh pool into production, retained control of their fields.

#### 7.4. Coalitions of Interest and the 'Tragedy of the Commons'

The case studies presented here can be seen as indications of 'the patterns of interaction', as Oakerson (1986) describes them. He characterises these patterns as involving the behaviour of users and other decision makers in relation to the commons, which defines the strategies that rural producers adopt. He opposes two sets of strategy - free-rider as against reciprocal - arguing that the former is inimical to communal management, while the latter is a necessary condition for its promotion.

Which of these two strategies rural producers will adopt depends upon individual expectations of others' behaviour, so situating Oakerson's framework within the paradigms elucidated by Runge in his several contributions to the common property debate (Runge 1981, 1984, 1986). Rural producers choose strategies according to the balance between costs and benefits they perceive in following one particular set of activities, costs being defined behaviourally as obstacles, and benefits as inducements, to choose one strategy over another:

'Individual choices thus derive from a mental image of obstacles and inducements in one's environment. Patterns of interaction cannot be understood except in terms of these elements of choice.'

(Oakerson 1986:20)

Table 11 on Page 277 indicates in a very schematic way some of the patterns of interaction the preceding case studies have illustrated. Local farmers, farmer fishermen, farmer herders and transhumant pastoralists cooperate with customary authorities (masters of the water and land, pasture managers) in their strategies of exploiting resources: that is, they act in accordance with customary rules in the belief that others in the same communities will behave likewise. They defect in relation to state rules: that is, they do not admit access to all Malian citizens and they do not follow rules about how resources should be exploited (timing of entry of strangers to pastures, fisheries, net-mesh sizes, methods of cutting trees in

forests to provide forage for small stock etc.). Stranger transhumant herders and fishermen behave contrarily: they defect in terms of customary rules and cooperate with state authorities.

The costs local producers perceive in acting in accordance with customary rules are essentially those entailed in defecting from state

Table II: Patterns of Interaction between Rural Producers, Customary and State Management Institutions

USERS	MANAGERS			
	Master of the Land	Master of the Water	Pasture Manager	State Official
Farmer Fishermen (Locals)	Cooperate	Cooperate	--	Defect
Farmers (Local)	Cooperate	Cooperate	--	Defect
Farmer Herders (Locals)	Cooperate	Cooperate	--	Defect
Transh. Herders (Locals)	--	--	Cooperate	Defect
Transh. Herders (Strangers)	--	--	Defect	Cooperate
Transh. Fishermen (Strangers)	--	Defect	--	Cooperate

rules: fining for illegal mesh sizes; cutting branches of trees for their smallstock; informal payments to the administration when disputes come to their attention. The inducements they perceive are more indirect but nonetheless powerful: the threat of exile from the community to which they are attached by consanguine and kinship ties; and the fear of the supernatural power of the customary managers. In a more positive vein, solidarity with the community to

which they belong is strongly linked to the most important principle of right of access to resources - the right of the founders of a community to manage resources, which is the most ancient right of access found in the Delta. As explained above, in the communities dealt with here this is not rigorously applied and has been much influenced by waves of immigration of new producers into the area over a long span of history. But in operational terms, for the inhabitants of these communities, the situation as it stood at the time of the Dina is the point of reference that divides strangers from local people. This principle applies not only to founding lineages but also to those linked to them by consanguine ties and to those accorded a right of residence as long-term strangers by the founders.

For stranger herders and transhumant fishermen, the costs accruing to them through their cooperation with state rules consist principally in the enmity they attract from local communities and the concomitant destruction of their equipment (in the fisheries), and the stampeding of their herds accompanied often by outright violence. To this are added the charges they must support in informal and formal payments to the state in compliance with their rules. The benefits they perceive consist in access to resources they need - in the transhumant fishermen's case not only for their subsistence, but also to repay credit. Further, they benefit from the protection of the state in breaking customary rules.

This analysis, while drawing attention to general issues, needs to be refined for specific resources as the 'mental image' of producers varies. The classic contrast between local farmer fishermen cooperating with customary authorities and strangers with state officials is nuanced by who local producers are within the community hierarchy, who the strangers are in terms of the period over which they have been coming to an area, and their levels of status and influence. The tendency to defect from customary rules increases the further one moves away from the founding lineage, through consanguine units to resident strangers and seasonal visitors. The seasonal visitors themselves need to be divided into those who come each year to fish in the locality, known to local masters of the water

as 'our strangers', and those who have come to the area to fish recently. A further distinction needs to be made among stranger fishermen between those who are poor in terms of equipment and have few ties outside the community, and those who are rich and have influential contacts (for instance, one stranger fisherman in Youvarou was very powerful because his daughter had married the Minister of the Interior, to whom the local Commandant du Cercle was responsible).

This situation makes for a number of coalitions that are commonly found in the Cercle of Youvarou. The first is the classic one set out above, where local fishermen cooperate with local rules while strangers ally with the administration. But often alliances emerge around poorer stranger fishermen who customarily come to one camp allying themselves with the customary authorities and the local community in the face of the administration. As has been mentioned above, local masters of the water often represent the interests of stranger fishermen to the administration, very frequently when they have been fined by foresters. A further common association is found around influential fishermen representing the interests of other strangers who have only recently come to fish in the locality, as the case study of the Diaka fisheries demonstrates. Other coalitions form round members of the founding lineage who have broken away from the unit and have gone to live elsewhere, in a neighbouring Cercle, as the case of Togguéré Koumbé illustrates.

In the case of transhumant herders the dominant alliances are between founding lineages, consanguine ones and customary strangers composed of the Fulani, and herders belonging to outside ethnic groups, such as the Twareg. However, divisions can emerge within management units (led by the Dioro), with members of the founding lineages acting unilaterally to let stranger Fulani herds into the pasture without informing the head of the clan, often because the head is away on transhumance. In one case within a clan, a herd belonging to the political party Deputy tried to claim pre-eminent rights to enter pasture belonging to the clan ahead of the traditional leading herd, provoking an outcry and the re-establishment of the customary order.



In a general vein, the Fulani manage access to their pastures in a much more effective fashion than local fishermen manage access to their fisheries, and it is almost unheard of to hear that sub-groups within Fulani clans are claiming rights of access through the local administration. Divisions within clans do appear however (in particular when one manager dies and there is a dispute between brothers for leadership), and they are often played out at a national level rather than a local one. In part, this is because of strong linkages between customary managers and national ministries in the capital connected to the considerable wealth that is embodied in the herds (as a rough estimate, the million or so cattle that pasture in the Delta in the dry season - the overwhelming proportion of which are herded by the Fulani - were worth at 1986 prices something in the order of US\$ 85-100 million). This situation was summed up by one manager who said: 'We have two kinds of problems with the pasture in the Delta. We manage smaller problems ourselves, while for the larger ones we go to Bamako'.

In farming communities on the borderlands of the Delta the majority of conflicts concern founder and consanguine lineages on the one side and resident strangers on the other, the former group claiming customary right, the latter state rules. As the preceding case study concerning farmers has demonstrated, this can result in the re-allocation of land to individuals who were resident outsiders. This happens above all on land that is newly brought into production in line with changing flood levels rather than on established fields, though there are reports of conflict arising where land has been loaned or rented to other members of the community, and where the original owner wants it back.

The major point at issue here is whether customary and state rules of access promote reciprocal or free-rider strategies, for it is all too easy to hark back to the past as a time when reciprocity was the normal strategy: indeed, elders in communities paint such a picture. This view is frequently used to argue that the re-animation of customary management systems will result in the promotion of reciprocal strategies. This thesis does not make this argument, for

the conditions under which rural producers exploit their environment now are fundamentally different from those in the past.

It nonetheless remains plausible to contend that those who cooperate with customary authorities collaborate with an institution that unites management of access to resources with networks of kinship and consanguinity, and widely held beliefs in the rights of first comers, underwritten by the knowledge local producers and managers have of the resources they exploit. Local inhabitants are only too well aware that the degradation of the shrinking resource base they rely upon will very probably lead in the future to their having to leave (on either short or long-term migration) the locality. As such, customary rules provide a widely accepted and understood system whereby conditions of assurance with regard to other producers' behaviour might be promoted.

Cooperation with state rules implies no such linkage with social structure, residence or knowledge of the area. Nor, under the present conditions in which state policy is administered, does such collaboration imply adherence to a consistent set of rules that are just in the sense of equity or efficient in the sense of conserving the natural resources they exploit (see Chapter 8 for a discussion of outcomes). State rules (fishing, hunting and forestry codes, land tenure law) in other words, while on paper providing for a set of norms that producers should be able to rely upon, in practice deliver no such benefit. Rather, they expose rural producers to the whim of state managers belonging to different structures within the administration whose goals are often contradictory and short-term.

In this context, it can be seen that adherence to state rules, and the role of state management in debilitating local conventions, in effect create the conditions for 'Tragedy of the Commons' outcomes. Here Oakerson's opposition between 'reciprocal' and 'free-rider' strategies does not seem to describe the situation, for strangers or those who defect from the customary system and cleave to the state system do not do so with a view to maintaining customary rules with a view to exploiting them. Rather, they would like to do away with them altogether. At another level, if 'reciprocity' is held to mean

that all producers are fully assured that if they behave in one way others will follow suit, then its opposite is not 'free-riding' (where they are assured in a sense that others will continue collaborating with a set of rules while they defect), but anarchical exploitation of resources where one individual producer neither cares nor heeds what others do. This is a highly artificial situation as, it is hoped, the description of the conditions under which rural producers exploit resources in this sector of the Delta has made clear. This situation is here seen to be promoted by external structures that influence decision-making arrangements, which in turn condition the patterns of interaction which inform rural producers choice of strategy.

In many ways rural producers in the Cercle of Youvarou have not yet reached the stage of the 'Tragedy of the Commons' for, as this chapter has shown, they still operate within groups whether they are collaborating with customary or state rules. Rural producers themselves identify the ownership of resources as a vital need for the future, with customary managers of water, land and fishery resources, and stranger groups, in alliance with their constituent associations all attempting to establish long-term rights either through adherence to customary or state conventions. As such, the recent evolution of management systems in the Cercle of Youvarou can be seen as an account of how external structures (in synergy with deteriorating natural conditions) operate to break open reciprocal management systems, by authorising small groups to act at variance with local customs. As conditions worsen, and state authorities are able to deepen and widen their control over the rural economy by intervening at strategic moments of the year, so the relative benefits of pursuing anarchical strategies become more attractive (or rural producers have no choice but to adopt them), leading to conditions favouring 'Tragedy of the Commons' outcomes.

#### 7.5. Summary

This chapter has provided evidence of how rural producers and decision makers - both local managers and state officials - have acted where conflict has broken out over access to resources in the

Cercle of Youvarou. The case studies presented are those for which some documentation exists in the regional archives with which to judge the nuanced and contradictory accounts received in the field. It is important to realise that they form the tip of an iceberg, as the issue of access rights, and in particular the rights of entry of outsiders, is the material of rumour, intrigue and tension in almost every community in the area.

More than this, the cases that actually broke out into conflict and came to official attention are obviously substantially fewer than the day to day judgements made either by officials, technical service staff, or local managers in allocating access in the light of precedents set when serious conflict has brought in the authorities in the past. As such, the study of conflict presents in a dramatic and compressed form the issues that inform decisions made on a daily basis in the zone.

The chapter has shown how coalitions of interests form around different state structures and levels within those structures, under the broad rubric of outsiders to the Cercle trying to use the nationalisation of resources as justification for access, and local producers claiming they have preferential rights because they are the traditional exploiters and inhabitants of the zone. In making these claims local producers equally argue their case through the state structure.

The resolution of these conflicts has in many of these cases been shown not to depend upon a clear interpretation of the law confirming customary rights where they do not infringe on state interests, mentioned in Chapter 6. Rather, informal payments and kinship linkages to powerful people in the state structure are instrumental in the judgements state officials make and the policies they follow. In this, the inherent ambiguity of the law is exploited by state officials for short-term fiscal and personal ends.

The following chapter looks at the outcomes that result from the 'structural chaos' this and the previous chapter have examined. It examines outcomes in terms of 'equity' and 'efficiency', the two

criteria used by Oakerson (1986), in order to show how government development policy is both inefficient in managing the Delta's resources and inequitable in local people's eyes.

## CHAPTER 8

## 8. CONCLUSION AND POLICY OPTIONS: WHAT IS TO BE DONE?

The previous chapter has provided examples of how different structures of the post-colonial state work to break down customary management systems. It has shown how the political party, the technical services and the administration are different foci around which coalitions of rural producers gather to retain or gain access to valuable resources. These post-colonial structures aim to maximise their revenue from the allocation of natural resources, whilst also competing with each other for control over the allocation process. This creates 'patterns of interaction' between rural producers and decision makers which favour anarchical strategies of resource exploitation, in the absence of any consistent state policy for natural resource management.

In this concluding chapter the outcomes arising from the way natural resources are being managed in the Cercle of Youvarou will be reviewed in the context of the last category of Oakerson's framework, drawing upon the concepts of efficiency and equity. It will demonstrate the ways in which customary management systems were able to consistently apply a set of rules considered by rural producers to be 'fair', and which thus promoted reciprocal strategies, as well as enabling rural producers to manage their resources more efficiently. The outcomes of post-colonial management of the Delta are, on the contrary, both more inequitable and less efficient than the systems they seek to replace.

This leads into a discussion of the contribution the major conclusions of this thesis make to the theoretical debate on common property in terms of those theories that account for the decline of common property institutions, and those that explain their creation, as set out in Chapter 2.

In a final section, the implications of this analysis for policy are presented. Suggestions for structural reform will be made, to bring an end to the competitive and contradictory relationships between the

political party, the administration, the technical services and rural producers. Policy options for securing rural producers' ownership of resources are presented, and some policies and projects reviewed which would promote the sustainable management of the Delta's natural resources by the people most dependent upon them.

### 8.1. Equity

Chapter 5 has shown how the customary management systems in the Delta in pre-colonial times were equitable in three principal ways. First, they offered reciprocal rights on entry. Between neighbours practicing the same production system, and from the same ethnic group, reciprocal access rights allowed producers entry to each others' territory. Between production systems practicing the same livelihoods, and belonging to the same ethnic group, but living further apart, access was conditional on payment of a fee. A fee was also paid by strangers of a different ethnic group coming to make seasonal use of a community's resources.

Second, customary management systems were based on a widely accepted principle of equity - the right of the first comer to pre-eminent access and to manage. Even when the Delta passed under the control of the Mali and Sonrai Empires and later the Dina state, and there was a certain re-allocation of resources between and within production systems, this principle was still respected. Following from this major resources were allocated according to distance from the founding lineage: founders managed and had preferential access; followed by consanguine lineages and strangers who had been allowed to settle in the community. Seasonal strangers who regularly came to the area were next in this order, with least rights of access (or highest fees) being accorded to first-time seasonal outsiders.

Third, these management regimes were equitable because rules of access were administered consistently between and within production systems. The "congruence" that existed between the external structures and local management regimes were essential in promoting this sense of "fairness" among rural producers, that persuaded them

to conform to the rules. Evidently this was underwritten by the real threat of sanction if they broke the regulations: fear of the supernatural powers of the masters of the water and land, expulsion from the community; and the threat of force from wider social and economic structures that controlled the zone.

Chapter 6 has shown the extent to which the equity of this system has changed. This should be examined in two ways: the equity the latter-day state purports to administer; and the actual equity of the system as it operates on the ground. The post-colonial state effectively claims its system of management is more equitable than the customary regime because control over access to resources has been taken out of 'feudal' authorities' hands who, in the view of the administration, used their powers in the past to enrich themselves and to exploit their people. The administration would argue that the nationalisation of resources and the opening of access rights to citizens of the nation are progressive, more equitable policies because the system is managed by a professional corps of administrative and technical staff who stand above the local interests of the area as their personnel are drawn from outsiders to the zone. Further, they look up the administrative ladder and are loyal to the state, rather than down to local sectarian interests.

Chapter 6 and Chapter 7 have shown this modern 'equity' to be in practice less fair than the system it was meant to replace. Many former reciprocal agreements between rural producers - and particularly between outsiders and local people and between different ethnic groups - have now been transformed into confrontations. In these confrontations, it is almost always the case that one party proclaims the equity of the post-colonial state system, while the other upholds the equity of customary regimes. Relationships between these groups are characterised by suspicion, subterfuge and violence. Both these systems consider themselves to be 'equitable' because they are 'fair', but one looks to the nation state for its legitimation, and the other to ethnic group, kinship and residency rules.



The principle of the first comer having the right to manage as the basic rule by which an equitable distribution of resources was managed in the past - while being ambiguously alluded to in land tenure law - is denied by post-colonial state structures. At the same time the universal rights of citizens to have access to resources is not upheld, for access to resources is often based upon personal contacts within competing state structures and the ability to pay fiscal dues, fines and informal payments. No attempt has been made by the post-colonial state to implement land tenure law that on paper allows rural producers to claim title to resources.

It follows from this that the latter-day management system is inconsistently administered: judgements made by one set of state officials are overturned by others, often for reasons unattached to the putative justifications claimed for making the decisions in the first place. The inequitable nature of these outcomes feeds back into the 'patterns of interaction' within and between production systems, so that rural producers switch from cooperation with customary regimes to cooperation with the state system, and back again, according to how they see their short-term needs being best met (as analysed in Chapter 4). Criteria that natural producers use for choosing strategies cannot be based on long-term factors as there is no assurance that cooperation with one set of rules will lead to sustainable rights of access to resources in the future.

## 8.2. Efficiency

Oakerson argues that common property is managed 'efficiently' if the overall rate of use of natural resources does not exceed an 'optimal' rate defined by the technical and physical characteristics of the resources. This concept is problematic, particularly in relation to the resources of the Inland Niger Delta. It inherently assumes that a 'carrying capacity' can be measured for any given set of natural resources given the ways they are exploited, and data for this are simply not available for this area. Moreover, it would be very difficult to determine the overall productivity of resources in the Delta because conditions change so much from year to year, and

between different localities. The technologies used to exploit the area (specie-mix of herds, different mixes of fishing techniques) are numerous, and in spite of many attempts to estimate a 'carrying capacity' by several projects (ODEM, CIPEA, IUCN, ORSTOM), no reliable figures have been reached so far<sup>13</sup>.

A wider definition of 'efficiency' is proposed here in order to examine a set of relationships between the natural characteristics of resources and the way they have been managed under customary and post-colonial state regimes. The Oakerson framework implies that any management system should match the technical and physical characteristics of resources to the 'decision-making arrangements' and 'patterns of interaction' that govern their use.

'Efficiency' may be considered to exist in a broader manner here than simply in terms of 'optimal' use of resources, so as to include the compatibility of management systems with natural resources in two areas. It has two dimensions:

- 1) the linkages between knowledge of the characteristics of resources, the power to manage, and the economic importance of those resources to rural producers and managers.
- 2) the flexibility with which management regimes respond to variability in natural conditions and their ability to complement linkages between production systems using the zone.

Customary management systems are efficient in the manner they unite local knowledge of resources, the dependence of local producers on those assets, and the power to effectively manage them. Masters of the water, land and pastures are drawn from founding lineages, who were the first comers to the zone, and who by definition have considerable knowledge of the nature and extent of the territories they manage. Under the Dina state in the last century these managers were supported by wider political and economic structures

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13 The ORSTOM project is still under way.

which provided local communities with a measure of security of tenure through codifying pasturing, fishing and farming territories in the Delta and on its borders.

Present day state management systems break these linkages. Outsiders to the zone in the form of technical service staff and administrators are now responsible for strategic decisions of access and management, and the short period and lack of continuity between successive appointments mean they have a minimum of knowledge of the area they work in. This combines with a policy of: 1) denying the fundamental principle of allocation through founding lineages; 2) through the nationalisation of resources; and 3) through administering an ambiguous right of customary exploiters to control access to their resources. In this process the dependency of local producers is divorced from responsibility for their management, knowledge of the area is separated from its administration, and the power to allocate entry and exit rules is placed in the hands of officials who have little understanding of the zone.

Customary management systems, through reciprocal access agreements between and within production systems, allow rural producers to move to different areas of the Delta as they become productive in different seasons of each year, and in bad years allow them to move to areas which have been productive when their own territories have suffered from drought. This is on the understanding that the founding, consanguine and stranger lineages settled in host communities have preferential access to those resources, which are therefore managed principally in local producers' interests. Evidence has also been presented in this thesis to show that customary regimes can act to conserve their resources (e.g. by allowing entry of animals to floodplain pasture when it is still wet, through organising fishing reserves. See Chapter 5).

Further, these regimes promote linkages between production systems which allow rural producers to benefit from resources they do not themselves exploit directly. Fishermen and farmers in the Delta invest (when they can) in cattle, which they give to the Fulani to herd and which provide the owners with dairy products, animal

traction and assets they can sell when the need arises. Herders, through contractual relations with farmers for animal loans, receive cereals in return. They barter fish for dairy products from fishermen. This creates linkages between production systems and gives producers a vested interest in the maintenance of a wider range of resources than those they exploit directly themselves.

The post-colonial state system undermines this compatibility between customary management regimes and the physical characteristics of natural resources they exploit. Reciprocal agreements between communities well known to each other have been replaced by confrontations between host communities and strangers who seek to force access to more productive zones. Strangers now no longer accept the right of communities managing their resources in their own interest. Payments for access to resources which in the past benefited host communities are now made to the state, which does not re-invest in the zone. State policy itself is administered unmindful of the characteristics of the zone, and does not take into account the linkages between production systems, nor the strategies producers adopt in the face of drought. This thesis has argued that the state's interventions can at times be detrimental to resources (preventing animals from entering flood pastures until they are dry, increasing rural producers' cash needs etc. Chapter 6), and can thus be characterised as inefficient both in terms of the conservation of the areas resources, and in raising local producers' standards' of livelihood.

### 8.3. The Oakerson Framework and the Management of Communal Resources

Oakerson suggests that one can move forwards and backwards through the components of his framework - the technical and physical characteristics of resources, 'decision-making arrangements', 'patterns of interaction' and 'outcomes' - in order to analyse common property problems and provide solutions. This thesis has shown how there existed in the past in the Delta a set of resources (floodland pasture, fisheries, innundated agricultural land) that had the

qualities of jointness, exclusion and indivisibility of common property. These resources were managed under a set of rules which established conditions of collective choice, as well as providing regulations to control their exploitation as commons. External structures to these management institutions reinforced the basic principle of access that allocated rights on the basis of the first comer, kinship, and residency rules. This process promoted reciprocal strategies between groups making up rural communities and strangers who came to visit them each year, leading in turn to outcomes that were 'equitable' in the sense that they were perceived as being 'fair' in that rural producers accepted that first comers had the right to manage, that consanguine and resident outsider groups had preferential access, and that seasonal strangers were obliged to pay a tithe for entry. This system was underpinned by a set of beliefs in the supernatural powers of customary managers, redistributive mechanisms, and relationships of force between the rulers of the Delta and their subjects. It provided a framework within which rural producers had assurances and incentives to cooperate with the rules, which included allowing them access to resources in different parts of the Delta and to redistributive mechanisms that were essential to subsistence in this area of considerable climatic variability.

This situation has been compared to conditions pertaining at present, in which the resource base rural producers rely upon has been significantly reduced, and the rate of exploitation considerably increased. Groups within communities, and particularly alliances of seasonal strangers, now have considerably greater freedom to act alone, even if their actions harm the interests of others. 'Veto' positions have appeared alongside the customary management structure, whereby traditional rules coordinating the activities of the community can be broken, effectively undermining the ability of communities to impose collective decisions over all users. This has been accompanied by: a re-definition of jurisdictional rules (administrative boundaries and the rights of traditional managers to manage); the opening out of entry and exit rules to producers who never had rights before; and the breakdown of partitioning rules

whereby producers were obliged to collaborate in collective forms of production at certain moments in the year.

Of fundamental importance in this shift has been the change in relationship between local management institutions and external structures. Whereas before wider political and economic groupings supported a 'customary' system, and endeavoured to graft changes in allocating access rights onto this structure, the post-colonial Malian state is intent upon debilitating and undermining the customary regime. Through legal, fiscal and administrative measures the state not only deprives local communities of the ability to manage, but also throws the exploitation of the area's diminishing resource base open to a far wider constituency. While on paper a consistent set of rules has been elaborated for the access, management and use of natural resources; in practice these rules are honoured in the breach and are used, essentially, as a mechanism for extracting formal and informal income.

This has in great measure deprived rural producers of the incentives and assurances necessary for promoting reciprocal strategies upon which a rational management of these resources depends. Defection from the customary system is promoted, as is cooperation with a set of state rules that does not amount to a consistent policy with regard to the conservation and regeneration of natural resources. To the extent that customary systems are debilitated and yet not entirely destroyed, the state encourages free-riding strategies on behalf of outsiders who have preferential links to different structures making up the post-colonial state, members of which have less incentive than local people to manage resources. The consequences are inequitable both in the sense that they are perceived as being 'unfair', and in the distribution of the products of these commons between those who are most dependent on them, and those who can force access. It is also inefficient in that it is promoting practices that degrade the environment over and above degradation ensuing from drought. To the extent that the continual debilitation of local management systems is leading to their demise, external structures are contributing significantly to the creation of 'Tragedy of the Commons' outcomes.

It can be plausibly argued, on the basis of Oakerson's own observation that 'congruence' should exist between the natural and technical attributes of resources and the rules used to exploit them, that the effect of drought in diminishing the quantity of resources available would lead to increasing privatisation, especially of those resources that become more valuable as conditions deteriorate. According to this scenario, as a resource becomes less 'joint' (i.e. the consumption of that resource takes away proportionately more from the ability of others to consume it); more excludable in that it becomes more concentrated; smaller in size; less easy to trespass upon; and more divisible in that the boundaries of that resource become clearer, so decision-making arrangements tend towards narrowing the constituency of those who have access to it, and who have a greater incentive to cooperate to keep outsiders away, or impose higher tithes for entry. Within this smaller group, reciprocal strategies reinforce an 'equitable' system for the distribution of benefits of managing the resource and self interest (and the clear realisation that over-use of the smaller commons would lead to its degradation) dictate 'efficient' outcomes that tend to optimise exploitation in the interests of a sustainable yield.

The preceding chapters of this thesis have shown that these outcomes have not come about in the part of the Inland Niger Delta where the fieldwork was carried out, and in the process some important issues about the relative importance of the different components of Oakerson's framework have been raised. The major point is that even where the resource base diminishes, and where conditions would seem to be propitious for a tightening of local rules of access, the ability of external structures (in this case the post-colonial state) to undermine local interest groups and customary management systems has been decisive in pushing the allocation of rights towards a more open-access regime. Furthermore, it has shown that an understanding of the nature of the component parts of the state structure is necessary to comprehend the form of open-access regime that is being promoted. Competition over who should control access to valuable resources in the Delta is not a simple contest between a progressive, modern state and entrenched feudal

authorities intent on retaining their control (no matter how much state and technical service officials would like it to be seen as such) but between local producers, outsiders, and members of different parts of the state structure. Nor, in spite of the rhetoric of Government policy, is it primarily about the conservation of a rich set of natural resources menaced by desertification, but rather about the distribution of scarce income.

This thesis has also demonstrated how growing scarcity of resources increases the market value of certain goods, but rather than the value of these goods being captured by local elites, more powerful (often urban based) outside interests have been sucked in, which have acted in synergy with state structures to break open communal management systems. In these conditions, rural producers have come to rely on the market to provide them with basic necessities they need. Local management institutions that existed to coordinate rural producers' actions have now been subjected to the short-term immediate needs of local producers to get access to resources which have a marketable value so that they can in turn acquire basic foodstuffs.

In many ways the Oakerson framework, with its initial emphasis on the nature of the resource in question and its 'hard' characteristics, infers something of a 'closed' system by which appropriate management practices are arrived at through a consideration of the resources in question, and linking these to the 'decision-making arrangements' that manage them. The implication of this is that certain resources quite apart from the role they play in the economy of rural producers who exploit them, are best managed in certain ways. This thesis would argue that a study of property regimes needs, as a prerequisite, an analysis both of the social structure and the economy of local communities and of larger groupings of which they are a part, as it is only on this basis that the management regimes imposed on physical resources can be understood. In the particular case studied here, changes in the way that resources have been managed cannot be understood primarily in terms of the changing nature of the physical characteristics of those resources. The manner in which communal regimes are being pushed



through state property systems towards open access is being driven, fundamentally, by a constellation of historical, political and economic conditions which are specific to this part of the Delta, and to the nature of the post-colonial state, in increasingly difficult climatic conditions.

#### 8.4. Contributions to the Theory of Common Property

A major strand of the debate on common property argues that as resources become more valuable and subject to greater pressure of exploitation, so rural communities move to restrict access to them. The switch, initially from 'open access' to more communal entry rules, comes about according to this theory at the moment when the cost of policing the resource so as to exclude outsiders or rule breakers is recompensed by the additional revenue earned from limiting access to the resource. In a subsequent stage, as these resources continue to grow in value, elites within rural communities will move to capture these resources in a process of privatisation. Case studies from other parts of Africa (Behnke 1985) have shown that this happens where new technology spreads through the rural economy, and where rural producers become involved in a market economy.

In this manner, the 'externalities' of common property resource use (i.e. the costs accruing to the community through individual actions of its members) become 'internalised', so that private owners are obliged to take into account the negative effects of how they exploit their natural resource, and hence manage them wisely.

The increasing value of some resources, commercialisation of the economy and the spread of new technology are all present in the Cercle of Youvarou, and yet this thesis has demonstrated emphatically that these factors have not led to the privatisation of resources in recent times. At an earlier stage, typified by the Dina system, it can be argued that as the Delta became more populated and developed into a unified state, so communities moved to extend communal control over formerly more open access resources.

Recent history, particularly since independence and more recently the onset of drought, has shown communal resources, rather than moving towards more limited access agreements, are moving the other way, towards open access regimes under the aegis of the policies of the post-colonial state. In this process costs that under the customary system were perceived as being 'externalities', and motivated members of the community to police and agree to a set of rules that benefited them (for instance, keeping strangers out until an appointed time, obliging them to pay a tithe or organising collective forms of exploitation so as to maximise production) have become impossible to manage because external structures controlling the legitimate use of force actively oppose the practice of their customary exclusive rights.

The throwing open of access to resources to all-comers (or to those who have preferential access to the state structure) has the effect of 'externalising' the costs of abusive exploitation. Since individuals cannot act communally to protect their collective interests, they are encouraged to pursue their own self interest. The incentive to cooperate with a set of rules because producers perceive a tangible benefit accruing to them as a result of doing so (higher productivity, insurance against bad years), has in many ways been removed. A string of dry years has eroded people's capacity to produce in one year sufficient to take them through subsequent bad years, and their short-term need to exploit their natural resources to generate cash to buy necessities has become allied to an uncertain right of access to resources, so as to motivate people to exploit their environment in self interested ways because if they do not, someone else will.

This brings the discussion to the most influential set of arguments about common property that inform many of the beliefs of planners in their understanding of how rural producers exploit their environment. The 'Tragedy of the Commons' thesis is reinforced by the sequence of events presented above: rural producers, put in a situation where there are significant obstacles to developing indigenous 'internal' solutions, act in ways associated with the

'Tragedy of the Commons' argument. Because they do so, planners assume it is true, without taking into account that before they reached this juncture, rural communities in the Delta had well-elaborated methods of managing access.

This thesis has traced in some detail the manner in which local communities had communal management systems in the past that specifically counteracted the underlying conditions that make 'Tragedy' outcomes possible. In terms of the cattle herders each animal belonged to a specific herd, each herd belonged to a grouping (Eggirgol), and each grouping, and each herd within the grouping, had a specific set of rights to pastures, and an established order of entry. The herders themselves were linked by kinship and consanguine ties to a clan which owned its own pastoral territory, codified under the Dina system. With regard to fisheries and agricultural land access was conditioned by residency rules, kinship and consanguine ties. Clearly, the notion that these rural producers acted without reference to one another and without reference to the web of social relationships that accorded them access to the resources is improbable. This thesis has demonstrated how institutions and relationships within rural communities have been undermined so as to create the conditions in which 'Tragedy of the Commons' outcomes can come about (and are plausible for resources that are open-access rather than common). They exist, and are created under specific social, political and economic conditions, the most important of which, in the case of the northern sector of the Delta, are the uncoordinated, extractive and short-term policies and ideologies of the post-colonial state.

Equally, the notion that rural producers are locked in a self-reinforcing spiral leading inevitably towards the destruction of the resources they depend upon, from which they will be unable to escape without outside intervention, has been shown to be erroneous in the emphasis it puts on local communities inherent inability to cooperate. Examples of this are the ways in which local fishing communities attempt to keep outsiders away by arguing the equipment they use is not 'customary' (instead of claiming customary right to the resource through the master of the water); the success

with which alliances of outside fishermen have been able to force access to fisheries through formal and informal payments to the administration; the calls for the creation of 'Harrima' by farmers and agro-pastoralists on the borderlands; and the relative success of the herders in keeping the bones of the Dina pasturing system alive. They all attest to the ability of rural communities to perceive their communal interest in managing exclusive access and their efforts to bring this about in modern times.

The key to understanding why local communities in this part of the Delta are unable to develop sustainable indigenous forms of management is precisely the role the state plays in debilitating them, by providing support for some groups to 'free-ride'. This situation might be classified as being the opposite suggested in the 'Tragedy' hypothesis, in that it is the imposition of state rules that is preventing the formation of management systems, rather than the lack of outside coercion. It is not suggested here that the simple abolition of state interference in local forms of managing access is either necessary or workable, rather that state policy must be reoriented to support local initiatives to manage.

In order to understand these initiatives, attention needs to be placed on how local interest groups are formed and disintegrate in present conditions of a diminishing resource base being increasingly exploited. This thesis provides evidence of the practical importance of assuming that production decisions by individuals are based on the expected decisions of others, and lends support to the notion that central to any management system is the need to create or build on mechanisms that promote assurance within communities. 'Assurance Problem' theory argues, realistically, that in any community a certain amount of producers will have an interest in 'free-riding,' but that if a critical-mass coalesces around cooperative norms, management systems appropriate to the resource base can be generated. The evidence presented in this thesis shows that it is essential to understand the political, economic and historical context in which rural producers are making decisions in the Delta today if the component 'free-riding' and 'cooperating' groups are to be identified

and their strategies understood. It suggests that significant ways of promoting the coalition of a 'critical mass' of cooperators within communities might in fact be to intervene outside the community, in institution building within the state structure.

Evidently this thesis shares the view of several writers (Jodha 1985,1990, Gutto 1981, Kisangani 1986) that the state has had a fundamental effect on the functioning of communal management regimes. However, in contrast to what most of the writers mentioned in Chapter 2 argue, state legislation and administration in the Delta has not redistributed the better resources to rural producers as private property, with their linked conversion into peasants-cum-wage earners and the marginalisation of poorer groups. Rather the case presented here argues that the state has used its powers to debilitate rather than destroy, and has administered those powers to extract revenue rather than to change the fundamental relations of production. Certainly, some of the outcomes have been similar, in that formerly subordinate groups have been given access to resources, and entry has been accorded to politically dominant groups to certain key resources at strategic moments of the year. But the according of those rights has been a haphazard, ambiguous and contradictory affair which has left all rural producers in many senses less secure in their tenure than before. As Chapter 6 has explained, there has been no serious effort by the state to register community resources as the property of rural producers, and no serious responsibility or power has been devolved upon village chiefs and their councils, apart from the duty of gathering taxes. The picture painted by writers on Kenya (Gutto 1981) and India (Jodha 1985,1990) of state policy with regard to the commons, shows the state concerned to change the basis of tenure rules in rural communities at the same time as attempting to raise productivity, whilst in the process attributing some rights to rural communities. In the Delta, the picture is more one of the state feeding off customary production systems, extracting revenue and offering very little in return, prompting rural producers to consider state officials as fiscal agents, and opening the area's resources out to anarchical production strategies.

### 8.5. Implications and Options for Policy

This thesis does not call for a return to 'Merrie Africa' and the withdrawal of state structures from the management of natural resources in the Delta. Rather, the essential task for the future is to re-orient state policy to support local initiatives to manage, in order to create the conditions in which rural producers will cooperate with a consistent set of rules aimed at conserving and regenerating the resources they depend upon for sustaining their livelihoods.

This thesis has shown that this re-orientation must take place in three related fields: reform in the structure of post-colonial state institutions which deal with access to natural resources; reform and enhancement of land tenure legislation; and a significant shift in the direction of policy and practice of rural development initiatives. Each of these fields is treated separately below.

#### 8.5.1. Structural reform

This thesis has shown how competition between structures of the state over control of access to natural resources both weakens local management systems and promotes a free-for-all in the struggle for entry to the Delta's more marketable assets. In this process personal linkages with officials in different state structures, and the pursuit of formal and informal revenue, play significant roles in the attribution of rights of access. Clearly important changes need to be made in the functions of state structures if a consistent policy for the management of natural resources is to be implemented.

One of the most obvious reforms that needs to be realised is in binding together the disparate structures of technical services, administration, political party and rural producers into a coherent body which can coordinate policy and its implementation, at a local level. This body already exists in the form of the village council, elected every three years, though at present it is powerless.

Three reforms need to be made in the structure and function of these councils. First, they need to be empowered to represent the communities interests to higher level authorities and to manage the resources belonging to the community (see below for a discussion of the ownership of assets).

Of crucial importance will be the power to allocate access to resources between co-owners and to exclude outsiders, with recourse to both the judicial system and the forces of law and order where conflict arises. In fact conflict over access between strangers and host communities, and between different production systems using the same resource (e.g. as fisheries during the high water season and as floodplain pasture in the dry season), need not be as severe as might be thought. As this thesis has shown, host communities have an interest in providing reciprocal access rights to outsiders as an insurance mechanism and in order to gain access to resources in different parts of the Delta as they become productive in different seasons of the year. To this end they distinguish between 'our strangers' and first-time visitors. With regard to resources used by two different production systems at different moments of the year, rural producers themselves are clear where their own responsibilities end, and where those of other production systems begin.

Second, the composition of village councils needs to be widened to take in strangers when they visit the zone, and the technical services, administration and political party need to be represented on the council. In effect, the administration and political party are already part of the council, the former in the position of the village chief, the latter in the form of councillors. It would be quite feasible for other councillors to take on the role of technical service representatives.

Third, councils need to be incorporated into the wider state structure through making them directly a part of the Development Committee hierarchy (see Chapter 6). In line with the most recent government policy initiative, which calls for the inclusion of local producers in the planning process (République du Mali 1987a), these community-level development committees should identify and carry out

rural development initiatives as well as managing access to the community's resources. Political party representatives, technical service agents and administrators at all levels in matters relating to development initiatives and management of resources would need to act on the committee's instructions, rather than in their own right.

This structure, and the development committee at the community-level, would provide some of the fundamental conditions for more successful management of resources. It would link local knowledge of the assets producers depend upon to the ability to allocate access and organise production, and so provide them with a vested interest in the area's sustainable exploitation. Groups or individuals seeking access through influential contacts within the state structure would have to contend with the legitimate authority of these committees to allocate access and decide on rules. 'Free-riders' on the rules would be threatened with withdrawal of access rights, at the same time as the cost of their actions would be evident for community members to see.

#### 8.5.2. Land tenure legislation

Chapters 5 and 6 have shown the ambiguity of the laws dealing with land tenure which have transferred the ownership of resources into the domain of the state, whilst at the same time giving local communities a vague right to continue to exploit the resources they customarily use. In the manner in which these laws have been interpreted on the ground, and in particular in the way in which the state has failed to encourage registration of use rights, post-colonial legislation and practice has promoted insecurity of tenure of rural producers over the resources they depend upon.

Security of tenure is a pre-condition for the sustainable management of the Delta's natural resources, and measures to bring this about are an urgent priority for the area. As Chapters 5 and 6 have made clear, much of the legislation needed for this task is already in place, though some obstacles (such as the unnecessarily ponderous procedure, high fiscal charges) need to be cleared away. Chapter 5



has also shown that resources can be clearly attributed to communities inhabiting the zone, using the Dina system as a guide, but also taking into account migration into the zone since the turn of the century, and the end of Fulani hegemony. For practical purposes a date will have to be chosen for when communities are considered to be inhabitants established in the zone, and present day administrative boundaries will most probably have to be retained, though they need to be surveyed.

These territories could be ascertained by a process of public hearings (also already included in present day legislation), followed by a survey of the ground. The territories so defined could then be vested as the property of the Development Committee of the community, as described in the preceding section.

#### 8.5.3. The policy and practice of rural development initiatives

The post-colonial state follows a policy of extracting more from the Delta's natural resources than it invests, and promoting rural development initiatives that are at variance with or irrelevant to local producers' strategies. These initiatives have met with little success. Relations between the state and rural producers are characterised by a top-down approach where outsiders to the zone, who have little knowledge of the dynamic of the area's resources or economy, impose decisions and planning initiatives on local producers. The relationship of these external political and economic structures to local management systems are incongruous, and contribute significantly to mismanagement of the Delta's resources.

A principal aim of state policy and practice in the future should be to re-orient its relationship to rural communities so as to support rather than hinder them in the management of resources. Two of the essential preconditions for this - the establishment of community-level management units with sufficient power to operate effectively, supported by legal title to the resources they exploit - have already been discussed. A further urgent need is for the top-down ideology and practice of state planning and policy to be converted to a

participatory approach. The technical services need to be stripped of their taxing and fining powers (these functions being taken over by the judiciary) and reoriented towards providing extension services, equipping local management committees with technical knowledge and organisational skills. These ideas have already been mooted in documents assessing forestry policy in Mali (see République du Mali et Confédération Suisse 1987), which suggest that foresters be paid in part according to the success they have in promoting conservation practices. This might be complemented by re-investing the sums extracted from rural producers for breaking resource-use laws in the area, so as to demonstrate that forestry, fishery, hunting and pastoral laws are tangibly geared towards the conservation and regeneration of the area's resources upon which rural producers depend, rather than furnishing the coffers of the state and the pockets of technical service personnel.

The state should further provide a set of collective goods of practical use to rural producers. At a Delta-wide level, the government needs to elucidate a policy with regard to the management of all the floodwater that comes into the area, specifically concerning the amount that is going in future to be allocated to irrigation schemes (for instance, the Office du Niger) upstream of the Delta. Water drawn off upstream for potentially productive irrigation projects arguably has a disproportionately negative effect both on some of the more productive economic activities of Delta inhabitants, and on the overall biodiversity of the zone. It will be recalled from Chapter 3 that a small off-take from the top of the flood level effects hundreds of square kilometres of the Delta's surface, diminishing, for example, the area in which fish breed. This policy calls for co-ordination between regions of the state, and between technical services.

A further collective good that could be provided at low cost, is information regarding the productivity of resources in different years, which would allow rural producers to make a more efficient use of what was available. This thesis has shown how herders need information on the quality and quantity of pasture availability at the crucial moment of the onset of the rains, in order to decide when to

leave the floodplains and how far to travel. Fishermen, farmer fishermen, farmers and farmer herders all need information on the level floodwaters will reach in order to ascertain the height of the fields they should cultivate and the size of the fisheries. This intelligence would be easy to provide from recording and correlating the water level in Bamako (Niger river floodwaters take two months to reach the Delta from the capital), or even earlier if data from the catchment areas of the Niger and Bani rivers in Guinea and the Ivory Coast were used. The thesis has also shown how important wild food and outside harvests are to producers: again information on where productive areas were would be easy to ascertain and broadcast through the state's administrative and technical service structure.

After years of extracting more value from the natural resources of the Delta than investing in them, compounded by the recent period of drought, the post-colonial state in Mali now needs not only to facilitate producers' own management of their natural resources but also to actively promote resource regeneration. This requires that returns to rural producers from adopting cooperative strategies be increased, so as to build assurance between rural producers that if they cooperate with communal systems of management they will benefit and others will follow suit. They also need to be provided with the insurance mechanisms that are a pre-requisite for the sustainable reproduction of their livelihoods, and which have been eroded away in recent years of drought.

To meet these requirements, government policy needs to match the short-term needs of rural producers to the longer term necessity of regenerating and then sustaining the natural productivity of the area. Chapter 4 has clearly shown how rural producers have reacted to latter-day conditions by exploiting the Delta's more marketable assets, in order to generate cash with which to buy essential foodstuffs. Rural development policy needs to modify this relationship in order to provide incentives for rural producers to build long-term and sustainable management systems.

A number of policy options are available to the government to achieve this end. Short-term needs for cereals can be met through the establishment of grain banks at the community level, by the provision of seed of the right quality at the right time, and by providing (on credit) the means of transport for local producers to reach wild food crops and outside harvests where they are available. Rural producers themselves identified rolling funds as one of the most useful interventions allowing them to invest in seed, then fishing equipment and then petty trade in the case of farmer fishermen; and seed, smallstock and petty trade in the case of farmer herders. In 1987-88, the IUCN project in Youvarou distributed a fund to several communities in the Cercle in order to take advantage of price differences in cereals between rural and urban markets, which met with a measure of success.

These interventions, which directly address rural producers' pressing needs, could be linked effectively to management regimes covering specific resources. Here again policy options exist which rural producers would be likely to support, and which they have in some cases already identified themselves. In the case of pasture work carried out by CIPEA (1983), ways in which the rotation of cattle through different types of pasture on the floodplains (Vetiveria as well as Echinochloa), and the use of burning as a means of increasing green vegetative production through the falling water and dry seasons, have been suggested to increase pasture production, at the same time as promoting its regeneration.

The stationing of animals on the floodplains in the rainy season - if it does have a seriously degrading effect on the pastures (and the capacity of the bourgou to regenerate in areas where it is thought to have disappeared is remarkable) - must confront the logic of herders making this choice, who perceive an 'opportunistic' (Sandford 1983) strategy as being preferable to keeping smaller herds of higher quality animals. This thesis has shown that herders attempt to maximise their cereal acquisitions during their stay on the floodplains, and in the dry season are obliged to buy them on the market. Interventions aimed at providing them with better access to cereals might furnish them with the incentive to exploit floodland

pastures in the rainy season less, particularly if it was combined with access to more dryland pasture as a result of better information as to its whereabouts.

In the case of fisheries, this thesis has shown the extent to which producers exploit the resource in the rainy and rising water season and has correlated this with their need for cereals and seed. The provision of grain banks and other community food security interventions would go some considerable way towards restraining their fishing efforts at a time when the effect on fish populations is disproportionately great. A further inducement for fishermen to cooperate with such a plan would be the knowledge that the increased production resulting from their restraint would go to them either directly or in the form of higher rents they could charge outsiders for access. Added to this is the greater success they might achieve from agriculture if they were provided with better seed and were able to cultivate fields they knew would be successful because of timely information about the expected flood level.

With regard to transhumant fishermen, again the provision of better access to cereals, wild food and outside harvests might alleviate some of the pressures on them to increasingly exploit the more productive fisheries of the Delta. It would be unlikely, however, to break the link between powerful fish merchants, transhumant fishermen to whom they issue credit, and the latter's need for open-access fisheries in the more productive parts of the Delta. This vicious circle can only be broken if the state consistently upholds the tenure rights of communities in these parts of the Delta (who would benefit by charging higher rents), combined with initiatives aimed at providing transhumant fishermen with alternative livelihoods to fishing.

The dependence of farmers and farmer herders on forest resources for forage, woodfuel and the materials for handicrafts in order to generate cash to buy food has been demonstrated in Chapter 4. Here again interventions aimed at improving their food security could be used as an inducement to support a management regime they themselves have begun to promote: that of creating 'reserves'

(Harrima) in forests where they can graze their goats, and in which re-forestation initiatives would be likely to succeed because of rural producers' own appreciation of the value of this resource in recent years.

The proposals presented here for structural and land tenure reform, and for rural development initiatives, argue that a set of interlocking measures have to be put in place in the Delta in order for a 'virtuous circle' of resource management to come into being. This circle starts with the identification of the short-term needs of rural producers and an understanding of how producers act to meet them. This both defines measures that can be taken to alleviate those needs and identifies the resources that are most at risk. Interventions aimed at meeting short-term needs can then be directly linked to measures for the regeneration of the natural resources rural producers depend upon. The success of those measures will increase the productivity of natural resources. Eventually, this would enable rural producers to sustainably meet their short-term requirements from the production of the natural assets they exploit.

This thesis has demonstrated that it is an essential pre-condition for this process to come about that a management unit is created which matches a clearly defined set of people to a bounded range of resources. It is also an essential condition that rural producers have security of tenure over the resources they exploit. This in turn implies an array of external relations with wider political and economic structures that upholds the right of local producers to own and manage the resources they depend upon.

The nature of the resources found in the Inland Niger Delta, their extreme variability both between seasons and between years, and the ways in which rural producers exploit them, imply that communal forms of tenure are the most suitable management system for the area. This thesis has demonstrated that the post-colonial state has acted to severely debilitate communal forms of management in the area and that, given appropriate support from external structures, could have evolved into efficient managers of the area's resources today. The state has been unable (even unwilling) to replace

customary management rules with a consistent policy of its own and, in these conditions of 'structural chaos', anarchical production strategies have been allowed to spread, leading to 'Tragedy of the Commons' outcomes.

The rhetoric of recent Government development policy points to a growing awareness in political and administrative circles of the need for local producers to be made responsible for the management of natural resources, upon whose productivity in the end the larger part of their fiscal revenue depends. As long, however, as entrenched power remains in the hands of an urban-based elite who for historical and political reasons are unmindful of the particular conditions that are found in the Delta today, who believe in the imposition of 'progressive' solutions on rural producers, and who are obliged to extract as much revenue from the area as they can, the prospects for the sustainable management of the area's resources remain bleak.

## A. APPENDIX

**A. THE HOUSEHOLD USE OF NATURAL RESOURCES BY FARMER FISHERMEN, FARMERS AND FARMER HERDERS IN 1985-86 AND 1980-81.****.A.1. The Sample**

The households for which data were gathered for the 1985-86 study came from 11 communities. Four of these communities (Garceye, Taneredji, Fara Yeni and Gourao Bozo) are composed of Sorogho farmer fishermen living on the floodplains on the banks of the Diaka river and beside the Niger river where it debouches into Lake Debo. The remaining seven communities (Enguem, Aora, Modioko, Kokoro, Owa, Gourao Peul and Gourao Sare) are spread through the Guimballa and on the eastern borders of the lake, and are composed primarily of Sonraï (with some Fulani and Bella) farmers and farmer herders. Information on the transhumant herders of the Cercle came from its major Fulani grouping the Yaalalbé, while that on the transhumant fishermen came primarily from 'strangers' inhabiting seasonal fishing camps beside the settlements where household data were being gathered from farmer fishing communities.

The production systems practiced by these communities are representative of the activities of the greater part of the Cercle's population. The farmer fishermen on the floodplains cultivate rice between June/July and December as well as fish, and concentrate their activities in fishing for the remainder of the year, moving out to fishing camps in the high water season and back to their settlements as the waters contract. The farmers grow millet between June/July and October and farm flood rising and flood retreat pools through the falling water season, while farmer herders, once the millet crop is in, concentrate their activities in managing their small stock. This distinction reflects on the one hand the clear difference between millet - based and rice - based societies relying on different ecosystems to make their living, with farmer fishermen being part of the latter group and farmers and farmer herders making up the



former. Farmers and farmer herders have been brought together because of the similarity of their production strategies at the present day: farmers, unsuccessful in their millet cultivation have fallen back progressively on small stock - primarily goats - in order to provide them with their livelihoods, while farmer herders, who usually keep cattle, have equally invested in goats that are more resilient to dry conditions.

They are also representative of the social structure most commonly found in the Cercle, being composed of founding and consanguine lineages and resident outsiders, through which rural inhabitants in the Delta customarily gain access to resources (see Chapter 5). In line with the brief historical account given in the previous chapter, the farmer fishing settlements are principally composed of the oldest inhabitants of the zone (the Sorogho), while the Sonraï, Fulani and Bella farmers and farmer herders originally arrived in the area in the 15<sup>th</sup> - 18<sup>th</sup> centuries. The Yaalabé probably migrated into the zone at about the same time: they only became owners of their floodplain pastures in the last century. The history of the transhumant fishing groups is diverse, reflecting the rapid changes taking place in their livelihoods: information was gathered from producers who customarily visit the area, as well as from more recent temporary migrants.

The household data for 1980-81 cover one community alone (Garosye), which was studied in detail for another project. This same community was part of the 1985-86 work and is composed of Sorogho farmer fishermen. The database gathered at this time is directly comparable to information gathered in the second survey and can thus be used as a 'pre-drought' comparative study, though only for farmer fishermen. More qualitative information gathered in 1980-81, and retrospective information gathered in 1985-86 allows some comparisons to be made for the other production systems that are part of this study.

There are 75 households in the 1985-86 study, 40 of them from farming and farmer herding communities, and 35 farmer fishermen.

Table 12 on Page 313 and Table 13 on Page 314 summarise the salient features of their composition.

Table 12: The Composition of Households in the 1985-86 Sample

Communities	N <sup>o</sup> of Hslds	Total Pop.	Mean Household Size	Dependency Ratio
Garoeve	10	88	8.8	0.6
Taneredji	10	104	10.4	0.8
Fara Yeni	10	82	8.2	0.9
Gourao Bozo	5	42	8.4	0.5
<b>Total farmer Fishermen</b>	<b>35</b>	<b>316</b>	<b>9.0</b>	<b>0.7</b>
Enguem	5	51	10.2	0.4
Aore	5	58	11.6	0.5
Modioko	6	43	7.2	0.6
Kokoro	5	56	11.2	0.6
Owa	7	100	14.3	0.9
Gourao Peul	6	76	12.7	0.9
Gourao Sare	6	46	7.6	0.5
<b>Total Farmers and Farmer herders</b>	<b>40</b>	<b>430</b>	<b>10.7</b>	<b>0.6</b>
<b>Total all hslds</b>	<b>75</b>	<b>746</b>		
<b>Average all hslds</b>			<b>9.8</b>	<b>0.7</b>

The mean household size for the 75 households composed of 746 people was 9.8 people - over twice the average size of all the households that took part in the 1987 census (4.6). The reason for this is partly due to the methodology of choosing the sample (see below), but mostly because the unit of analysis is not the 'household' (ménage) used in the census, but a patrilocal consuming and producing unit identified by rural inhabitants themselves as the 'marmite' or 'cooking pot'. This unit is larger than the administrative

'ménage' which is used for fiscal purposes and often contains only the names of the head of the family, his wife or wives and children.

Table 13: Structure of Households in 1985-86 sample (N° of households)

Communities	Monogamous	Polygamous	Siblings+ Spouses+ Offspring	Own Offspring	Offspring's Spouses+ Grand- children
Garoeye	6	4	6	10	6
Taneredji	3	7	7	8	1
Fara Yeni	5	5	5	10	4
Gourao Bozo	2	3	5	4	1
Total Farmer Fishermen	16	19	23	32	12
Proportion	46%	54%	66%	91%	34%
Enguem	5	0	5	4	0
Aore	4	1	5	5	1
Modioko	6	0	6	5	2
Kokoro	3	2	3	5	0
Owa	5	2	7	7	1
Gourao Peul	4	2	5	6	4
Gourao Sare	4	2	4	5	2
Total Farmers and Farmer Herders	31	9	35	37	10
Proportion	78%	22%	88%	93%	25%
Total all hsls	47	28	58	69	22
Proportion	63%	37%	77%	92%	29%

Table 13 on Page 314 shows the 'marmite' to contain a much wider span of relations, with over three quarters of households containing siblings, their spouses and children as part of the co-residential consuming and producing group. It is worth bearing in mind here that local producers have a vested interest in minimising the amount

of people they say are part of their 'ménage' when asked by administration officials, as fiscal dues are levied on a poll tax system, which all adults (men between 17-55 years old, women between 15-55 years old) have to pay. The 'carnet de famille' (family document) that makes up the 'ménage' is re-appraised in administrative censuses every five years and is the basic document upon which administrators levy dues each year.

Table 12 on Page 313 and Table 13 on Page 314 also show that farmer fishing households are smaller (9.0 people) than farming and farmer herding units (10.7), that they are more polygamous (54% of households as against 22%) and that fewer of them contain siblings, siblings spouses and children, than farming and farmer herding units (66% as against 88%). The dependency ratio in the two groups is similar.

The same data for the 1980-81 study (Table 14 on Page 316) in the farmer fishing community show smaller household sizes and lower dependency ratios than the later material, as well as considerably fewer households with siblings living together. This may reflect a movement of formerly independent units living elsewhere in the region into the village as conditions have become drier: Garoeye is not only situated on highly productive floodplains near Lake Walado, but is also on a lorry track in the dry season, when it benefits considerably from petty trade with overland traffic between Mopti and Tombouctou.

Table 14: The Composition of Households in the 1980-81 Sample

	N° of hshlds	Total pop.	Mean Hsld Size	Dependency Ratio
Garoeve	12	89	7.4	0.4
Monogamous	Polygamous	Siblings+ Spouses+ Offspring	Own Offspring	Offspring's Spouses+ Grandchildren
7 (58%)	5 (42%)	3 (25%)	12 (100%)	1 (8%)

#### A.2. Methodology

Three principal methodologies were used to gather data for this study: a survey of the regional economy and of Youvarou Cercle; the selection of a sample and the gathering of household data; and both directed and unstructured interviews.

At the regional level the administration archives were consulted, and the regional offices of the principal ministries dealing with the rural sector were contacted with a view to placing Youvarou Cercle in the context of the region as a whole. Aid agencies, para-statal development organisations, the customs bureau and the regional treasury were also visited, their archives consulted and personnel interviewed in order to establish the extent and nature of government fiscal and development policy, and the activities of non-governmental agencies in the area.

In Youvarou Cercle itself the administration's records were consulted and administrative census studied with a view to establishing the

distribution of the population of the zone, and the ethnic groups that inhabited the various Arrondissements of which it is composed. Local livestock, fishing, agricultural and forestry offices were also visited, their records studied and personnel interviewed, both at the Cercle and arrondissement level.

This was followed by three months spent visiting communities found in each arrondissement that were representative of the production systems found in the area, and in interviewing local inhabitants in order to establish their principal occupations through the year. Information on the resources they used was gathered, and a preliminary sketch of the major adaptive strategies they had adopted in the face of increasingly dry conditions was drawn up. The first elements of the social and political structure of these communities were also ascertained, and customary resource managers identified. Concomitantly, maps and publications on the area, and on the Delta as a whole, were being consulted in order to glean what background information there was on the history, economy and natural resources of the zone.

This preliminary work allowed the Cercle to be divided into the three agro-ecological zones. In view of logistical and manpower constraints and the difficult terrain, it was decided to locate the samples of households to the north, east and south of the Cercle, both because it was apparent that the most significant changes in natural resource availability and access rules were taking place in those areas, and also because the farmer and farmer herder production systems found in those areas were broadly representative of many communities living to the west.

Some fifteen communities that were representative of farmer fishermen, farmer and farmer herder production systems were then approached, covering as wide an area as possible given the difficulties of travel in different seasons of the year. Community chiefs were asked at the outset of the study to provide the names of ten households who could be visited once a month for the period of at least a year. Twelve communities agreed to this, giving an overall sample of some 120 households. They were asked to provide the

names of households that were large, medium and small in size, and, if possible, reflecting founding, consanguine, long-term resident stranger, and seasonal stranger units. These households were then visited once a month by a team of field agents, who asked retrospective questions of their income and expenditure for the previous period, and made measurements of productivity according to major economic tasks for that particular season (i.e. daily catch of fish, harvest and wild food measurements). This data was collated on forms that were refined by a process of trial and error, and the first two months were spent field testing information gathering methods.

As field agents became more familiar with the nature of their tasks, and, above all became known to villagers, so more qualitative subjects were introduced into the study, and the third methodology of directed and unstructured interviews came increasingly to be used. These covered the history of particular communities, who the founding families were, how their productive methods had changed within the lifetime of the oldest members of the community, where people were moving to in different seasons, what were the major constraints they found in their livelihoods etc.

There were several problems with this approach. The logistical task of covering all the communities within a month given the difficulties of transport, especially in the transitional seasons ((August-September, December-January), proved such that on some occasions more than four weeks passed between visits, so that by the end of the study, for some communities, there was one months' data that were not available in one season. A seasonal idea (inasmuch as communities were visited at least twice in each season) of what they bought and sold was however available from the data that were gathered, and, together with questions on subsequent visits to communities following a gap, an estimate has been made of household income and expenditure budgets for these periods.

Second, it was not possible to fully reflect the structure of communities (founders, consanguine lineages, resident outsiders and seasonal visitors) partly because seasonal outsiders were continually

on the move, and it was not possible to monitor them at the same time as visiting the other households in the sample, partly because many of the more sedentary households also moved frequently during the year. The fact that only 75 households make up this sample reflects this fact: these households are the ones for which the most reliable and continuous data were gathered.

Last, the sample reflects the village chiefs' own choice of households, which means that founder and consanguine households are most represented. In the circumstances pertaining in the Delta in 1985-86, in the aftermath of the great drought of 1982-84, it was very difficult to get access to seasonal stranger and resident stranger households if one worked through indigenous authorities. These data were gathered as part of an international research project looking at how local producers were using their natural resources with a view to proposing methods for their conservation and regeneration, which had a high profile as the only large project in the Cercle of Youvarou.

In local people's eyes, collaboration with the project was probably going to lead to a distribution of food aid sometime in the future, as food aid had been distributed according to lists drawn up by the administration in the years immediately preceding this work. The sample of households asked for from village chiefs was initially conceived by them as one of these lists. An example of how these expectations worked through to data gathering was that for the first two months households provided gross overestimates of what they had bought in the belief that this would set the level for what they needed, and hence would receive.

That said, regular visits by field agents every month gradually established a relationship between them and the households concerned. Cross checking revenue information with expenditure soon established a more realistic picture of their budgets. As the visits continued, so villagers became more persuaded that the project was intent on what it had initially said it wanted to do, which was to find out what the real conditions were for local producers in the area throughout the year. Villagers were more used to officials and



project personnel visiting their communities once, or at most twice, probably in the dry season when travel was easiest, and then disappearing for ever, much as Chambers (Chambers 1983) has described. The process of building up relationships with households and communities was greatly aided by the fact that all the field agents came from the area, and had either worked with, or came from, the production systems concerned.

The material presented here for the period 1980-81 is part of a wider study that was concerned to collect time, income and expenditure budgets and productivity data for households making up a farmer fishing community. The choice of site on that occasion was based on criteria of selecting a community representing the way of life of farmer fishermen living in the northern sector of the Delta, rather than with the specific aim of studying natural resource use and the manner in which it has evolved. Twelve households - 50% of the community - were visited twice a week over a period of 14 months, and the activities of each household member for each day were recorded as well as data on fish catch, harvests and income and expenditure. This makes the 1980-81 database directly comparable with the 1985-86 study.

### A.3. The Analysis

The household data have been analysed in the following way. It has been established in Chapter 3 that resources move through different attributes of 'open', 'restricted' and 'concentrated' characteristics through different seasons of the year, in line with the first category of Oakerson's framework. These attributes are retained here so that, for any one season, a value can be attributed to resources having different technical and physical characteristics. The value of these assets is considered to be represented by the income or expenditure households made for those resources expressed in Francs du Communauté Financière Africaine (FCFA), per capita, for active members of the producing and consuming unit, rather than for all members of the households concerned.

The analysis runs from August through to July and the seasons are considered to be:

Table 15: The Seasons of the Year

Season	Months
Rising and High Water	September - November
Falling Water	December - February
Dry Season	March - May
Rains	June - August

The analysis presented here is in two sections. In the first section (1985-86) the data were examined overall, for all households making up the sample, and then broken down into a comparison between farmers and farmer herders on the one hand, and farmer fishermen on the other. Both with the overall data, and that comparing production systems, the information is looked at from four aspects: 1) total per capita value of production, 2) production for subsistence and exchange, 3) cash income and expenditure, and 4) access to cereals. In each of these aspects the relative value of households' use of resources according to the seasonal physical and technical attributes of assets are examined, in order to provide a comprehensive view of the importance resources having different attributes have in the economic cycle of production systems. The data are presented both for the year as a whole, and by season. This framework is followed in the analysis of farmer fishermen in 1980-81, presented in section two.

For the data on production in 1985-86, the seasonal attributes of resources for which an economic value is calculated are shown in Table 16 on Page 322. These are classified as 'restricted', 'concentrated' or 'unused', as discussed in Chapter 3.

Table 16: Resources and their seasonal attributes, 1985-86

Resource Aug	Sep-Nov Rising/High Water	Dec-Feb Falling Water	Mar-May Dry Season	Jun- Rains
Dryland Pasture	R	--	--	--/R
Dryland Forest	R	R	--	--/R
Dryland Wild Food	R	R	--	--
Millet Fields	C	--	--	--/C
Flood Fields	C	C	--	--/C
Floodplain Pasture	R	C	C	C
Floodplain Forest	R	C	C	R
Rice Fields	C	C	--	--/C
Fisheries	R	C	C	C
Floodplain Wild Food	R	--	--	--

R = Restricted  
 C = Concentrated  
 -- = Unused

For some resources, while they have particular attributes over a period of months, they generate no income. For instance, the rice harvest ripens in December while the fields upon which it is grown have 'concentrated' attributes from July - December. The harvest point is taken to provide the value of the resource, and its value is not reflected in the months in which it was growing: for rice, in other words, its value is reflected in the falling water period (December-February). Table 17 on Page 323 shows the month in which harvests of crops and wild food took place and the seasons in which they are accounted for.

Table 17: Seasonal Harvests of Crops and Wild Food

Crops	Month of Harvest	Season
Rice	December-January	Falling Water
Millet	October	Rising/High Water
Fonio	September	Rising/High Water
Haiga	October	Rising/High Water
Bourgou	October	Rising/High Water
Water-Lilies	November	Rising/High Water
Melons	December-February	Falling Water

In the case of rice and millet, their value is calculated by the amount they harvested multiplied by the current market price. The value of wild food production has taken Bourgou, Fonio and Haiga as equivalent in value to the market price of millet. For water-lilies and melons data was gathered on days supply of food provided from this source. Each days' supply of melons and water-lilies was assumed to equal the equivalent amount of millet they were estimated to need, using the FAO (1973) estimates of annual average per capita requirement for cereals of 167 kg/yr (which is also used by the Malian Government in annual estimates of the cereal balance). The millet price was then used to value these crops.

Price data were being gathered in six markets in the Delta in 1985-86 by the IUCN project, but for reasons of space it has not been possible to include this data here.

For the other resources used in production, Table 18 on Page 324 shows the units used to value the asset. These include not only primary goods but also the value of services rural producers provided such as transport, agricultural labour, and petty trade.

Table 18: Units of measurement for valuing resources

Resource	Unit of Value
Dryland Pasture	Sales of livestock
Dryland Forest	Sales of Livestock/ Wood consumed and sold/ Handicrafts sold
Flood Fields	Sale of Garden Products
Floodplain Pasture	Sale of Livestock
Floodplain Forest	Sale of Livestock
Fisheries	Sale of Fish
Other Goods	
Agricultural Labour	Wages
Maraboutage <sup>14</sup>	Fees
Transport	Fees
Housebuilding	Wages
Gold Sales	Sales
Alms and Remittances	Income
Trade	Profits

The analysis of the data on production for exchange and subsistence divides the total value of production into two groups, as shown in Table 19 on Page 325.

14 'Maraboutage' is a service provided by elders noted for their wisdom and religious learning and consists in advice on all aspects of daily life: marital disputes, planting dates for cereals, investment of funds, healing. Fees are charged for these services, and are often accompanied by the promise of an intercession with God (Allah), and the writing of parts of the Koran on small pieces of paper which the client carries on his person, or sometimes eats or drinks.

Table 19: The grouping of items into subsistence and exchange categories

Subsistence	Exchange
Crops	Livestock
Woodfuel	Woodfuel sold
Fish consumed <sup>15</sup>	Handicrafts
Wild Food	Garden Products
	Fish
	Agricultural Labour
	Maraboutage
	Transport
	Building
	Gold sales
	Alms and remittances
	Trade

These items are allocated values in line with the technical and physical attributes of the resources they derive from, and the data is presented by season, and overall. Thus, for example, goats sold in the rising and high water season, when smallstock are exploiting dryland forests is included in the value of 'restricted' assets (see Table 16 on Page 322); sales in the dry season, when small stock are being grazed in floodplain forests is included in the value of 'concentrated' resources.

In the subsequent part of the analysis the cash raised through their production for exchange is compared to what was bought. Their expenditure has been grouped into five elements which contain 19 items in all, as shown in Table 20 on Page 326.

<sup>15</sup> Estimated at 5% of production, in line with Opération Pêche figures.

Table 20: The grouping of items of expenditure

Food	Energy	Clothes	Non-essential goods	Other goods
Cereals Condiments <sup>16</sup> Meat Milk Fish	Wood Paraffin Charcoal	Clothes Shoes	Tea Sugar Kola-nuts Tobacco Dates Cigarettes	Soap Matches Batteries

Total expenditure and total income are shown by season and the difference between the two assessed with a view to establishing periods of the year when households are most in deficit or surplus. The importance of expenditure on local goods produced from natural resources is also shown.

In the last part of the analysis data on access to cereals are presented which distinguish between those grains rural inhabitants produced themselves, those which they received through migrating to harvests in other parts of the Delta, cereals they bought, and wild grain they gathered. Using the FAO (1973) figures for cereal needs, this allows households' success in meeting their cereal requirements to be appraised. Finally, the attributes of different resources that produce these grains are compared.

16 Includes salt, spices, dried onion, dried tomato etc. Used in the preparation of sauce.

## A.4. Resource Use in 1985-86

## A.4.1. All Households

## A.4.1.1. Total production, all households

The value of what households produced through their major activities in 1985-86 is presented in Table 21, demonstrating the significant changes in the value of output through the year with the falling water and rainy seasons being the most productive, and the rising/high water and dry seasons being the least. Overall, per capita production stood at some 70,000 FCFA, or about US\$ 230 (1986: 300 FCFA = 1US\$).

Table 21: Per Capita value of activities, all households, FCFA, 1985-86

	RISING HIGH WATER (Sep-Nov)	FALLING WATER (Dec-Feb)	DRY SEASON (Mar-May)	RAINS (June-Aug)	TOTAL
Millet Harvest	3974	0	0	0	3974
Ponio Harvest	376	0	0	0	376
Melon Harvest	0	225	0	0	225
Rice Harvest	0	10306	0	0	10306
Bourgou Harvest	2294	0	0	0	2294
Baiga Harvest	191	0	0	0	191
Water Lily Harvest	1388	0	0	0	1388
Flood Field Harvest	510	1108	485	942	3045
Herding Livestock	1171	2357	1311	1230	6069
Fishing	2739	9473	6573	9705	28490
Wood Gathering	842	675	1528	1633	4678
Transport	1162	650	466	333	2611
Handicrafts	200	207	132	381	920
Maraboutage	40	254	591	546	1431
Trade	205	525	1096	600	2426
Agricultural labour	67	34	154	1188	1443
Alms and remittances	644	390	202	738	1974
Gold Sales	218	0	0	0	218
<b>TOTALS</b>	<b>16021</b>	<b>26204</b>	<b>12538</b>	<b>17296</b>	<b>72059</b>

Table 22 shows that fishing was by far the most important economic activity, followed by cereal production, livestock herding, woodfuel



and wild food gathering and production from flood retreat and flood-rising fields. In all, these activities accounted for over 80% of the value they produced.

Table 22: The value of major economic outputs, all households, 1985-86

Outputs	Value FCFA Per Capita	% of Total Value of Production
Fish	28490	39%
Cereals	14280	20%
Livestock sales	6069	8%
Wood	4678	7%
Wild Food	4474	6%
Flood field crops	3045	4%

Table 23 on Page 329 breaks the data down from Table 21 on Page 327 to show the value of resources according to their physical attributes, by season. It demonstrates overall that 'concentrated' resources are of greater value than 'restricted' ones in every season except the rising and high water period, when wild food production is at its height, fisheries are 'restricted' and when all livestock belonging to these production systems are in the borderlands of the Delta. It also shows that other forms of production become increasingly important as the year progresses, particularly in the rainy season, when agricultural labour brings in significant income, and when the value of these services are greater than the value of production from 'restricted' sources.

Table 23: Value of resources by physical attribute, by season, PCFA Per Capita, 1985-86

	RISING/HIGH WATER (Sep-Nov)	FALLING WATER (Dec-Feb)	DRY SEASON (Mar-May)	RAINS (Jun-Aug)
<b>RESTRICTED RESOURCES</b>				
Dryland Pasture <sup>17</sup>	0	0	0	0
Dryland Forest <sup>18</sup>	2212	3239	1660	3244
Dryland Wild food	376	225	0	0
Floodplain wild food	3873	0	0	0
Fisheries	2739	0	0	0
<b>Total Restricted</b>	<b>9200</b>	<b>3464</b>	<b>1660</b>	<b>3244</b>
<b>CONCENTRATED</b>				
Millet fields	3974	0	0	0
Flood Fields	510	1108	485	942
Floodplain pasture	0	0	0	0
Floodplain Forest <sup>19</sup>	0	0	1311	0
Rice Fields	0	10306	0	0
Fisheries	0	9473	6573	9705
<b>Total concentrated</b>	<b>4484</b>	<b>20887</b>	<b>8369</b>	<b>10647</b>
<b>OTHER</b>				
Transport	1162	650	466	333
Maraboutage	40	254	591	546
Trade	205	525	1096	600
Agricultural Labour	67	34	154	1188
Alms and Remittances	644	390	202	738
Gold sales	218	0	0	0
<b>Total other</b>	<b>2336</b>	<b>1853</b>	<b>2509</b>	<b>3405</b>
<b>Grand Totals</b>	<b>16020</b>	<b>26204</b>	<b>12538</b>	<b>17296</b>

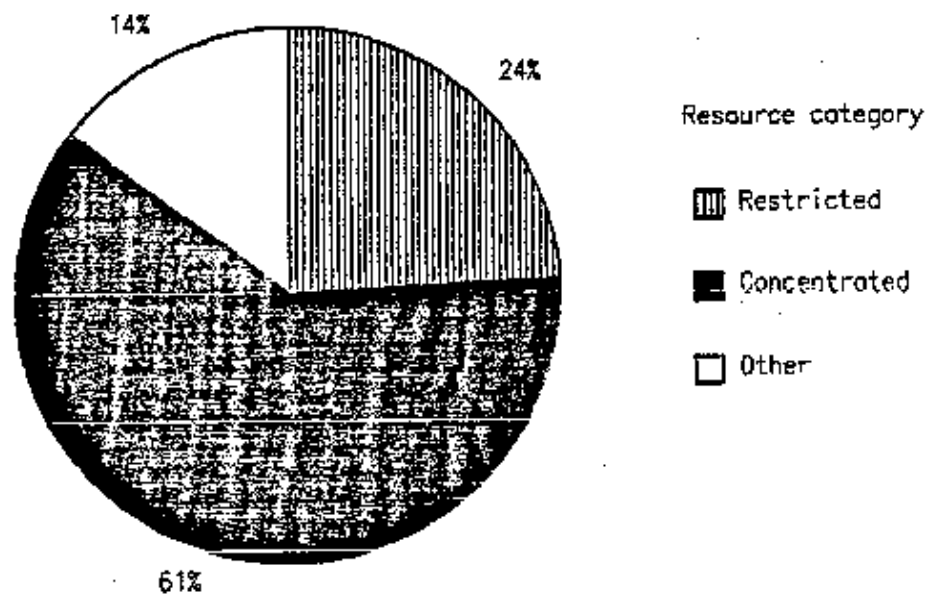
17 No data on floodplain/dryland pasture because these households kept goats.

18 Includes goat sales, wood gathered and handicrafts.

19 Includes goat sales only: wood and handicrafts under 'restricted'

Figure 55 below shows the total value of all households production over the whole year broken down into the categories mentioned at the beginning of this chapter: 'restricted', 'concentrated' and 'other'.

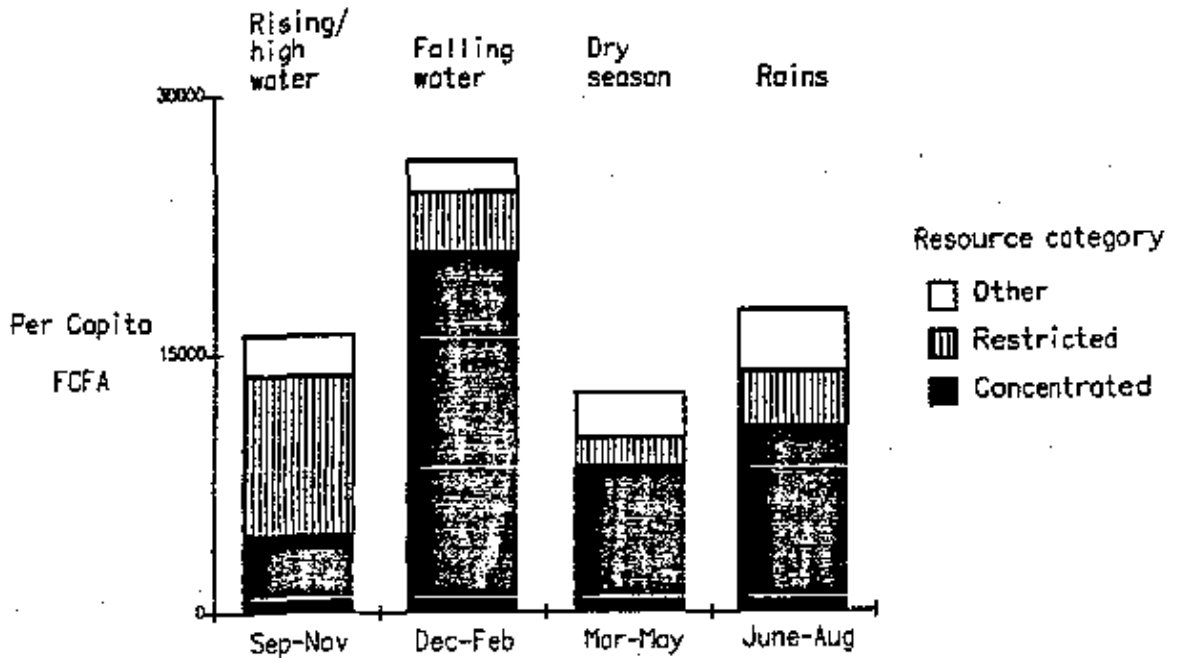
Figure 55: Proportion of Total Value of Production, by Category of Resource, Per Capita, All Households



Well over half the total value of rural household production comes from 'concentrated' resources, while a third comes from 'restricted' assets, and the rest from services and other activities. Figure 56 on Page 331 shows the relative value of these resources through the year, and demonstrates, together with Table 21 on Page 327 that the falling water season is by far the most productive interval in the cycle, followed by the rainy and rising/high water periods. The dry season is the least productive.

The economic importance of the falling water season is due primarily to the rice harvest falling within this period, the high productivity of fishing, and the sale of garden products and livestock. In the rainy season fishing is the most productive activity, wood gathering is at its highest level of the year, while sales of livestock and garden products continue to contribute significantly to the value of

Figure 56: Per Capita Value of Production, By Category of Resource and by Season, All Households



production. It is also worth noting that in this period other forms of income are at their highest, particularly revenue from agricultural labour and from remittances sent back to rural communities by producers who have left the zone.

In the rising water season the bulk of the value of production comes from the millet harvest and from the wild food producers gather from the drylands and the floodplains. Fishing, while contributing significantly, is at its lowest point in the year as are sales of livestock. Revenue from transport is higher in this season than in any other period, and remittances sent home to communities are also high. Fishing contributes the bulk of the value of production in this period, followed by wood gathering and livestock sales. Petty trade is at its most productive, while production from flood retreat pools is at its lowest.

Within these seasons it can be seen that 'concentrated' resources are the most important in every season except the rising and high water period. Table 23 on Page 329 reveals that this is due to the value of

fish which between December and August congregate in the main watercourses of the zone. The importance of 'restricted' resources in the rising and high water seasons is due to wild food production both on the drylands and the wetlands and to fish production. Other productive activities make a minor contribution through the year: reference has already been made above to their increasing values in the dry and rainy seasons.

This presentation allows the productive cycle of farmers, farmer herders and farmer fishermen to be divided in two periods according to the economic activities carried out within them, and the technical and physical characteristics of resources that are exploited. The first spans the rising/high and falling water periods when crop harvests and wild food gathering make up the bulk of the value of production, in the former season 'restricted' resources being the most important, and in the latter 'concentrated' assets. In the second period, covering the dry and rainy seasons 'concentrated' resources predominate, with fishing being the most productive activity as income from services and other sources increase in importance.

#### A.4.1.2. Production for exchange and subsistence

Rural producers exploit their natural environment for two reasons: for their own subsistence and to raise cash to buy necessities and luxuries (if they can afford them) on the market. Figure 57 on Page 335 shows the value all households produced per capita for these two sectors, and reveals that on average they all produced more for the market than directly for their own consumption. The fact that under a third of the value of their production was for their own subsistence is a clear indication of the failure of their own crops: as will be shown below, in a reasonable year, household rice and millet production is of greater value than what they produce for the market. However, it should also be borne in mind that households are never entirely self sufficient: they have always relied on the market for essential items such as condiments for their cooking (oil,

dried tomatoes, onions, salt etc.) and for other necessities such as clothes. Barter was insignificant for these households.

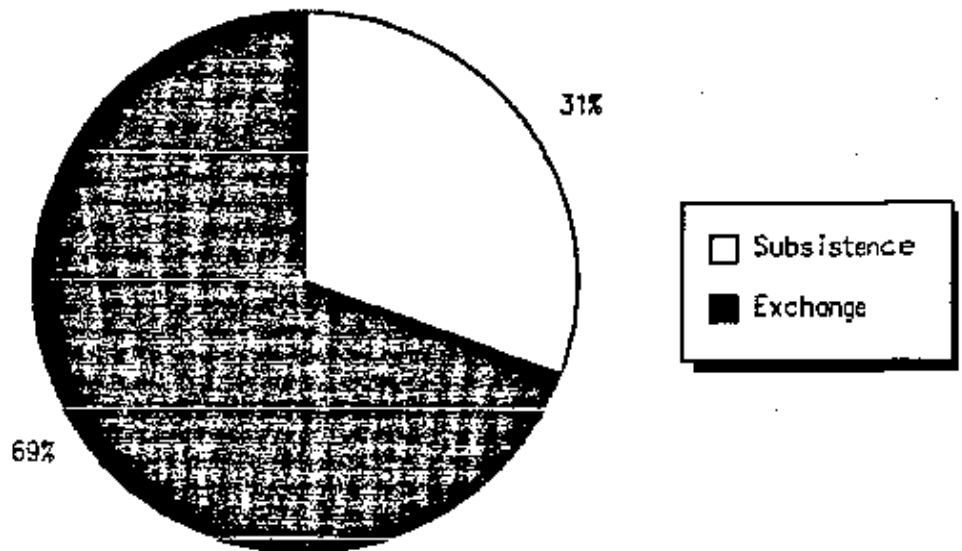
Table 24 on Page 334 shows the value of production split between these two categories. The most important resource under this category is the value of their rice harvest, followed by the wild food they gather and the millet crop. It can be seen that floodplain resources are of far greater value than dryland assets in their subsistence production (15,603 FCFA as against 6,950 FCFA).

Production for exchange, accounting for nearly 70% of the value of what they produced is dominated by the value of fish, which contributed over half of the worth of what they made in this category, followed by livestock, sale of garden products and wood. Taken as a group on its own, the value of services they provided and other sources of income (Maraboutage, agricultural labour etc.) generated 20% of their production for exchange.

Table 24: The Value of Production for Subsistence and Exchange, all households, FCFA per capita, 1985-86

	RISING/HIGH WATER (Sep-Nov)	FALLING WATER (Dec-Feb)	DRY SEASON (Mar-May)	RAINS (Jun-Aug)	TOTALS
<b>SUBSISTENCE</b>					
Millet	3974	0	0	0	3974
Fonio	376	0	0	0	376
Melon	0	225	0	0	225
Rice	0	10306	0	0	10306
Bourgou	2294	0	0	0	2294
Baiga	191	0	0	0	191
Water lily	1388	0	0	0	1388
Wood Gathered	590	144	275	1006	2015
Fish consumed	136	474	329	485	1424
<b>Total Subsistence</b>	<b>8949</b>	<b>11149</b>	<b>604</b>	<b>1491</b>	<b>22193</b>
<b>EXCHANGE</b>					
Livestock	1171	2357	1311	1130	5969
Wood fuel	252	531	1253	627	2663
Handicrafts	200	207	132	381	920
Vegetables	510	1108	485	942	3045
Fish	2603	8999	6244	9660	27506
Ag. Labour	67	34	154	1188	1443
Maraboutage	40	254	591	296	1181
Transport	1162	650	466	333	2611
Gold sales	218	0	0	0	218
Remittances	644	390	202	738	1974
Trade	205	525	1096	560	2386
<b>Total exchange</b>	<b>7072</b>	<b>15055</b>	<b>11934</b>	<b>15855</b>	<b>49916</b>
<b>Grand Total</b>	<b>16021</b>	<b>26204</b>	<b>12538</b>	<b>17346</b>	<b>72109</b>

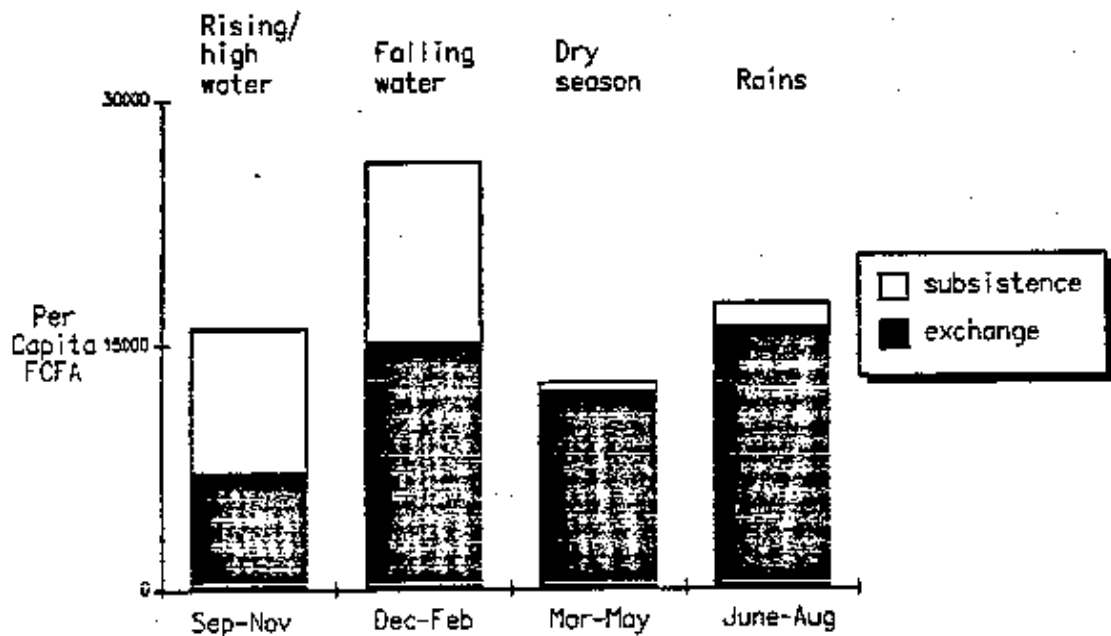
Figure 57: Proportion of Per Capita Production for Exchange, All Households, 1985-86



At the end of the last section it was shown how the production cycle of farmers, farmer herders and farmer fishermen involved exploiting 'restricted' and 'concentrated' resources in the first two seasons of the year and almost entirely 'concentrated' resources in the dry season and the rains. Table 24 on Page 334 and Figure 58 on Page 336 show that the primary months for subsistence production are between September and February when wild food and cultivated harvests take place, firstly with the fonio harvest in September, then the millet, Bourgou and Haiga harvests in October, the gathering of water-lilies in November, and the rice harvests in December and January, followed by gathering dry-land melons in February. The principal months for exchange production are during the falling water and rainy seasons. This reflects on the one side (farmers and farmer herders) the productivity of their flood retreat and flood rising fields and on the other (farmer fishermen), the productivity of the fisheries. This illustrates the basic overlapping duality of seasonal production in the Delta: September to February is the strategic period for subsistence production, and December to August the principal period of production for exchange.



**Figure 58: Value of Per Capita Production for Subsistence and Exchange, by Season, All Households, 1985-86**



Evidently there are strong linkages between the manner in which households produce for subsistence and exchange, and the relative use they make of resources with different seasonal attributes. These data are brought together in Figure 59 on Page 337 and Figure 60 on Page 338 which break down subsistence and exchange data according to the attributes of the productive resources concerned.

Figure 59: Proportion of Per Capita Value of Production for Subsistence, by Category of Resource, All Households, 1985-86

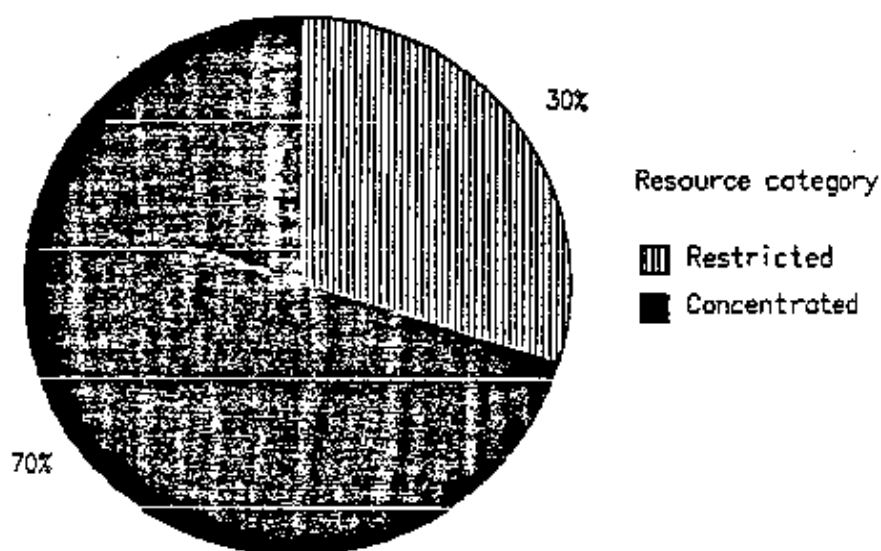
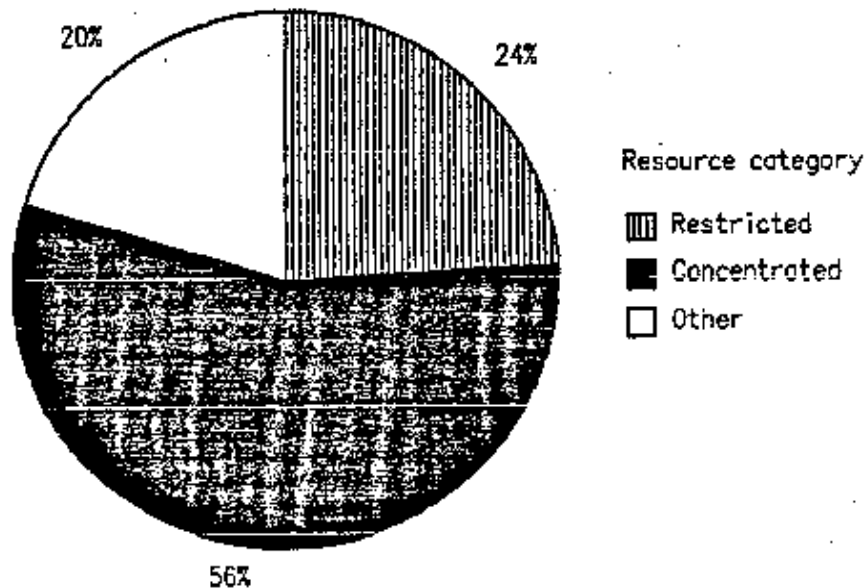


Figure 59 on Page 337 shows that the strategic resources for subsistence production are 'concentrated' in nature, composed primarily of rice and millet fields. The lesser value of 'restricted' resources consists in the wild grains and wood they gather and the fish they consume in the rising water season.

Figure 60: Proportion of Per Capita Value of Production for Exchange, by Category of Resource, All Households, 1985-86

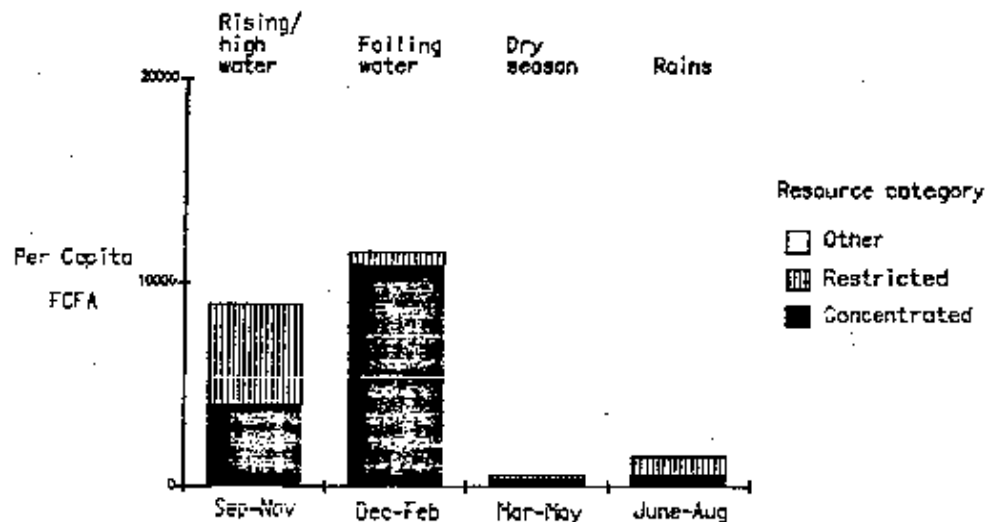


Turning to the data presented in Figure 60 on Page 338 it can be seen that 'concentrated' resources provided the bulk of what rural inhabitants in these production systems produced for exchange. Table 24 on Page 334 demonstrates that revenue from fishing provides the greater part of the value of production on 'concentrated' resources, followed by revenue from garden products. The major 'restricted' resources used in exchange production are dryland forests (livestock, woodfuel and handicraft sales). Agricultural labour, Maraboutage, Remittances and petty trade make up the greater part of the value of exchange production from other sources.

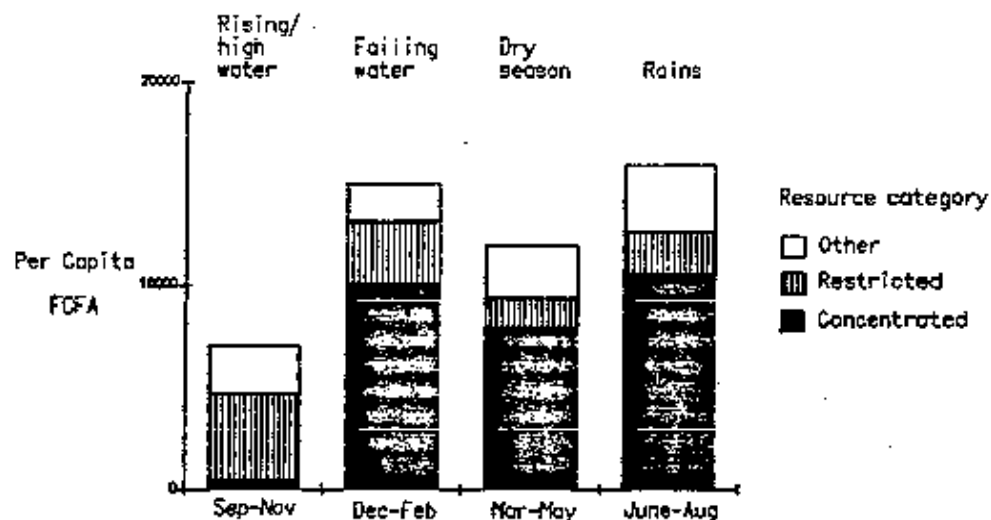
The relative economic importance of resources with different attributes can now be correlated with the shift in production from subsistence to exchange between the high and falling water seasons to the dry and rainy ones. Figure 61 on Page 339 and Figure 62 on Page 339 present these data, and graphically illustrate how at the same time as subsistence production falls to almost nothing in the dry and rainy seasons, exchange production not only maintains the

high level it reaches in the falling water season, but increases in the rainy season. Throughout this period from December to August the value produced from 'concentrated' resources never falls below 65% of all the value generated for exchange.

**Figure 61: Per Capita Value of Production for Subsistence, by Category of Resource and by Season, All Households, 1985-86**



**Figure 62: Per Capita Value of Production for Exchange, by Category of Resource and by Season, All Households, 1985-86**



This links three key characteristics of resource use in the area:

- 1) assets that generate the greatest value to rural producers are 'concentrated' in nature, both in what they produce for exchange

and for their own consumption. They are also principally found on the floodplains,

2) the value of assets exploited for exchange are considerably greater than those used for subsistence and

3) those resources that are most valuable, which are predominantly 'concentrated', and are mostly exploited for exchange, are utilised primarily in the falling, dry and rainy seasons.

The analysis can now proceed to look at the needs this cash income is generated to meet by looking at the income and expenditure profiles of the households in the sample.

#### A.4.1.3. Income and exchange

The preceding sections of this chapter have shown the importance of 'concentrated' and 'restricted' resources to households in the sample overall, between seasons, and between production for subsistence and that for exchange. This section looks at the importance of households' cash income and exchange in providing necessities for their livelihood and assesses their (in)ability to accumulate wealth in the year in question here to take them through subsequent bad years.

The issue of food security is the single most important factor underlying decisions made by rural producers over how, where and when they will use different resources. This was especially true in the year in which this study was carried out, for it came after three progressively drier years. Stocks, in the form of livestock (customarily cattle), grain stores and gold, which rural producers habitually husband against the high probability of a bad year following a good one, had been entirely exhausted by 1985, so that by the end of the harvest season (September-January) households could clearly see the months in which they would be short of food.

Table 25 on Page 342 and Figure 63 on Page 343 show the degree to which they were dependent on the market both to make up shortfalls in their own production of cereals, and to provide them with other essentials they could not produce (condiments, clothes etc.). On average they spent 81% of their total per capita cash income on food, energy and clothes.

This expenditure, as Figure 64 on Page 343 demonstrates, was concentrated in the falling water, dry and rainy seasons, and only 13% of it was on goods produced in the Delta itself (wood, fish, meat and milk). Most of the local goods they bought, as Figure (?) on Page (?) shows, were produced from 'restricted' resources. 87% of what they bought were imports.<sup>20</sup>

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20. All the cereals acquired on the market are considered to be imports into the region, as this was a bad year for cereal production in most parts of the Delta. See Table 20 on Page 326 for the list of items.

Table 25: Income and Expenditure of all households, FCFA per capita,  
1985-86

	RISING/HIGH WATER (Sep-Nov)	FALLING WATER (Dec-Feb)	DRY SEASON (Mar-May)	RAINS (Jun-Aug)	TOTALS
<b>INCOME</b>					
Livestock	1171	2357	1311	1130	5969
Wood fuel sold	252	531	1253	627	2663
Handicrafts	200	207	132	381	920
Garden Products	510	1108	485	942	3045
Fish	2603	8999	6244	9660	27506
Ag. Labour	67	34	154	1188	1443
Maraboutage	40	254	591	296	1181
Transport	1162	650	466	333	2611
Gold Sales	218	0	0	0	218
Remittances	644	390	202	738	1974
Trade	205	525	1096	560	2386
<b>TOTALS</b>	<b>7072</b>	<b>15055</b>	<b>11934</b>	<b>15855</b>	<b>49916</b>
<b>EXPENDITURE</b>					
Cereals	1949	3844	5115	5420	16328
Condiments	2198	2912	2795	2384	10290
Clothes	618	1471	1365	1162	4617
Non essential	1522	1950	1840	1787	7100
Energy	726	2050	832	768	4378
Other Food	654	1424	1244	1012	4337
Other	408	522	570	504	2006
<b>TOTALS</b>	<b>8077</b>	<b>14176</b>	<b>13764</b>	<b>13040</b>	<b>49059</b>
<b>BALANCE</b>	<b>-1005</b>	<b>879</b>	<b>-1830</b>	<b>2815</b>	<b>857</b>

Figure 63: Proportion of Per Capita Expenditure on Different Items, All Households, 1985-86

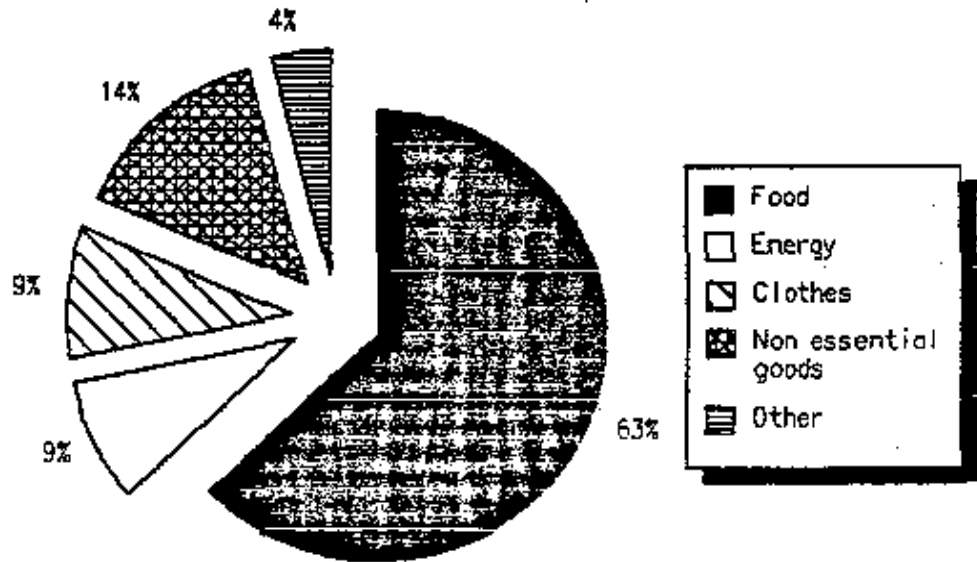


Figure 64: Per Capita Expenditure, by Category of Resource and by Season, All Households, 1985-85

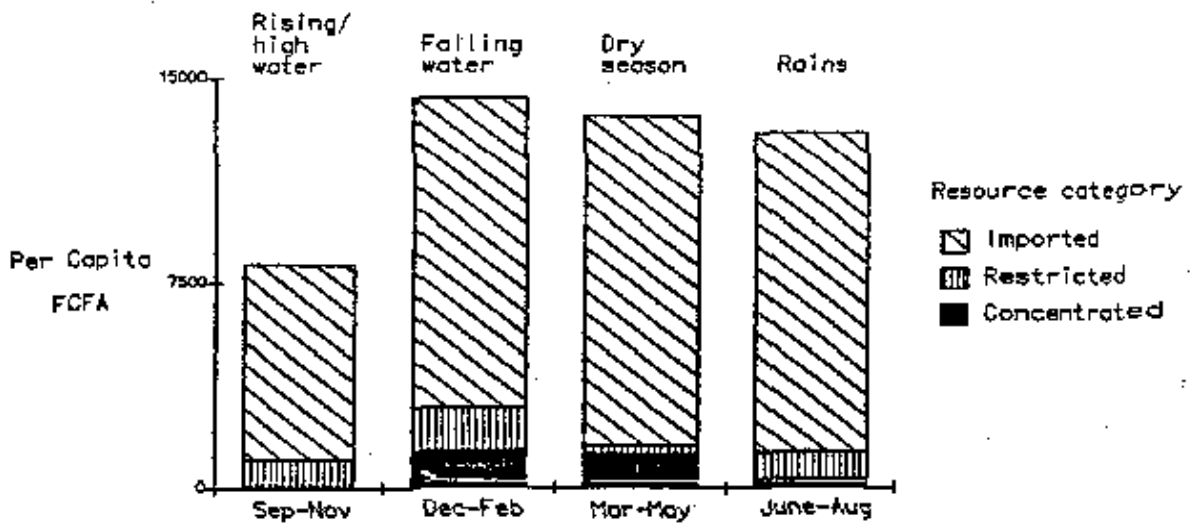




Figure 65: Proportion of Per Capita Expenditure on Imports and Local Products, by Category of Resource, All Households, 1985-86

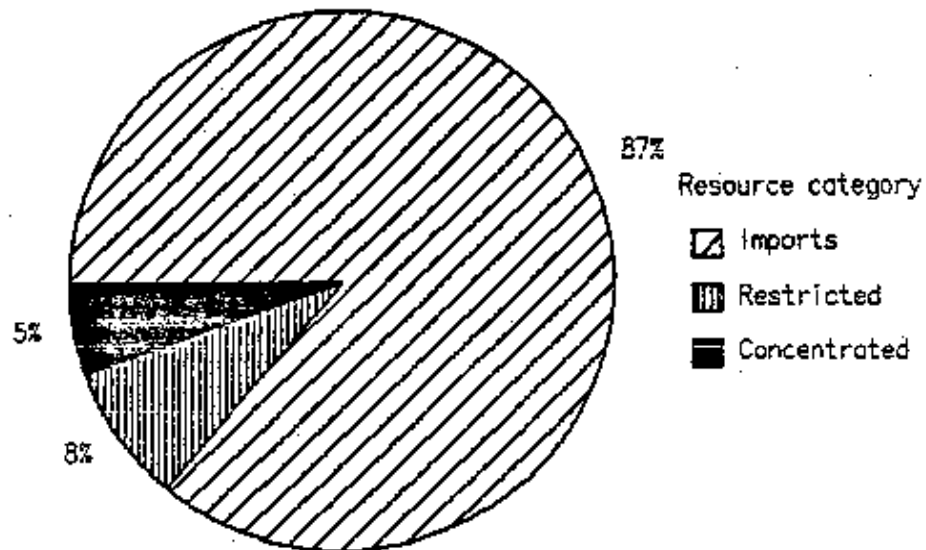
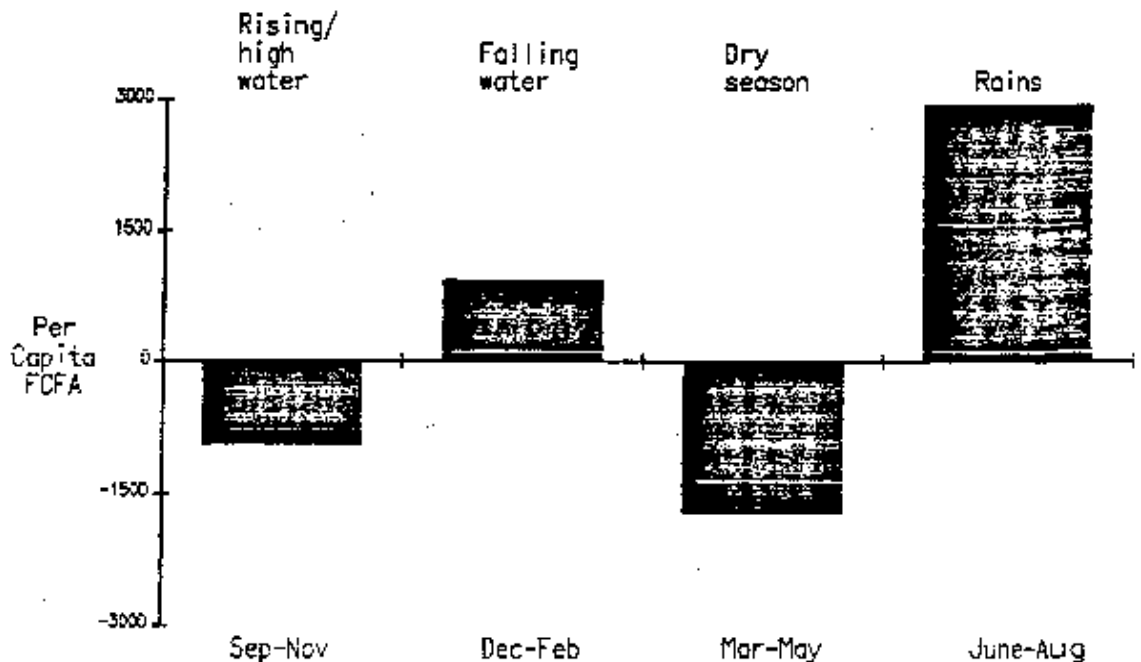


Figure 62 on Page 339, has already shown the break-down of data on production for exchange by category and has made it clear that the bulk of this income comes from 'concentrated' resources, followed by 'restricted' assets and income from services and other sources, with 'concentrated' resources becoming increasingly important as the year proceeds.

If the data on income and expenditure are compared as in Figure 66 on Page 345, in two seasons of the year - the rising and high water period, and the dry season - households made less revenue than they spent, though overall, they were marginally in surplus over the whole period. It is worth noting however, that the small surplus over expenditure in the falling water period did not wipe out the deficit from the previous season, meaning effectively that rural producers went into increasing debt up until the end of the dry season. 21

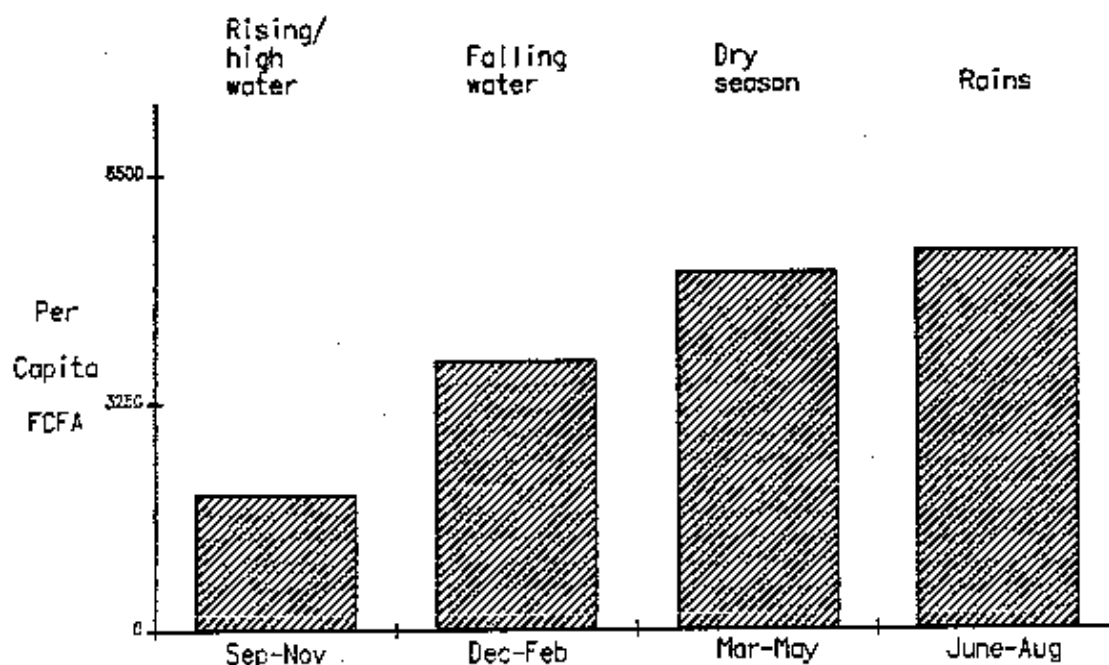
21 Without a doubt local producers - in particular fishermen, who need credit for their gear - are in greater debt than this with local merchants. Detailed data for these households were not available.

Figure 66: Balance of Per Capita Revenue and Expenditure, All Households, 1985-86



A major reason as to why they are in deficit for certain seasons of the year is because of their need to buy cereals to make up for the deficiency in their own production, as Figure 57 on Page 346 illustrates. Cereal acquisitions make up a third of all their expenditure and over half of what they spent on food, and, as the figure shows, this expenditure climbs steadily from December through to August, establishing the link between seasons of the year when they are obliged to buy food and their need to produce for exchange in order to meet these requirements.

Figure 67: Per Capita Expenditure on Cereals, by Season, All Households, 1985-86

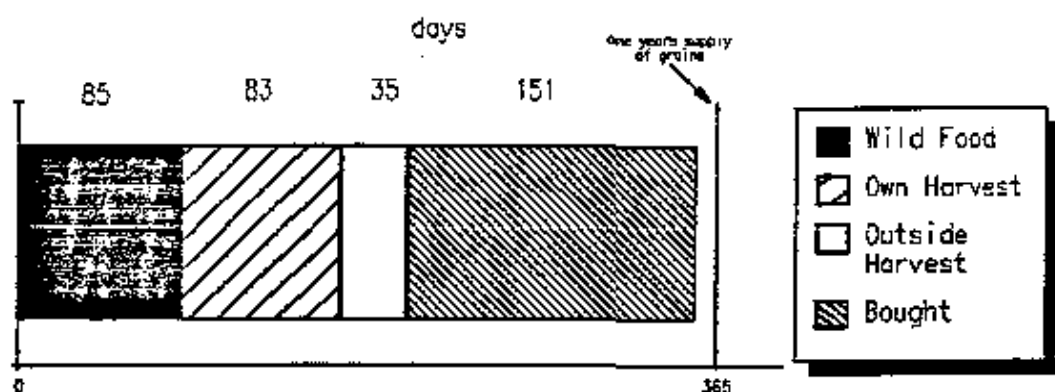


The analysis of the data on income and expenditure reveals the extent to which rural producers are involved in the cash economy in order to meet their requirements for basic necessities, and establishes that what they produce from primarily 'concentrated' resources, principally in the falling, dry and rainy seasons, goes overwhelmingly on the acquisition of imported items, with increasing amounts being spent on cereals as the year progresses. Further, it shows that for nine months of the year they are in debt, and only just balance their accounts by the end of the study period. This suggests that the accumulation of wealth within these production systems is at a standstill.

#### A.4.1.4. Access to cereals and wild grains

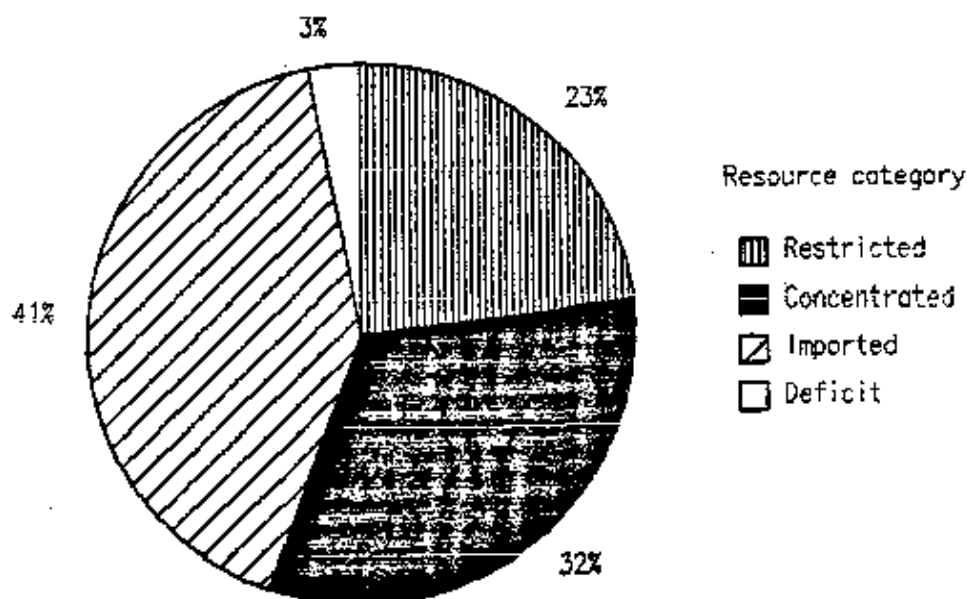
The data presented below show how rural producers in this sample achieved their access to grains from different sources. Figure 68 demonstrates that households in general managed to grow or gather just over half (56%) of their grain needs, and that just under half of that amount came from gathering wild food. By far the greatest proportion of what they managed to attain from a single source came from cereals they bought on the market (41%). In all they were marginally short of achieving their needs, with a deficit for the period in question here of only 12 days of grains. It is worth bearing in mind here that this study ended in August, after the rains began, when both fisheries and floodland used for gardens are picking up in productivity once more. 1986-87 was hardly better than the previous four year dry period.

Figure 68: Per Capita Access to Cereals and Wild Grains, All Households, 1985-86



In terms of the source of these grains, Figure 69 on Page 348 shows that a third of their needs were met by their production on their own fields or from the fields of outside harvests, and over 40% from imported cereals (from outside the region as well as from abroad) they bought on the market, with just under three months supply from wild food they gathered on 'restricted' resources, mostly on the floodplains. As has been shown in earlier figures, the wild grains and cultivated cereals were all obtained in the rising and falling water seasons, while the bulk of what they bought was in the falling, dry and rainy seasons, especially the latter two.

Figure 69: Proportion of Per Capita Access to Cereals and Wild Grains, by Category of Resource, All Households, 1985-86



#### A.4.1.5. The average household economy.

We are now in a position to make some tentative points on how households make seasonal use of resources with different technical and physical attributes in the Inland Niger Delta.

First the analysis of the data for all households shows that as resources change in characteristics between the rising and high

water period and the rainy season the economic value of 'concentrated' assets increase at the same time as production moves from subsistence to exchange-oriented activities and from the drylands to the floodplains.

Second, it follows from this that 'concentrated' resources found on the floodplains and exploited for exchange production between the falling water period and rainy season are the most important for rural producers' livelihoods.

Third, that the value of what is produced from the most valuable 'concentrated' assets on the floodplains between December and August is used primarily to acquire items that are imported into the zone. These items are basic necessities for the farmers, farmer herders and farmer fishermen of the zone and principally consist in the acquisition of cereals and food. Rural producers were scarcely able to meet their grain needs and other requirements from what they produced for exchange and subsistence.

Fourth these data have shown the breadth of natural resources rural producers exploit in the yearly cycle and have provided evidence of the logic of their seasonal movements - especially with regard to the value of wild food they gather on the drylands and the floodplains, and the sustenance they acquire through participating in harvests outside their zones of origin.

However, these aggregated data conceal significant differences between the two groups under study here: farmers and farmer herders living on the borderlands of the Delta on the one hand, and farmer fishermen inhabiting the floodplains on the other. The following sections of this chapter consider each of these groups in turn.

#### A.4.2. Farmers and farmer herders

##### A.4.2.1. Total production

It will be recalled that the principal activities of the farmers and farmer herders living on the borders of the Delta and in the Guimballa are to cultivate their flood rising pools and millet fields from the onset of the rains (June) to the high water season (November), and their flood retreat pools in the falling water season. Early in the rising water season they gather dryland wild food (Fonio) and then move onto the floodplains to gather wild grains (Bourgou, Haiga, water-lilies). Between December and January many of them migrate to parts of the Delta where the rice harvest has been productive, often staying away from their settlements until the onset of the rains. Households owning smallstock herd their animals close to settlements in the rainy and rising water seasons, and then move them down onto the floodplains in the falling water and dry seasons.

Table 26 on Page 351 shows the economic value of these activities to households through the year. The rising and falling water seasons are clearly the most productive in the cycle, followed by the rainy and dry seasons. Overall the per capita value of their production in 1985-86 stood at nearly 50,000FCFA, or US\$159.

Table 27 on Page 352 shows that nearly a third of the value of their production came from the cereals they either grew themselves (millet) or migrated to earn (rice), nearly a quarter of the value of what they produced came from sales of smallstock, 13% from sales of flood rising and flood retreat crops and 11% from wood they gathered both for their own consumption and for sale.

Table 26: Per Capita Value of Activities, Farmers and Farmer Herders,  
FCFA, 1985-86

BY SEASON	RISING HIGH WATER (Sep-Nov)	FALLING WATER (Dec-Feb)	DRY SEASON (Mar-May)	RAINS (Jun-Aug)	TOTAL
Millet harvest	7947	0	0	0	7947
Fonio harvest	752	0	0	0	752
Melon harvest	0	450	0	0	450
Rice harvest	0	6068	0	0	6068
Bourgou harvest	589	0	0	0	589
Halga harvest	382	0	0	0	382
Water lily harvest	166	0	0	0	166
Flood field Harvest	1019	2214	971	1884	6091
Herding livestock	1902	4176	2621	2389	11089
Fishing	84	339	166	621	1212
Wood gathering	886	1133	1731	1579	5331
Transport	121	77	215	342	757
Handicrafts	398	413	264	760	1837
Maraboutage	78	385	484	894	1842
Trade	0	0	0	0	0
Agricultural labour	89	66	93	289	539
Alms and remittances	681	237	403	1347	2670
Gold sales	26	0	0	0	26
<b>TOTAL</b>	<b>15130</b>	<b>15564</b>	<b>6953</b>	<b>10110</b>	<b>47756</b>



Table 27: The Value of Major Economic Outputs, Farmers and Farmer Herders, FCFA Per Capita, 1985-86

Outputs	Value FCFA Per Capita	% of Total Value of Production
Fish	1212	3%
Cereals	14015	29%
Livestock sales	11089	23%
Wood	5331	11%
Wild Food	2339	5%
Flood field crops	6091	13%

Table 28 on Page 353 shows how output from these sources correlates with the attributes of the resources they came from. 'Concentrated' resources, including what farmers produced from their own harvest, outside harvests and floodfields are the most important, followed by 'restricted' resources including the value of livestock sales, handicrafts and the wild food they gather. Other sources of production are the least valuable, and consist principally in their revenue from remittances sent home to the community, and from Maraboutage.

Table 28: Value of Resources by Physical Attribute, Farmers and Farmer Herders, by Season, FCFA Per Capita, 1985-86

	RISING/HIGH WATER (Sep-Nov)	FALLING WATER (Dec-Feb)	DRY SEASON (Mar-May)	RAINS (Jun-Aug)
<b>RESTRICTED RESOURCES</b>				
Dryland Pasture <sup>22</sup>	0	0	0	0
Dryland Forest <sup>23</sup>	3186	5722	1995	4728
Dryland Wild food	752	450	0	0
Floodplain wild food	1137	0	0	0
Fisheries	84	0	0	0
<b>Total Restricted</b>	<b>5159</b>	<b>6172</b>	<b>1995</b>	<b>4728</b>
<b>CONCENTRATED</b>				
Millet fields	7947	0	0	0
Flood Fields	1019	2214	971	1884
Floodplain pasture	0	0	0	0
Floodplain Forest <sup>24</sup>	0	0	2621	0
Rice Fields	0	6068	0	0
Fisheries	0	339	166	621
<b>Total concentrated</b>	<b>8966</b>	<b>8627</b>	<b>3708</b>	<b>2505</b>
<b>OTHER</b>				
Transport	121	77	215	342
Maraboutage	78	385	484	894
Trade	0	0	0	0
Agricultural Labour	89	66	93	289
Alms and Remittances	681	237	403	1347
Gold sales	26	0	0	0
<b>Total other</b>	<b>995</b>	<b>765</b>	<b>1195</b>	<b>2872</b>
<b>Grand Totals</b>	<b>15120</b>	<b>15558</b>	<b>6898</b>	<b>10105</b>

22 No data on floodplain/dryland pasture because these households kept goats.

23. Includes goat sales, wood gathered and handicrafts.

24 Includes goat sales only: wood and handicrafts under 'restricted'

Figure 70 on Page 354 demonstrates that overall half the value of their output comes from 'concentrated' resources, over a third from 'restricted' assets and 12% from other sources.

Figure 70: Proportion of Total Value of Production, Per Capita, by Category of Resource, Farmers and Farmer Herders 1985-86

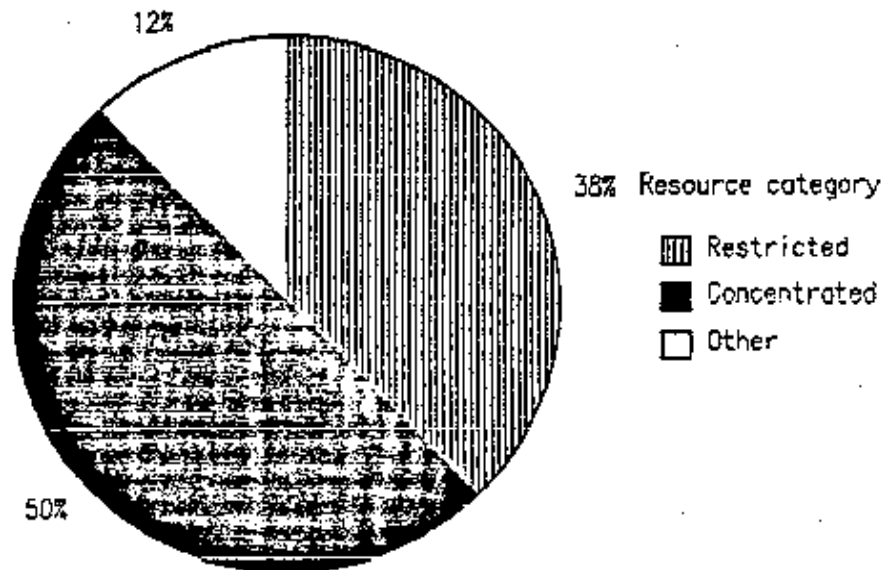
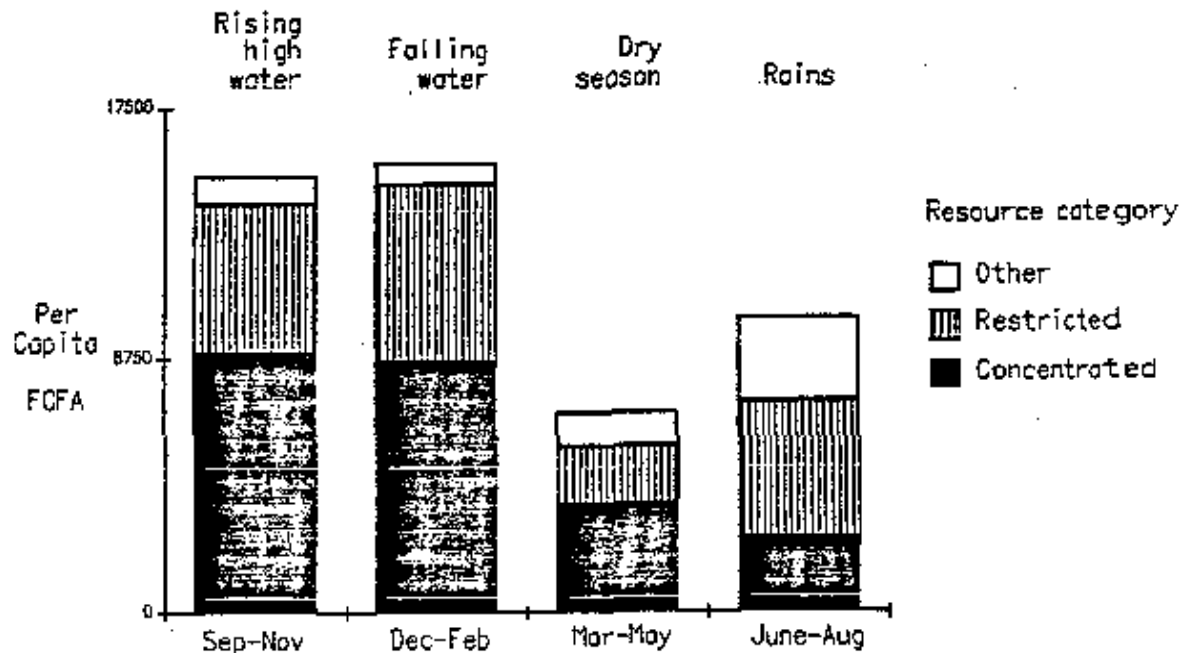


Figure 71 on Page 355 breaks this down by season, and shows that in the rising and falling water seasons 'concentrated' and 'restricted' assets are equally valuable; in the dry season 'concentrated' resources are the most important and in the rainy period 'restricted' assets. In the rising and falling water periods the value of livestock sales and the wild food farmers gather produce the most from 'restricted' resources in the year: cereal harvests and flood pool production make up the bulk of the 'concentrated' value. In the dry season sales of smallstock pasturing on 'concentrated' floodplain forests are the most significant, while production of handicrafts and woodfuel accounts for the value of 'restricted' resources. In the rainy season, farming households rely mostly on revenue from 'restricted' dryland forests through the value they generate from wood gathering, handicrafts and smallstock sales. Flood fields become more productive at this time of year and account for the larger part of production on 'concentrated' resources.

Figure 71: Per Capita Value of Production, By Category of Resource and by Season, Farmers and Farmer Herders, 1985-86



This process shows the farming and farmer herding economy to be dominated by cereal, floodpool and wild food production in the rising and falling water periods, with livestock sales, woodfuel and handicrafts production, as well as income from other sources becoming more important in the second half of the year. The value of output falls off significantly in the dry and rainy seasons.

#### A.4.2.2. Production for exchange and subsistence

Farmers' and farmer herders' major subsistence activities are composed of the cereals (millet) they grow upon their own fields, the harvests they travel to on the floodplains in order to get access to the rice crop, and the wild food they gather, both on the drylands neighbouring their communities and on the floodplains. Their major activities aimed at producing for exchange consist in the livestock,

garden (flood pool) products, handicrafts and woodfuel they sell. They also derive significant amounts of income from services they provide such as Maraboutage and transport, and from remittances they receive from members of the community who are employed outside the region.

Table 29 on Page 357 shows the economic values of these two groups of activities. Figure 72 on Page 358 and Figure 73 on Page 358 show the overall proportion of value generated by category and by season. Overall, the value of what they produce is nearly evenly split between production for subsistence (46%) and for exchange (54%), but it is very unevenly distributed through the year, with the rising and falling water period being characterised by subsistence production and the dry season and the rains by production for exchange.

Table 29: The Value of Production for Subsistence and Exchange,  
Farmers and Farmer Herders, FCPA Per Capita, 1985-86

	RISING HIGH WATER (Sep-Nov)	FALLING WATER (Dec-Feb)	DRY SEASON (Mar-May)	RAINS (Jun-Aug)	TOTAL
<b>SUBSISTENCE</b>					
Millet	7947	0	0	0	7947
Ponio	752	0	0	0	752
Melon	0	450	0	0	450
Rice	0	6068	0	0	6068
Bourgou	589	0	0	0	589
Haiga	382	0	0	0	382
Water lily	166	0	0	0	166
Wood	684	923	1436	1135	4178
Fish	84	339	166	621	1212
<b>Total Subsistence</b>	<b>10607</b>	<b>7780</b>	<b>1602</b>	<b>1756</b>	<b>21747</b>
<b>EXCHANGE</b>					
Livestock	1902	4176	2621	2389	11089
Wood fuel	203	211	295	424	1133
Handicrafts	398	413	264	760	1837
Vedgetables	1019	2214	971	1884	6091
Fish	0	0	0	0	0
Ag. Labour	89	66	93	289	539
Maraboutage	78	385	484	894	1842
Transport	121	77	215	342	757
Gold sales	26	0	0	0	26
Remittances	681	237	403	1347	2670
Trade	0	0	0	0	0
<b>Total Exchange</b>	<b>4522</b>	<b>7782</b>	<b>5350</b>	<b>8332</b>	<b>25988</b>
<b>Grand Total</b>	<b>15129</b>	<b>15563</b>	<b>6952</b>	<b>10089</b>	<b>47735</b>

Figure 72: Proportion of Per Capita Production for Exchange, Farmers and Farmer Herders, 1985-86

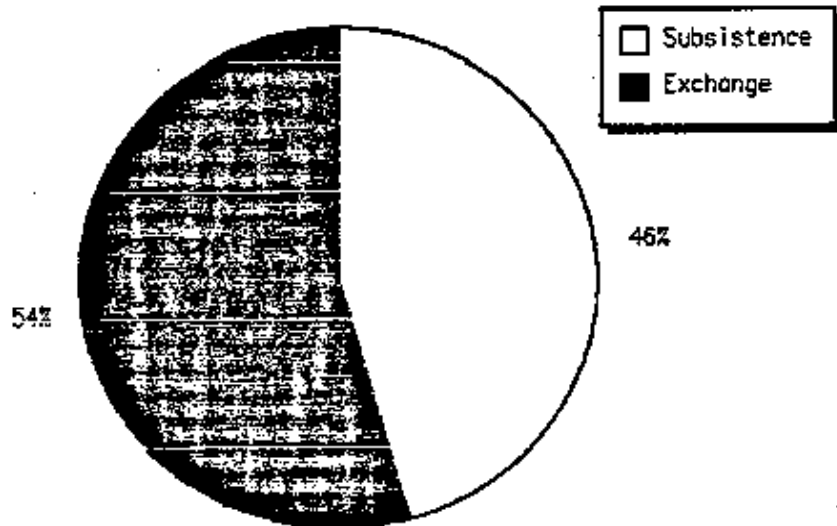
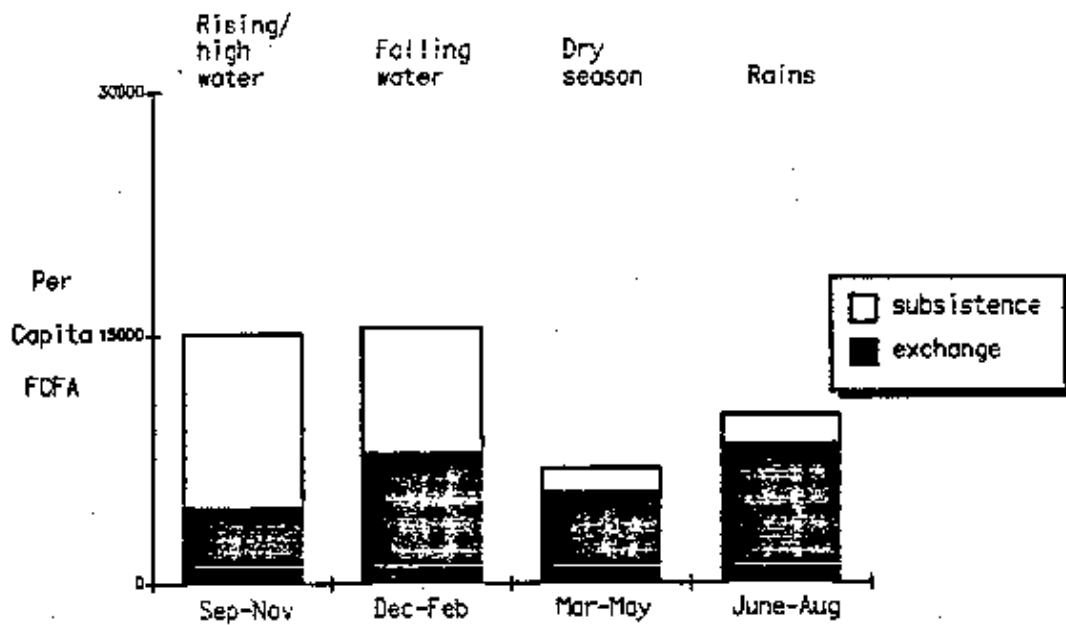
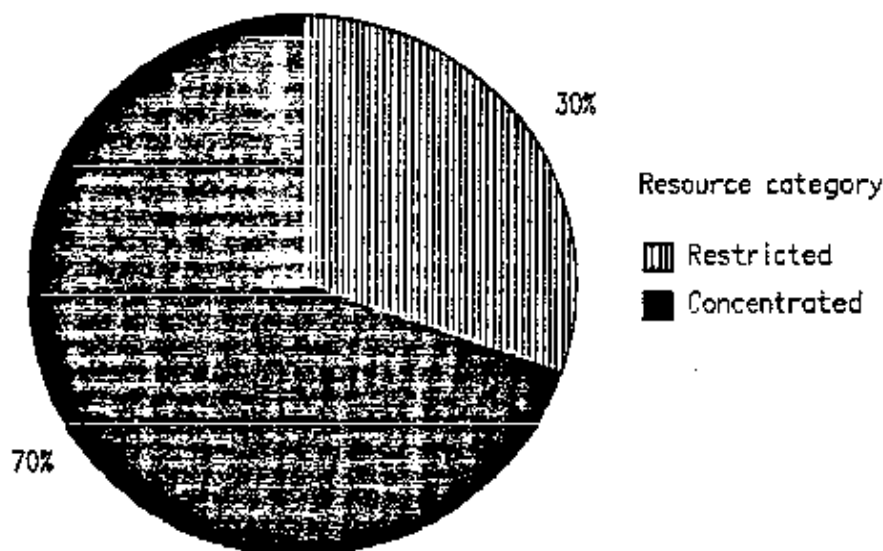


Figure 73: Value of Production for Subsistence and Exchange, by Season, Farmers and Farmer Herders, 1985-86



Looked at in more detail, it can be seen from Figure 74 on Page 359 that by far the greater part of what they produce for subsistence comes from 'concentrated' resources: millet, rice and flood pool fields, while a third comes from 'restricted' assets: the wild food they gather on the drylands and floodplains, as well as the woodfuel they exploited for their own consumption. It is worth noting here that nearly half of the value of the cereals they acquired and the wild grains they gathered came from the floodplains, underlining the importance of the seasonal movement of farmers and farmer herders away from their settlements in search of food security: in some of the borderland areas of Youvarou Cercle up to 50% of the community left on these migrations.

Figure 74: Proportion of Per Capita Value of Production for Subsistence, by Category of Resource, Farmers and Farmer Herders, 1985-86



Turning to exchange production, Figure 75 on Page 360 shows nearly half of the value of this output came from 'restricted' resources, just over a third from 'concentrated' assets, and the remainder from other sources of income. The value of 'restricted' resources reflects what they gained from the sale of smallstock, handicrafts and



woodfuel; the bulk of the 'concentrated' value comes from garden (flood pool) products, together with the sale of smallstock in the dry season, when they are being herded in the floodplain forests. The contribution of Maraboutage, remittances and transport services to other sources of income has been alluded to above.

Figure 75: Proportion of Per Capita Value of Production for Exchange, by Category of Resource, Farmers and Farmer Herders, 1985-86

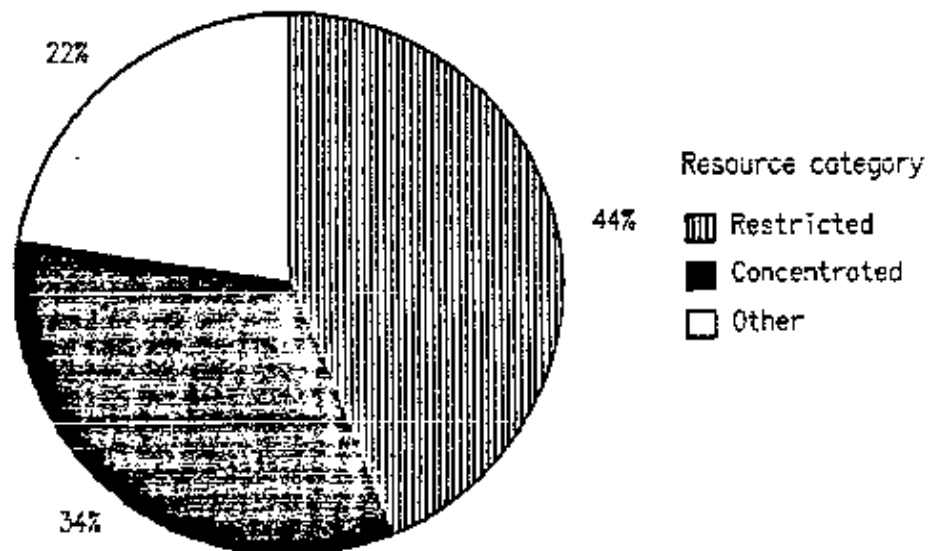


Figure 76 on Page 361 and Figure 77 on Page 362 show the breakdown of production for subsistence and exchange by season. The value of 'concentrated' assets in production for subsistence during the rising and falling water seasons is clearly demonstrated, as is the sharp fall off in this line of production in the ensuing two seasons of the year.

The seasonal value of production for exchange presents a more diverse picture. Two seasons of the year are the most productive: the falling water season when livestock sales and garden produce provide the bulk of income and are at their highest point of the year; and the rainy season when livestock sales remain high, when

woodfuel and handicraft sales are at their apogee, and when farming households receive the greatest amounts from Maraboutage, transport services, agricultural labour and from remittances. The two least productive seasons for exchange are the rising water and dry seasons: in the former livestock, handicrafts and woodfuel sales make up the greater part of production, in the latter livestock and garden product sales.

Figure 76: Per Capita Value of Production for Subsistence, by Category of Resource and by Season, Farmers and Farmer Herders, 1985-86

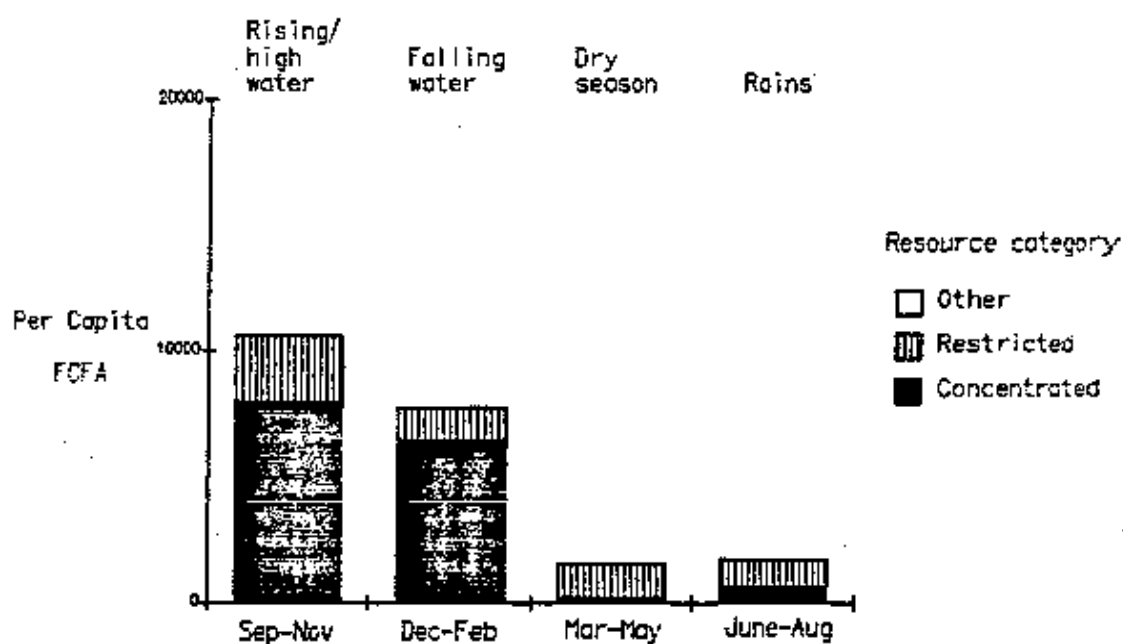
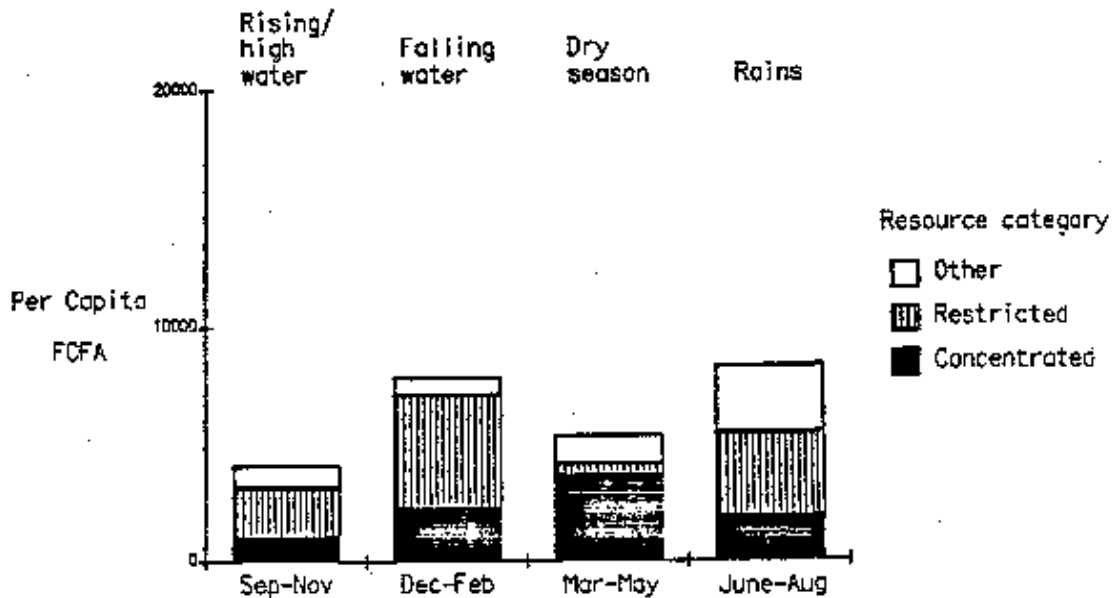


Figure 77: Per Capita Value of Production for Exchange, by Category of Resource and by Season, Farmers and Farmer Herders, 1985-86



This review of the relative importance of production for exchange and subsistence to farmers and farmer herders has provided evidence of the economic value of two coping strategies they have adopted as physical conditions have become more difficult. In demonstrating the importance of subsistence production in the rising and falling water seasons it has shown the value they produce from moving onto the floodplains in search of wild food and in gaining access to rice crops that have succeeded in the Delta even in bad years. In showing how the dry and rainy seasons are given over essentially to production for exchange it has revealed the importance of forest resources to these producers in providing nourishment for their smallstock, woodfuel for sale, and the materials for handicraft production. The reasons why they need to exploit this resource for cash are explored in the following section.

## A.4.2.3. Income and expenditure

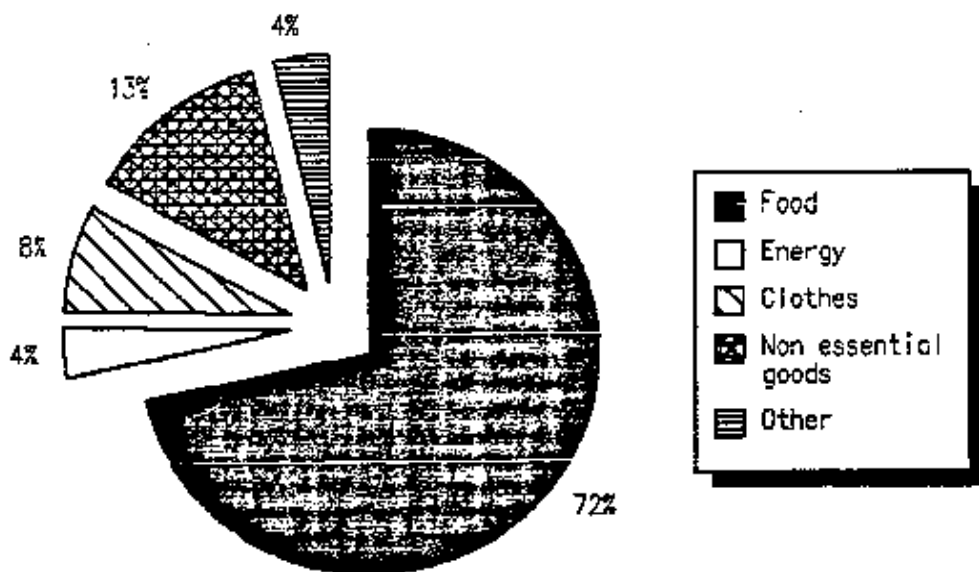
Table 30 on Page 363 shows the income and expenditure of farmers and farmer herders. The seasonality and attributes of farmers' incomes have already been discussed in the previous section under exchange, thus attention will initially be focused here on their expenditure.

Table 30: Cash Income and Expenditure of Farmers and Farmer Herders, PCFA Per Capita, 1985-86

	RISING HIGH WATER (Sep-Nov)	FALLING WATER (Dec-Feb)	DRY SEASON (Mar-May)	RAINS (Jun-Aug)	TOTAL
<b>INCOME</b>					
Livestock	1902	4176	2621	2389	11089
Wood fuel	203	211	295	424	1133
Handicrafts	398	413	264	760	1837
Vedgetables	1019	2214	971	1884	6091
Fish	0	0	0	0	0
Ag. labour	89	66	93	289	539
Maraboutage	78	385	484	894	1842
Transport	121	77	215	342	757
Gold sales	26	0	0	0	26
Remittances	681	237	403	1347	2670
Trade	0	0	0	0	0
<b>TOTALS</b>	<b>4522</b>	<b>7782</b>	<b>5350</b>	<b>8332</b>	<b>25988</b>
<b>EXPENDITURE</b>					
Cereals	990	2466	2802	3266	9525
Condiments	1398	2064	1583	1362	6408
Clothes	387	593	468	674	2124
Non essential	821	1135	798	873	3629
Energy	156	397	250	244	1048
Other Food	631	1324	1004	832	3793
Other	172	330	255	241	999
<b>TOTALS</b>	<b>4557</b>	<b>8311</b>	<b>7164</b>	<b>7495</b>	<b>27529</b>
<b>BALANCE</b>	<b>-35</b>	<b>-528</b>	<b>-1814</b>	<b>837</b>	<b>-1540</b>

Figure 78 on Page 364 demonstrates that nearly three quarters of all their expenditure is spent on food, and Figure 79 on Page 365 shows the seasons of greatest expenditure run from the falling water period through to the rainy season. The rising water period when the millet crop ripens and farmers are gathering wild grains on the drylands and the floodplains is the period of the year when they are least involved in the market. It should be mentioned here that this is the time of year when travel in the Delta is most difficult, therefore weekly markets are attended by fewer merchants from Mopti than in other seasons, and the general level of commercial activity is low.

Figure 78: Proportion of Per Capita Expenditure on Different Items, Farmers and Farmer Herders, 1985-86



**Figure 79: Per Capita Expenditure, by Category of Resource and by Season, Farmers and Farmer Herders, 1985-86**

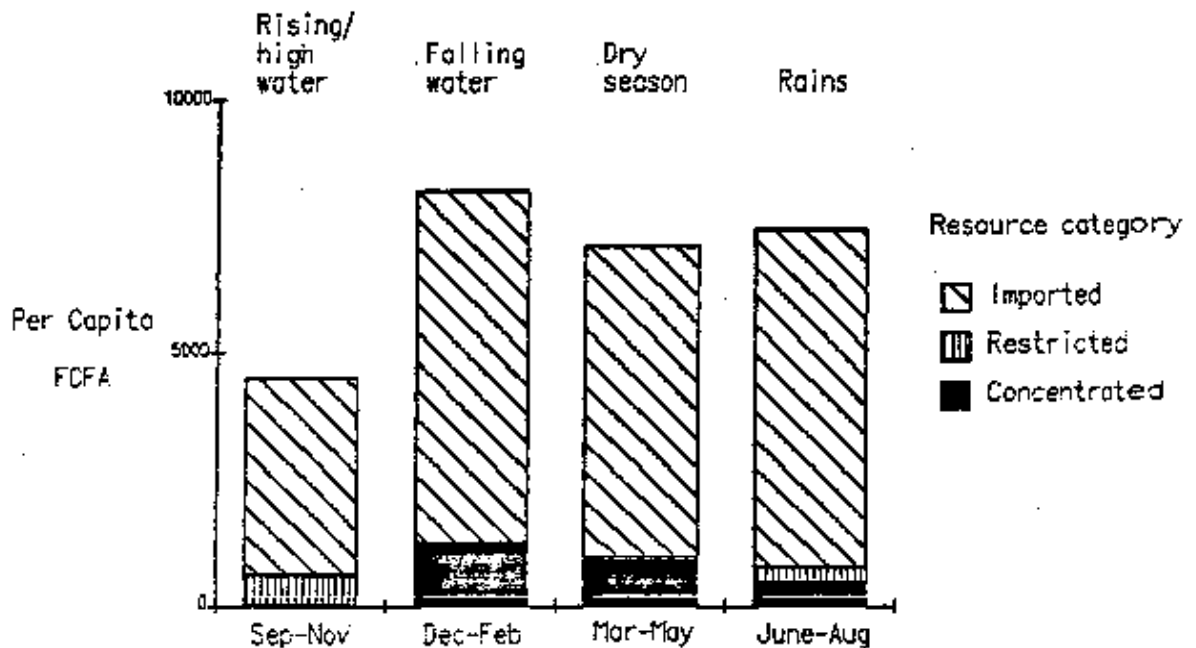
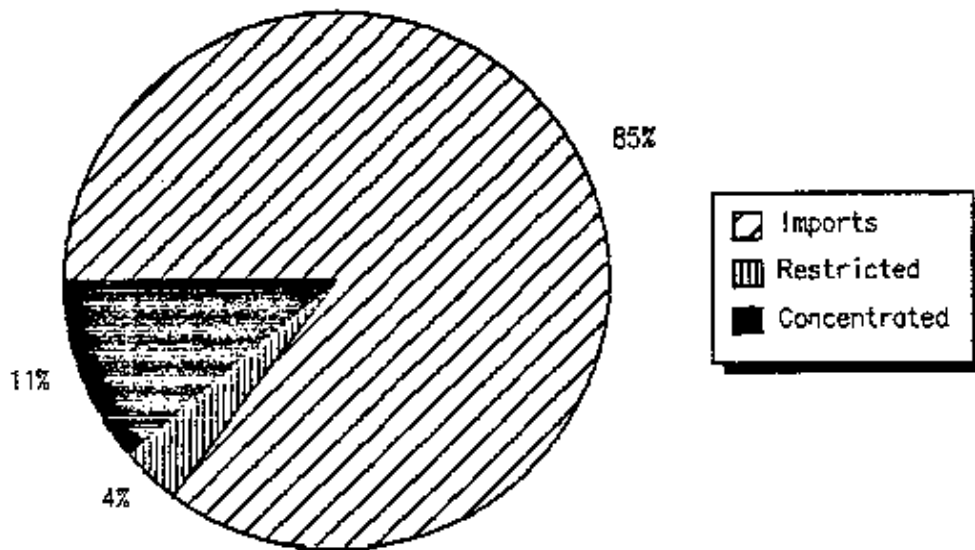


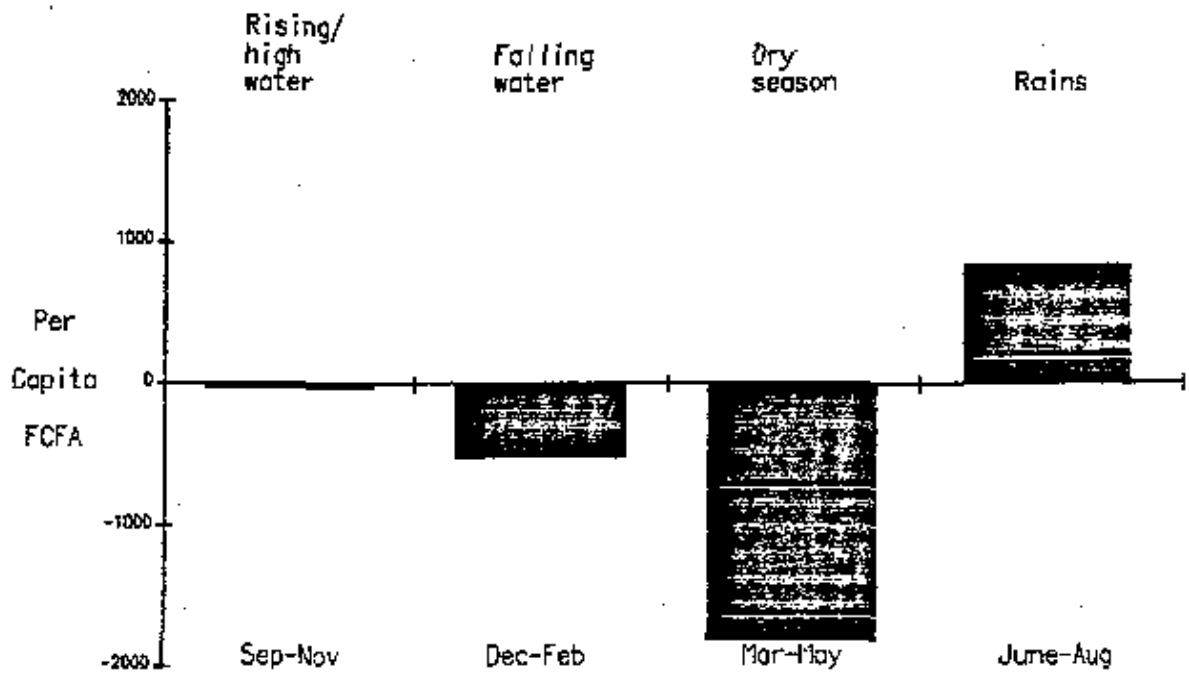
Figure 80 on Page 366 shows almost everything they buy is imported into the zone. Only 15% of the value of their acquisitions consist in local goods, which are principally composed of milk and fish produced from 'concentrated' resources in the falling and dry seasons and 'restricted' resources in the rising water and rainy seasons (except for fish which remains 'concentrated').

Figure 80: Proportion of Per Capita Expenditure on Imports and Local Products, by Category of Resource, Farmers and Farmer Herders, 1985-86



A comparison of the seasonal balance between the income and expenditure of farmers and farmer herders shows (Figure 81 on Page 367) that in three seasons of the year - from the rising water through to the dry season - they are in deficit, especially in the latter period. Table 30 on Page 363 shows the cumulative balance leads these households into an overall deficit at the end of the year.

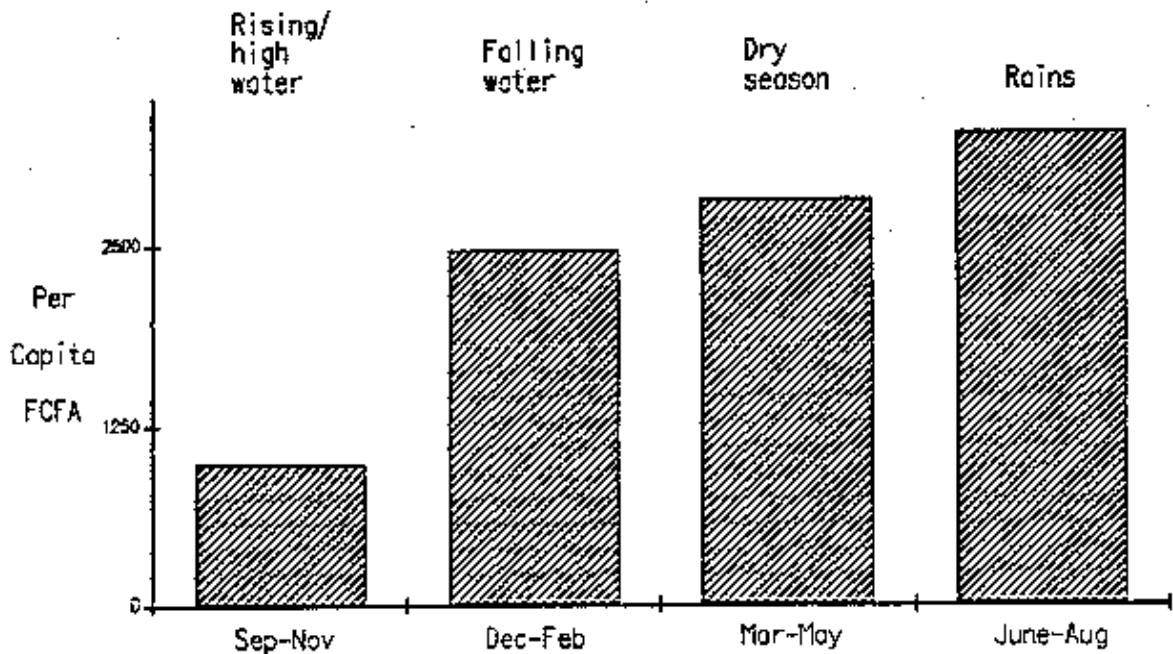
Figure 81: Balance of Per Capita Revenue and Expenditure, Farmers and Farmer Herders, 1985-86



One of the principal reasons for this is their need to buy cereals, as Figure 82 on Page 368 demonstrates, showing a steady climb in acquisitions through the year. On average, farming households spent well over a third of their total income on cereals: in the dry season this rose to half their seasonal income.



Figure 82: Per Capita Expenditure on Cereals, Farmers and Farmer Herders, 1985-86

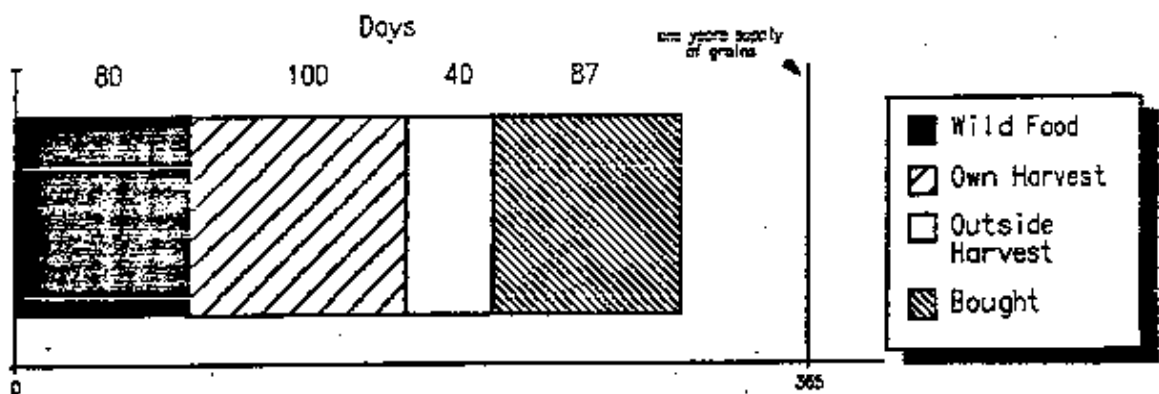


By the end of the study period in August 1986 most farmers and farmer herders were in debt to cereal merchants either from the community in which they lived, or to merchants in larger towns. The terms of these debts were disadvantageous, as habitually the merchant requires repayment to be for the same value as the amount lent. Farmers and farmer herders are often obliged to repay this credit as soon as the harvest comes in, and had only their crop to sell (in 1986, if farmers and farmer herders had any goats left, they were most unwilling to sell them because they formed the stock on which they would build a sufficient herd to take them through the next dry season). Prices for cereals - particularly millet - just after the harvest plummet, thus the amount of grain they are obliged to dispose of is often two to three times greater than what they were loaned when prices were high.

#### A.4.2.4. Access to cereals and wild grains

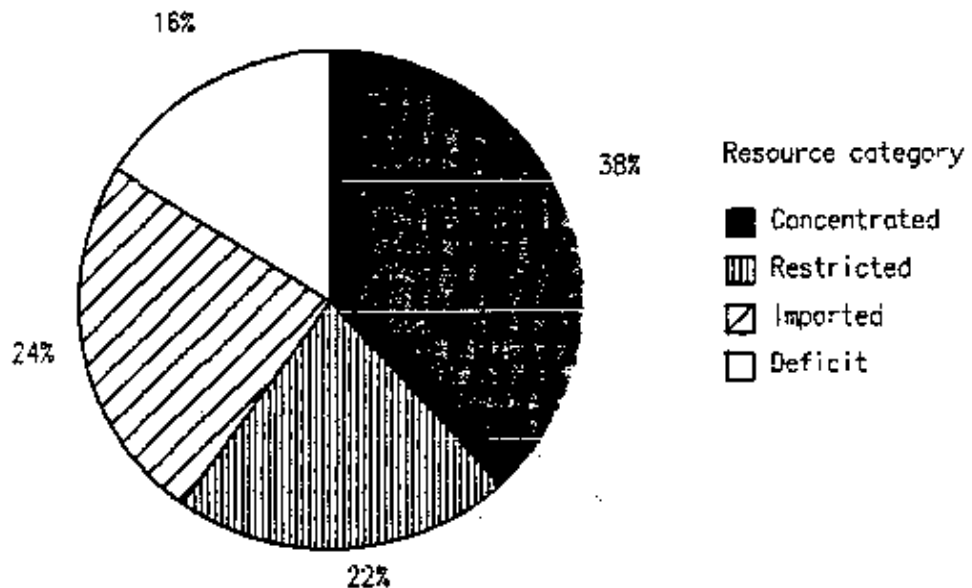
Farmers and farmer herders are substantially in deficit for their cereal needs, with all farming and farmer herding households being on average two months short of grains. Figure 83 on Page 369 shows their principal source of cereals came from their own harvests, followed by what they bought on the market, the wild grains they gathered and what they earned from migrating to outside harvests. If this data is looked at from the point of view of the productivity of the drylands and wetlands it shows that on average households derived nearly five and a half months (162 days) supply of grain from resources neighbouring their communities, and nearly two months supply (58 days) from wild food and cereals they gathered and earned on the floodplains. In view of their overall deficit, and the debt they accumulated over the year mentioned in the last section, it can be appreciated that the four months supply of grains they received from wild food and migrating to outside harvests was of strategic value to their livelihoods.

Figure 83: Per Capita Access to Cereals and Wild Grains, Farmers and Farmer Herders, 1985-86



If this data is examined from the point of view of the physical attributes of the resources cereals and wild food came from, Figure 84 on Page 370 demonstrates that well over a third of their grain requirements were provided from 'concentrated' resources, and just over a fifth came from 'restricted' assets, accounting for 60% of their overall grain needs.

**Figure 84: Proportion of Per Capita Access to Cereals and Wild Grains, by Category of Resource, Farmers and Farmer Herders, 1985-86**



#### A.4.2.5. The farming and farmer herding economy

This review of the farming and farmer herding economy in 1985-86 makes the following points:

- 1) In line with the trend identified from data including all households in the sample, production for subsistence switches to production for exchange between the rising and falling water seasons and the dry and rainy periods.

2) From the rising water through to the dry season 'concentrated' assets - millet, rice and floodpool fields, and floodplain forests in the dry season - are the most important resources. In the rainy season 'restricted' resources and 'other' sources of income are more important than 'concentrated' assets.

3) Dryland resources are more important than wetland assets for farmers and farmer herders. Of greatest value to them are the dryland forests they exploit which produce forage for their livestock, woodfuel for their own consumption and for sale, and materials for producing handicrafts, amounting to a third of the value of all they produce and which are most productive in the falling water and the rainy seasons.

4) In contrast to the tendency identified when data from all households were analysed, farmers and farmer herders do not produce more for exchange from 'concentrated' resources on the floodplains in the dry and rainy seasons, but anchor their livelihoods around the exploitation of their fields and neighbouring forests, and make forays onto the floodplains at strategic moments of the year.

This analysis of the farming economy allows the dual nature of their productive strategy to be clearly perceived and its success to be assessed. Their primary subsistence crop is millet which they supplement by gathering wild food and migrating onto the floodplains to take part in the rice harvest. These activities generated only just over half of their cereal needs in 1985-86 and the shortfall, including what they needed to acquire other essentials, necessarily had to come from exchange related activities. Of these, the products deriving from their exploitation of forests were of the greatest importance, supplemented by their revenue from flood pool cultivation, and from services they provided and remittances sent home. The data presented here has shown that overall these strategies were unsuccessful, and they finished the study period both with a shortfall in their access to grains, and in debt.

### A.4.3. Farmer Fishermen

#### A.4.3.1. Total production

In the rising and high water season farmer fishermen living in the communities under study here cultivated their rice fields, harvested wild grains, and fished the main rivers and secondary channels followed by the floodplains as water levels rose in the Delta. In the falling water season their principal activities were harvesting the rice crop when it ripened in December and fishing the secondary channels as water levels fell. Towards the end of this period they began to exploit the main waterways, in particular through collective fisheries organised around certain productive points of the river beds. In the dry and rainy seasons they principally fished the main waterways neighbouring their communities, in the latter period also sowing and weeding their rice fields. Table 31 on Page 373 shows the value of what they produced was just under 100,000 FCFA, or US\$ 319 - twice the value of production of farmers and farmer herders.

Table 31: Per Capita Value of Activities, Farmer Fishermen, PCFA, 1985-86

BY SEASON	RISING HIGH WATER (Sep-Nov)	FALLING WATER (Dec-Feb)	DRY SEASON (Mar-May)	RAINS (Jun-Aug)	TOTAL
Millet harvest	0	0	0	0	0
Ponio harvest	0	0	0	0	0
Melon harvest	0	0	0	0	0
Rice harvest	0	8498	0	0	8498
Bourgou harvest	3997	0	0	0	3997
Haiga harvest	0	0	0	0	0
Water lily harvest	2610	0	0	0	2610
Flood Field Harvest	0	0	0	0	0
Herdling livestock	439	0	0	71	510
Fishing	5391	17279	12979	18787	54437
Fishing Tithe	857	4876	1530	928	8191
Wood gathering	423	228	923	1081	2655
Transport	2202	1873	716	323	5115
Handicrafts	0	0	0	0	0
Maraboutage	0	67	696	198	963
Trade	409	1080	2191	1200	4881
Agricultural labour	42	0	214	2085	2342
Alms and remittances	607	307	0	127	1041
Gold sales	394	0	0	0	394
<b>TOTAL</b>	<b>17375</b>	<b>34210</b>	<b>19251</b>	<b>24805</b>	<b>95641</b>

Table 32 on Page 374 shows well over half the value of their production comes from fishing, and only 9% from their rice crop.

**Table 32: The Value of Major Economic Outputs, Farmer Fishermen,  
Per Capita PCFA, 1985-86**

Outputs	Value PCFA Per Capita	% of Total Value of Production
Fish	54437	57%
Cereals	8498	9%
Livestock sales	510	1%
Wood	2665	3%
wild Food	6607	7%
Flood field crops	0	-

Table 33 on Page 375 shows the data on production broken down by resource attribute and by season. Together with Figure 85 on Page 376 and Figure 86 on Page 376 they demonstrate the overwhelming importance of 'concentrated' resources in their economy both overall and for three out of four seasons of the year. This is due principally to the value of the fish they catch which, it will be recalled, are 'restricted' assets in the rising and high water season, thus accounting for the value of 'restricted' assets during this period also.

Table 33: Value of Resources by Physical Attribute, Farmer Fishermen, by Season, FCFA Per Capita, 1985-86

	RISING/HIGH WATER (Sep-Nov)	FALLING WATER (Dec-Feb)	DRY SEASON (Mar-May)	RAINS (Jun-Aug)
<b>RESTRICTED RESOURCES</b>				
Dryland Pasture	0	0	0	0
Dryland Forest <sup>25</sup>	862	228	923	1152
Dryland Wild food	0	0	0	0
Floodplain wild food	6607	0	0	0
Fisheries	6248	0	0	0
<b>Total Restricted</b>	<b>13717</b>	<b>228</b>	<b>923</b>	<b>1152</b>
<b>CONCENTRATED</b>				
Millet fields	0	0	0	0
Flood Fields	0	0	0	0
Floodplain pasture	0	0	0	0
Floodplain Forest	0	0	0	0
Rice Fields	0	8498	0	0
Fisheries	0	22155	14509	19715
<b>Total concentrated</b>	<b>0</b>	<b>30653</b>	<b>14509</b>	<b>19715</b>
<b>OTHER</b>				
Transport	2202	1873	716	323
Maraboutage	0	67	696	198
Trade	409	1080	2191	1200
Agricultural Labour	42	0	214	2085
Alms and Remittances	607	307	0	127
Gold sales	394	0	0	0
<b>Total other</b>	<b>3654</b>	<b>3327</b>	<b>3817</b>	<b>3933</b>
<b>Grand Totals</b>	<b>17371</b>	<b>34208</b>	<b>19249</b>	<b>24800</b>

25 Includes wood gathered and handicrafts.



Figure 85: Proportion of Total Value of Production, by Category of Resource, Per Capita, Farmer Fishermen, 1985-86

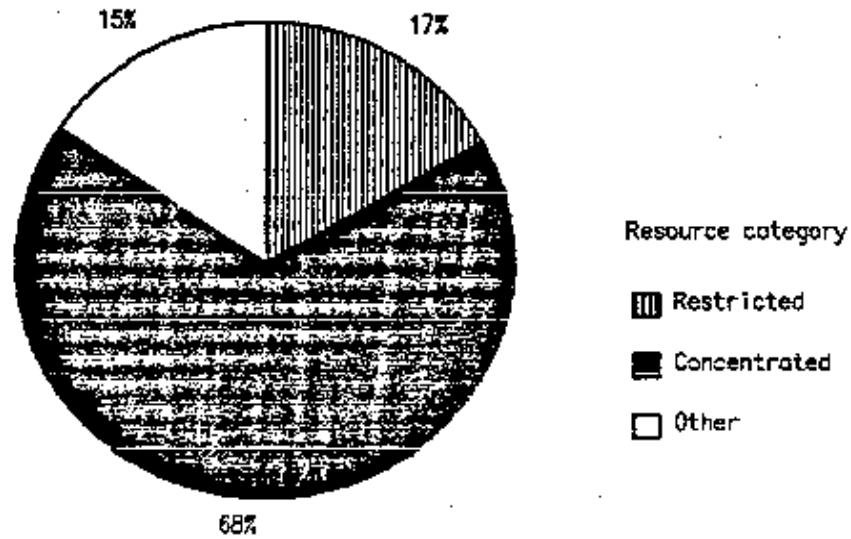


Figure 86: Per Capita Value of Production, By Category of Resource and by Season, Farmer Fishermen, 1985-86

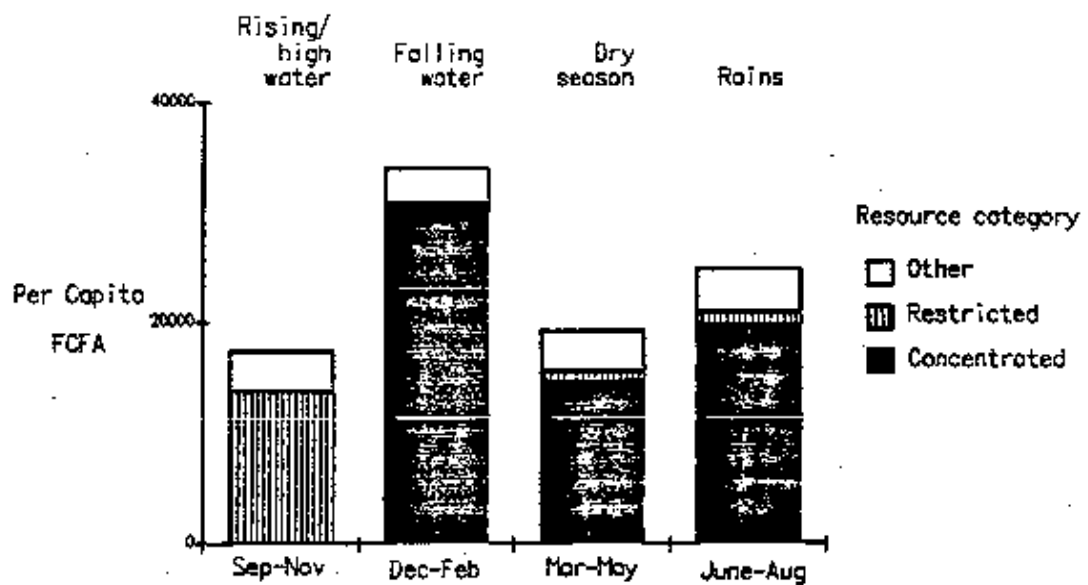


Figure 86 on Page 376 also reveals the disproportionate productivity of the falling water season compared to other periods in the year: this reflects the value of their own crops and the harvests they travel to take part in as well as what they produce from fishing. The months of December to February are strategic for farmer fishermen: during this period they produce over a third of all they make in the year, followed by the rainy season, when they generate a quarter.

The high level of fish production in the rainy season is of particular significance: it will be shown later in this chapter how in former years of higher rainfall and flood levels, farmer fishermen did not exploit the fisheries to anything like the same degree at this time as they were principally concerned with preparing their rice fields, and weeding the crop. This shows that farmer fishermen's response to drier conditions that make many of their fields unproductive has been to exploit the fisheries, at a time when this activity has a disproportionate effect on fish stocks, as it at this moment that fish are migrating into the floodplains to reproduce.

#### A.4.3.2. Production for exchange and subsistence

Farmer fishermen's subsistence activities consist in the rice they grow on their own fields, the harvests they migrate to in other parts of the Delta when their own crops are insufficient, the wild food and woodfuel they gather, and fishing for their own consumption. Their activities orientated towards exchange include fishing, agricultural labour, providing transport and petty trade. They also derive income from remittances sent home by household members working away from the community, and from Maraboutage.

Table 34 on Page 378 shows the economic value of these activities. Figure 87 on Page 379 and Figure 88 on Page 379 illustrate to what extent they are involved in the market, with well over three quarters of what they produce being intended for exchange. Their subsistence activities are almost entirely confined to the rising and falling water seasons, while the dry and rainy seasons are given over to exchange-related activities.

Table 34: Per capita value of production for subsistence and exchange, farmer fishermen, PCFA, 1985-86

	RISING HIGH WATER (Sep-Nov)	FALLING WATER (Dec-Feb)	DRY SEASON (Mar-May)	RAINS (Jun-Aug)	TOTAL
<b>SUBSISTENCE</b>					
Millet harvest	0	0	0	0	0
Ponio harvest	0	0	0	0	0
Melon harvest	0	0	0	0	0
Rice harvest	0	8498	0	0	8498
Bourgou harvest	3997	0	0	0	3997
Haiga harvest	0	0	0	0	0
Water lily harvest	2610	0	0	0	2610
Wood gathered	423	228	923	1081	2655
Fish consumed	30	864	649	939	2482
<b>Total Subsistence</b>	<b>7060</b>	<b>9590</b>	<b>1572</b>	<b>2020</b>	<b>20242</b>
<b>EXCHANGE</b>					
Livestock	439	0	0	0	439
Wood fuel sold	0	0	0	0	0
Handicrafts	0	0	0	0	0
Garden Products	0	0	0	0	0
Fish	6218	21291	13860	18776	60145
Agricultural Labour	42	0	214	2085	2341
Maraboutage	0	67	696	198	961
Transport	2202	1873	716	323	5114
Gold sales	394	0	0	0	394
Remittances	607	307	0	127	1041
Trade	409	1080	2191	1200	4880
<b>Total Exchange</b>	<b>10311</b>	<b>24618</b>	<b>17677</b>	<b>22709</b>	<b>75315</b>
<b>Grand Total</b>	<b>17371</b>	<b>34208</b>	<b>19249</b>	<b>24729</b>	<b>95557</b>

Figure 87: Proportion of Production for Exchange, Farmer Fishermen, 1985-86

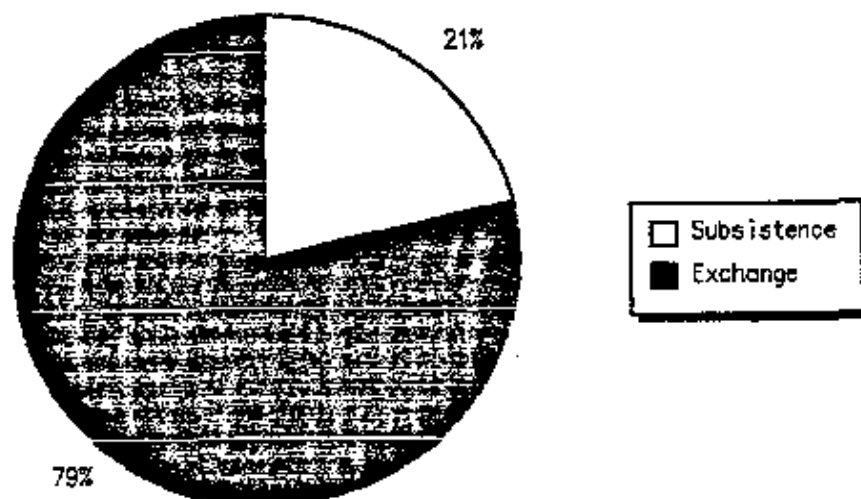
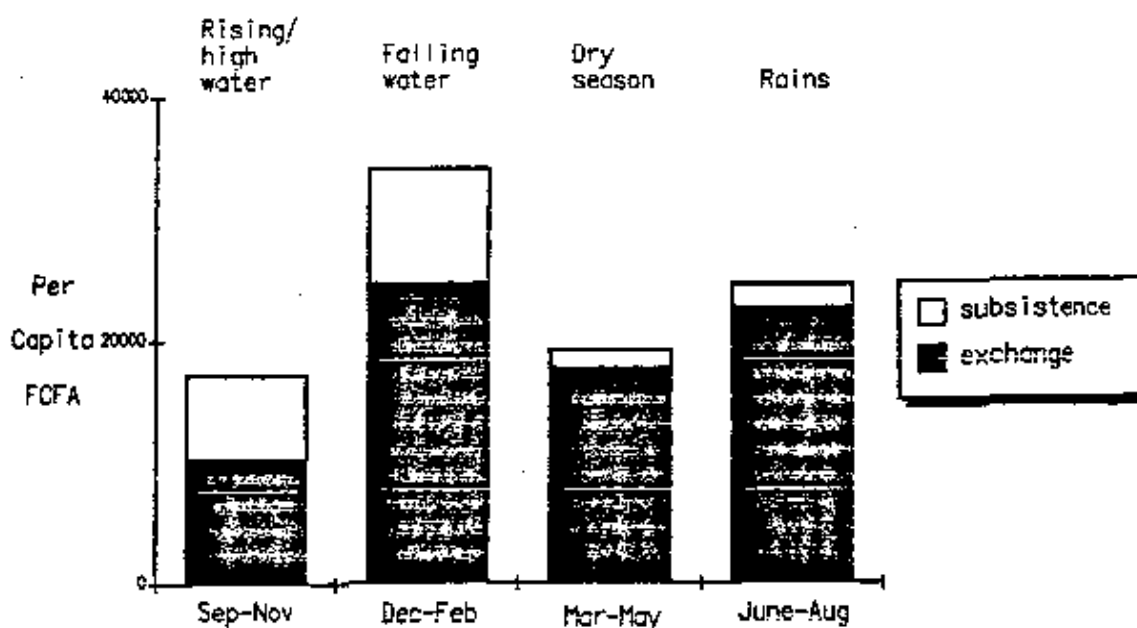


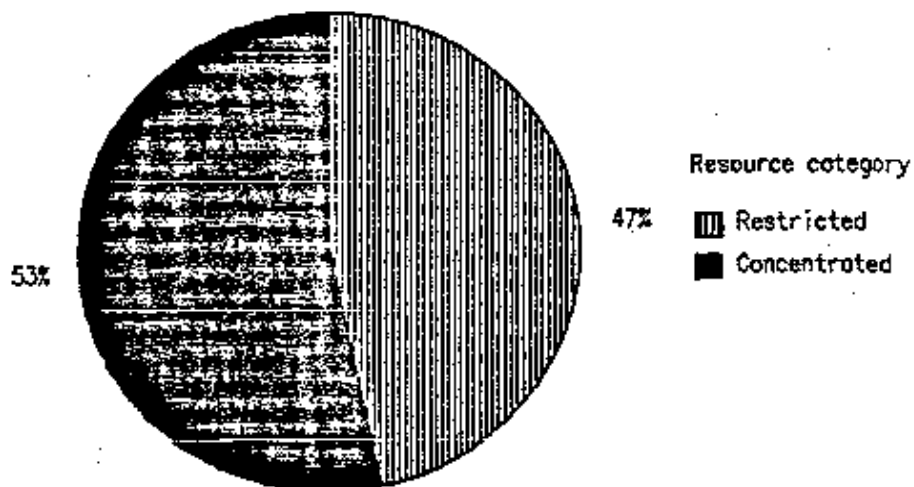
Figure 88: Value of Production for Subsistence and Exchange, by Season, Farmer Fishermen, 1985-86



It should be noted that they do not migrate to the dry lands for the millet harvest, as the farmers and farmer herders do for the rice harvests: there is some qualitative evidence that in years of good millet production they do in fact do this, but in 1985-86 neither the millet nor rice harvest was good in the northern sector of the Delta, thus rural producers moved south into areas of the floodplains in the centre of the Delta where rice production was high. Nor did farming and fishing households move into the borderlands of the Delta to take part in the wild food harvests of that area. They preferred to remain where they were and fish, and the benefit of such a strategy will be demonstrated below.

Figure 89 on Page 380 shows that the little they produce for their own subsistence is almost evenly split between 'concentrated' (53%) and 'restricted' (47%) resources. This reflects of the one hand the low productivity of their own rice crop and the amount they earned from outside harvests (see below), and on the other hand their higher production from wild food, compared to farmers and farmer herders.

Figure 89: Proportion of Per Capita Value of Production for Subsistence, by Category of Resource, Farmer Fishermen, 1985-86



Turning to their production for exchange, Figure 90 on Page 381 shows the dominant role played by 'concentrated' resources - essentially the value of fish they catch in the falling, dry and rainy seasons.

Figure 90: Proportion of Per Capita Value of Production for Exchange, by Category of Resource, Farmer Fishermen, 1985-86

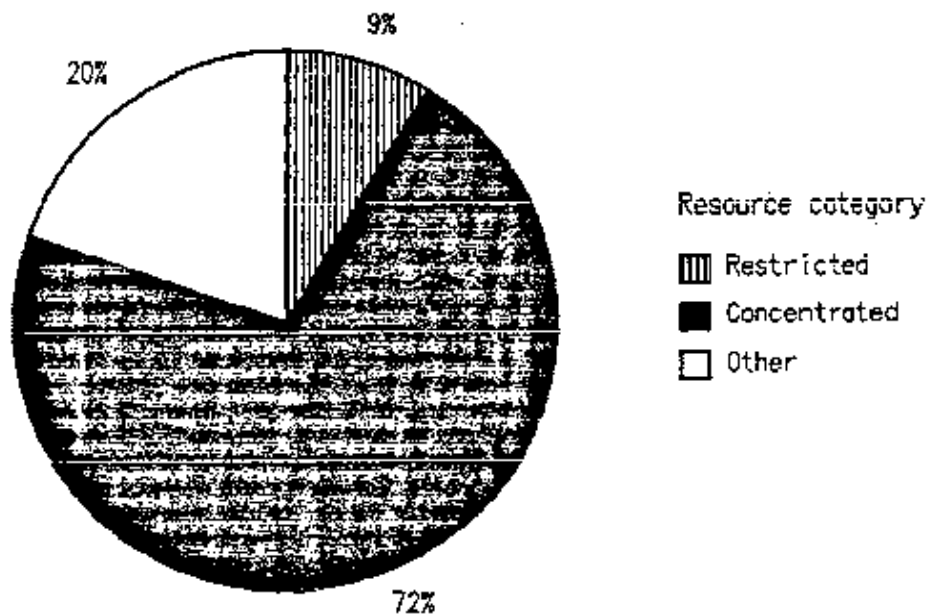
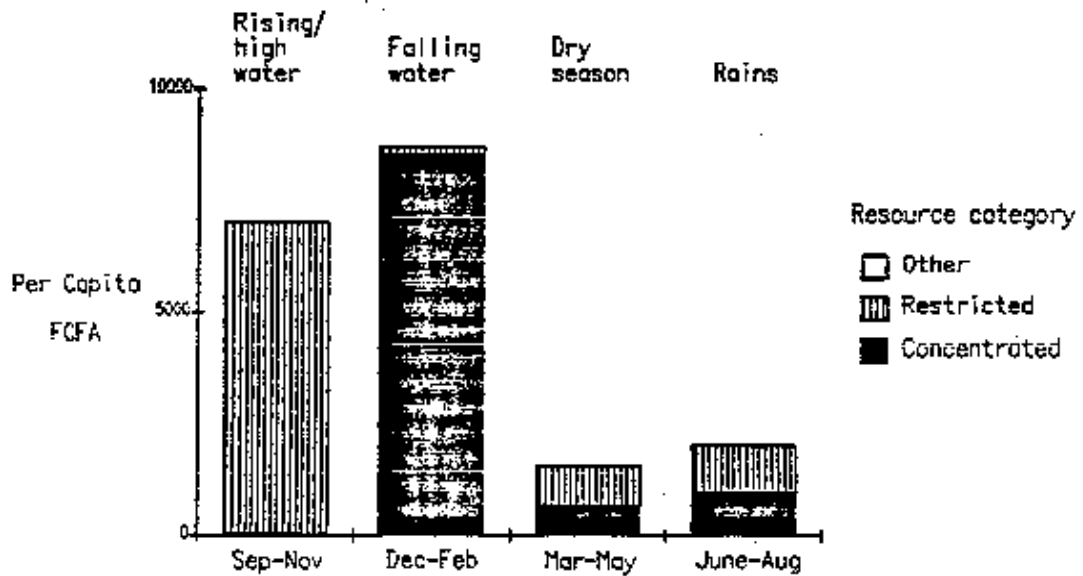


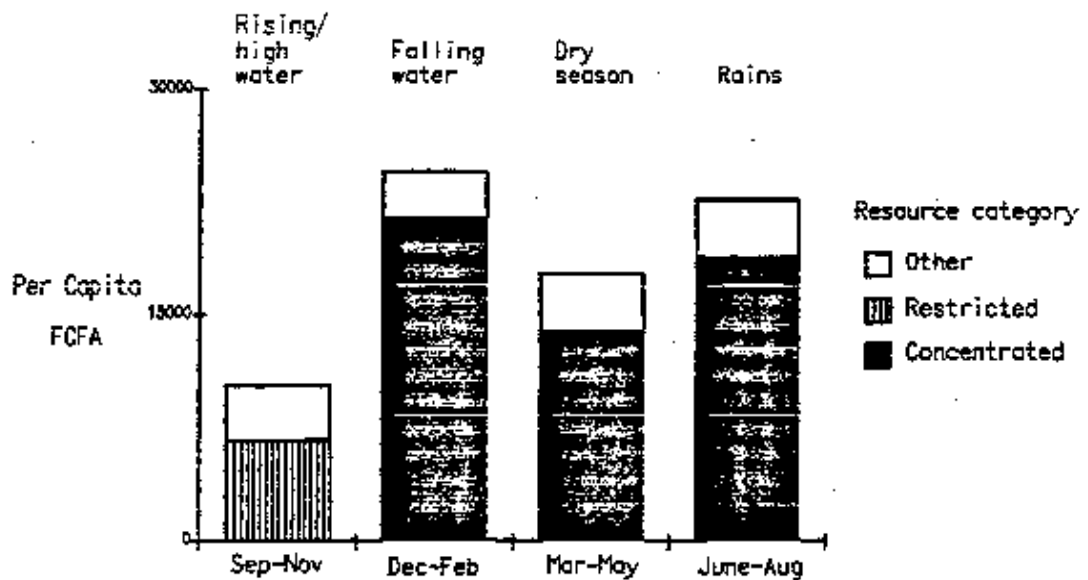
Figure 91 on Page 382 and Figure 92 on Page 382 break subsistence and exchange data down by resource attribute and by season. The former shows the value of 'restricted' wild food they gather in the rising water season and the value of 'concentrated' crops they harvest in December. The latter demonstrates the importance of 'concentrated' fish resources through the falling, dry and rainy seasons, as well as showing the value of other sources of income through the year. As Table 33 on Page 375 has shown, transport and trade make up the greater part of this income with remittances making a significant contribution in the rising water season and agricultural labour in the rainy season. The movement of outsiders and livestock through the floodplains in effect provide good opportunities for farmer fishermen to transport them in boats (which

strangers other than fishermen rarely have) and to sell them small items such as tea, sugar, kola nuts etc.

**Figure 91: Per Capita Value of Production for Subsistence, by Category of Resource and by Season, Farmer Fishermen, 1985-86**



**Figure 92: Per Capita Value of Production for Exchange, by Category of Resource and by Season, Farmer Fishermen, 1985-86**



Overall this review of farmer fishermen's production for subsistence and exchange has revealed the degree to which their livelihoods depend on exchange related activities, and their specialisation in one major activity. In stark contrast to farmers and farmer herders, farmer fishermen rely almost entirely on one agro-ecological area for their living, and within that area, on resources that are 'concentrated'.

#### A.4.3.3. Income and expenditure

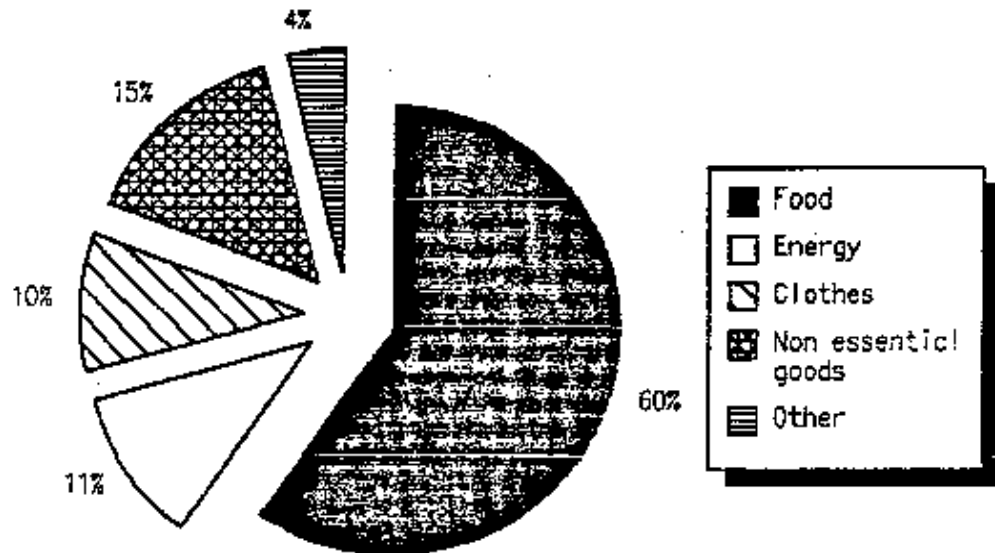
Table 35 on Page 384 presents the data on farmer fishermen's income and expenditure and together with Figure 93 on Page 385 shows the extent to which they were better off than farmers and farmer herders, in that they spent and earned nearly three times as much as them, spent proportionately less on food and more on small luxuries such as tea, sugar, kola nuts etc., and on clothes. They further bought significantly greater amounts of wood, which they need both for their own cooking and for smoking their catch.



Table 35: Income and Expenditure of Farmer Fishermen, FCFA Per Capita, 1985-86

	RISING HIGH WATER (Sep-Nov)	FALLING WATER (Dec-Feb)	DRY SEASON (Mar-May)	RAINS (Jun-Aug)	TOTAL
<b>INCOME</b>					
Livestock	439	0	0	0	439
Wood fuel	0	0	0	0	0
Handicrafts	0	0	0	0	0
Vedgetables	0	0	0	0	0
Fish	6218	21291	13860	18776	60145
Ag. labour	42	0	214	2085	2341
Maraboutage	0	67	696	198	961
Transport	2202	1873	716	323	5114
Gold sales	394	0	0	0	394
Remittances	607	307	0	127	1041
Trade	409	1080	2191	1200	4880
<b>TOTALS</b>	<b>10311</b>	<b>24618</b>	<b>17677</b>	<b>22709</b>	<b>75315</b>
<b>EXPENDITURE</b>					
Cereals	2908	5222	7428	7574	23132
Condiments	2998	3761	4008	3407	14174
Clothes	849	2349	2262	1651	7111
Non essential	2222	2765	2882	2701	10570
Energy	1297	3705	1415	1293	7710
Other Food	678	1525	1484	1193	4880
Other	598	703	801	742	2844
<b>TOTALS</b>	<b>11550</b>	<b>20030</b>	<b>20280</b>	<b>18561</b>	<b>70421</b>
<b>BALANCE</b>	<b>-1239</b>	<b>4588</b>	<b>-2603</b>	<b>4148</b>	<b>4894</b>

Figure 93: Proportion of Per Capita Expenditure on Different Items, Farmer Fishermen, 1985-86



Fishing households spent the greatest amounts in the falling water and dry seasons, and the least in the rising and high water periods as Figure 94 on Page 386 illustrates. Just under 90% of their expenditure was on imports, reflecting the greater amount of luxury items they acquired than farmers and farmer herders. They spent the same proportion on local goods as farmers and farmer herders though a greater part of this was on 'restricted' items, as Figure 95 on Page 386 shows. This reflects the value of the wood they bought, as well as milk: farmer fishermen bought no meat or fish over this period.

Figure 94: Per Capita Expenditure, by Category of Resource and by Season, Farmer Fishermen, 1985-86

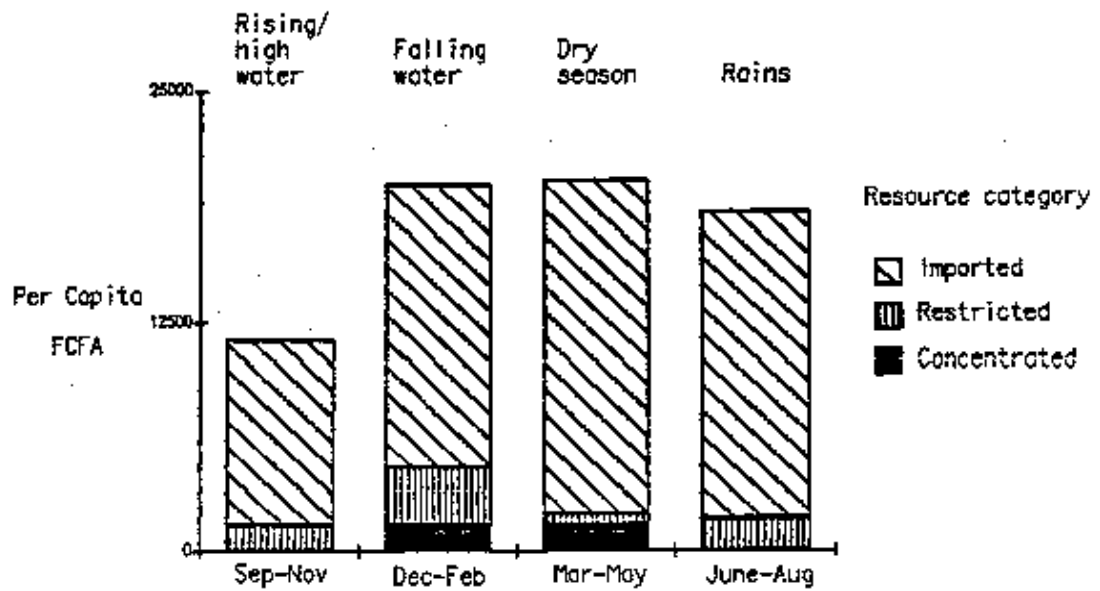


Figure 95: Proportion of Per Capita Expenditure on Imports and Local Products, by Category of Resource, Farmer Fishermen, 1985-86

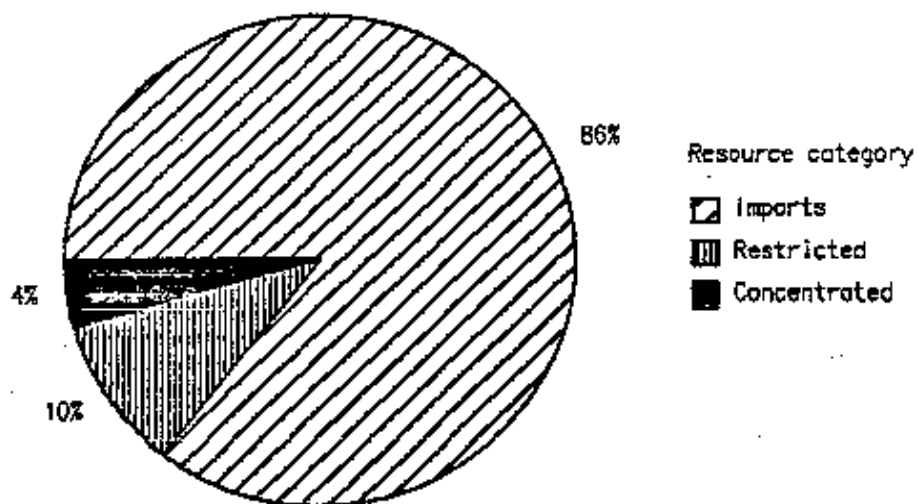
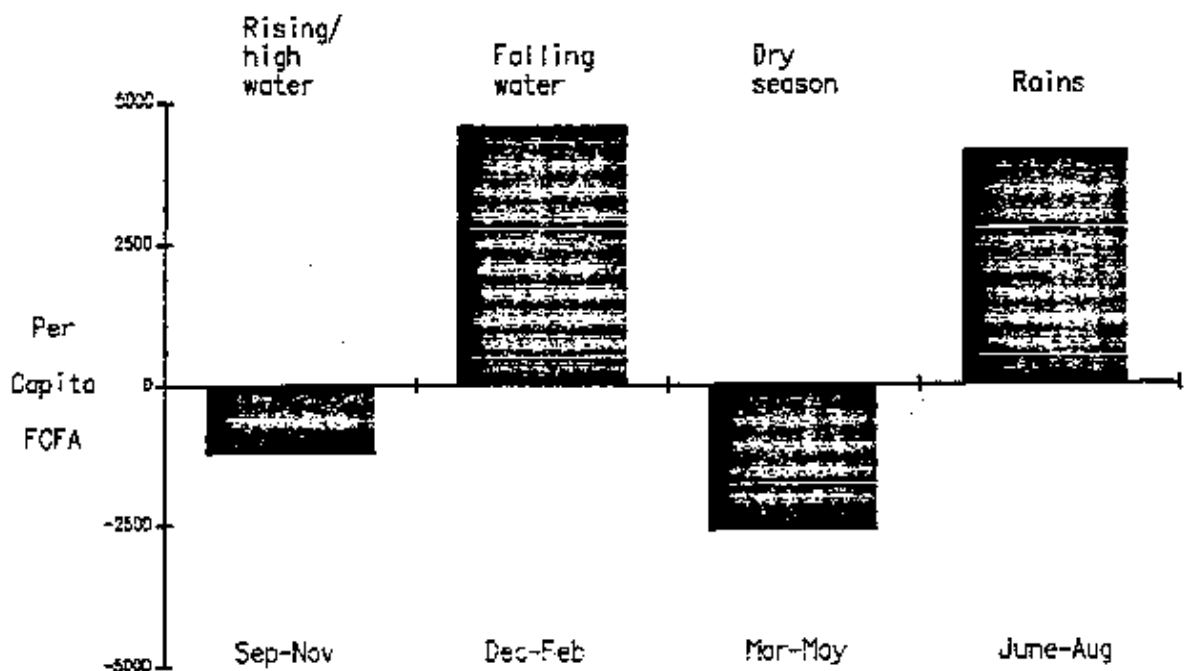


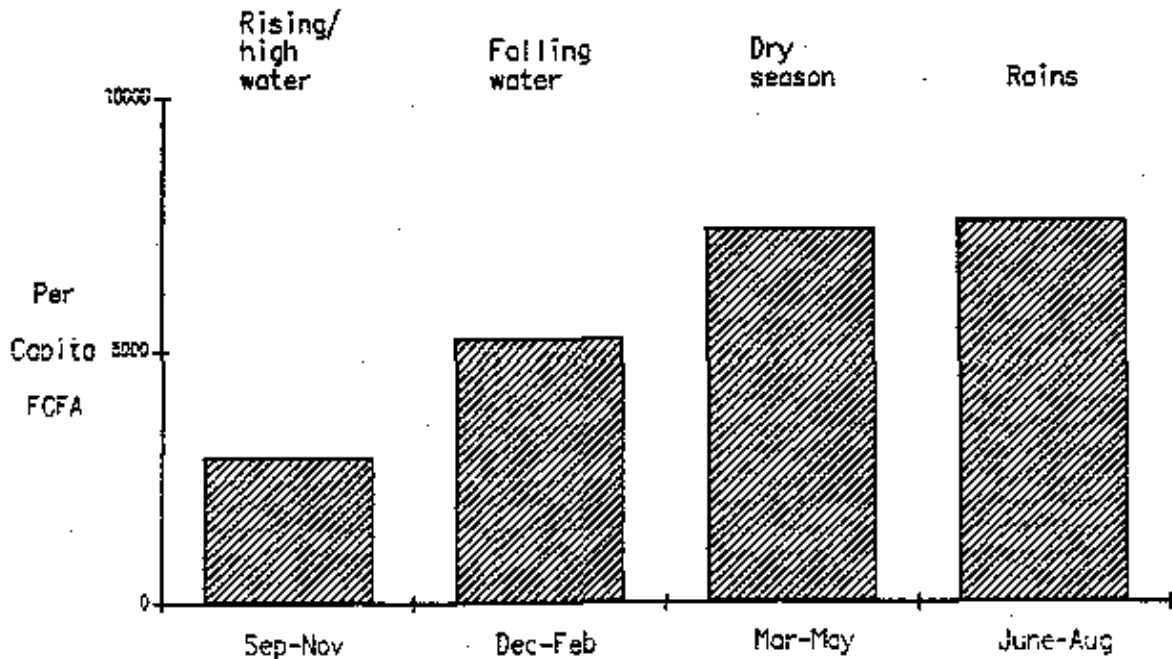
Figure 96 on Page 387 demonstrates that in spite of these higher levels of income, nonetheless two seasons of the year - the rising water period and the dry season - are periods of deficit, when they earn less than they spend, which coincide with the months when the fishery is at its least productive. Overall, however, it can be seen from Table 35 on Page 384 that they come out ahead at the end of the year.

Figure 96: Balance of Per Capita Revenue and Expenditure, Farmer Fishermen, 1985-86



Again, one the reasons for these deficits is explained by their expenditure on cereals, (Figure 97 on Page 388) which, proportionately, remain at the same level as those for farmers and farmer herders at over half of what they spend on food. As will be shown later in this chapter, farmer fishermen in fact gather and buy much more than their cereal needs based upon the amount of people in their household, mainly because they are obliged to offer hospitality to the many people who come to the floodplains in the falling water and dry seasons.

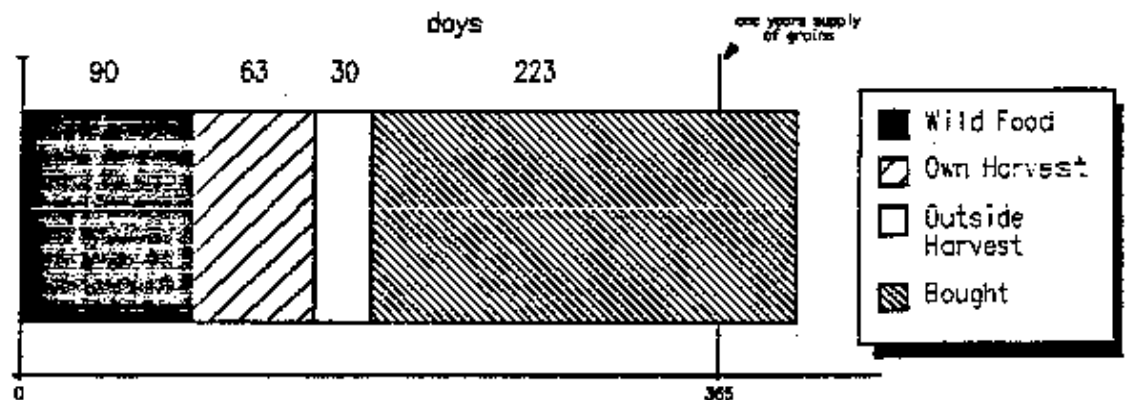
Figure 97: Per Capita Expenditure on Cereals, Farmer Fishermen, 1985-86



#### A.4.3.4. Access to cereals and wild grains

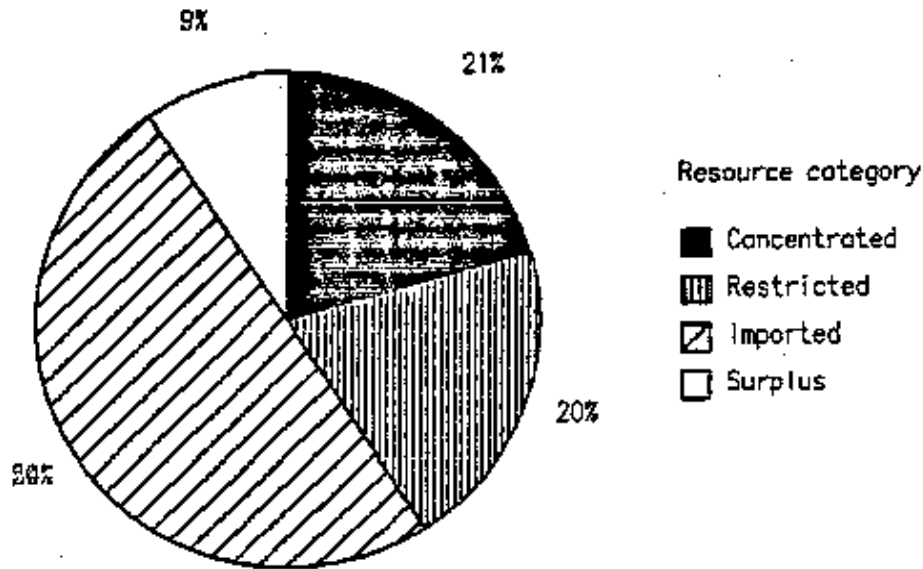
Farming and fishing households buy fully half of their grain on the market and have a 1.4 month surplus over the study period. As Figure 98 on Page 389 illustrates, the amount they produce from their own harvests is less than what they acquire from gathering wild food on the floodplains. Also, they do not earn many days supply of grain from migrating to outside harvests, as has been mentioned above.

Figure 98: Per Capita Access to Cereals and Wild Grains, Farmer Fishermen, 1985-86



If these sources of grains are looked at from the point of view of the attributes of the resources they come from, as in Figure 99 on Page 390, it can be seen that fully half their supply is imported, 21% comes from 'concentrated' assets and 20% from 'restricted' ones - in other words they buy double what they produce themselves, and they acquire as much from gathering wild food as from cultivated crops.

Figure 99: Proportion of Per Capita Access to Cereals and Wild Grains, by Category of Resource, Farmer Fishermen, 1985-86



This clearly shows the extent to which farmer fishing households concentrate on fishing in order to assure themselves of access to grains through buying cereals on the market. It also produces evidence to support their own claim that they need to buy these quantities of grain not only because of the failure of their own harvests but also to feed visitors to their communities, many of them from the borderlands of the Delta, particularly in the falling water and the dry seasons. The 'surplus' alluded to in the data does not therefore represent a stock of grains they held at the end of the rainy season in 1986, but rather represents the quantities of grain they consumed over the previous 12 months.

#### A.4.3.5. The farmer fishing economy

The strategies of farmer fishermen revealed by this review of their household economy allow the following points to be made:

- 1) Fishing is their principal economic activity in every season of the year and particularly in the falling water and rainy seasons. In this later period the intensity of their exploitation of fish is likely to have a disproportionately negative effect on the resource, as it takes place as fish are migrating into the floodplains to breed.
- 2) This specialisation of their activities ties their economy both to the exploitation of primarily 'concentrated' resources and to the market: in every season of the year the value of what they produce for exchange is greater than that for subsistence.
- 3) In the little they do produce for subsistence they generate as much value from gathering wild food as from cultivating crops (whether their own, or those that they travel to help harvest), giving 'restricted' resources a strategic role in what they generate for their own consumption.

In specialising in production for the market, and relying on production from 'concentrated' assets, farmer fishermen were singularly successful in generating sufficient revenue to meet their needs, implying they were able not only to reproduce their own livelihoods, but to contribute to the livelihoods of the many visitors who migrate into the floodplains each year.



#### A.5. Resource Use in the Pre-drought Period

The preceding sections of this chapter have given an detailed account of how two sets of producers in the northern sector of the inland Niger Delta use 'concentrated' and 'restricted' resources through the different seasons of the year for the period 1985-86 and has provided qualitative evidence of how transhumant systems exploited the zone as well. In this section this use is compared with how they utilised the same resources before the recent increasingly dry period commenced. In one particular case - that of the farmer fishermen - a direct comparison can be made, using the same indicators, as a result of research carried out by the author for the period 1980-81 in one of the communities that made up the 1985-86 sample. The methodology and make up of the sample of this earlier study has already been presented at the outset of this chapter (Pages 316 to 320). More qualitative evidence will be presented here for the evolution of resource use for transhumant fishermen and herders, and for farmers and farmer herders.

The period 1980-81 is treated as a 'pre-drought' period: as data presented in Chapter 3 have shown these years were the last two moderately good years (but still not as good as the 1950s and 1960s) in terms of flood level and fish and cereal production, before the onset of increasing drought after 1982. As such, resources are considered to have the technical and physical attributes set out for the 'pre-drought' period at the end of Chapter 2, and which are reproduced here in Table 36 on Page 393.

Table 36: Resources and their Seasonal Attributes: 1980-81

Resource Aug	Sep-Nov Rising/High Water	Dec-Feb Falling Water	Mar-May Dry Season	Jun- Rains
Dryland Pasture	O	O	--	O
Dryland Forest	O	O	--	O
Dryland Wild Food	O	O	--	--
Millet Fields	R	--	--	R
Flood Fields	R	R	--	R
Floodplain Pasture	--	C	O	--
Floodplain Forest	R	R	O	R
Rice Fields	R	R	--	R
Fisheries	R	O	C	R
Floodplain Wild Food	O	O	--	--

O = Open  
 R = Restricted  
 C = Concentrated  
 -- = Unused

The values presented here in FCFA have not been inflated to make them comparable to the 1985-86 figures, principally because the analysis is concerned with relative values and proportions rather than absolute figures. In 1984 the national currency changed from Malian Francs to FCFA, when Mali rejoined the French Franc zone. The set exchange rate was  $\frac{1}{2}$  FCFA to 1 Malian Franc, and this has been used to value the 1980-81 figures in FCFA. Inflation figures for this period are very approximate and might be estimated at circa 10% per annum.

### A.5.1 The production of farmer fishermen in 1980-81

#### A.5.1.1. Total production

Farmer fishermen's activities were significantly different in 1980-81 compared to 1985-86, as Table 37 on Page 395 illustrates. In the rising and high water period their most productive occupation was gathering woodfuel from forests on the borders of the Delta which they could reach because water levels were high enough to allow access by boat; all households were cultivating their rice fields and fishing the floodplains, towards the end of this period moving out to camps so as to have better access to the dispersed fisheries. They gathered no wild food. In the falling water season the rice harvest came in, dwarfing the value of all other economic activities. Households moved in from the fishing camps at this time: their revenue from this activity was the next most important after cereal production. Households continued to gather wood from borderland forests.

Table 37: Per Capita Value of Activities, Farmer Fishermen, 1980-81, FCFA.

BY SEASON	RISING HIGH WATER (Sep-Nov)	FALLING WATER (Dec-Feb)	DRY SEASON (Mar-May)	RAINS (Jun-Aug)	TOTAL
Millet harvest	0	0	0	0	0
Fonio harvest	0	0	0	0	0
Melon harvest	0	0	0	0	0
Rice harvest	0	36863	0	0	36863
Paillettes/forage*	0	322	761	0	1084
Water lily harvest	0	0	0	0	0
Flood Field Harvests	0	0	0	0	0
Berding livestock	0	0	0	0	0
Fishing	3703	5872	10051	4629	24256
Fishing Tithes	43	108	0	0	151
Wood gathering	4755	2603	1204	2005	10568
Construction	201	877	806	437	2323
Handicrafts (carding wool)	0	31	699	0	730
Maraboutage	0	0	0	0	0
Tailoring	0	0	0	0	0
Trade	0	0	0	0	0
Agricultural labour	0	0	0	0	0
Aims and remittances	0	0	0	0	0
Gold sales	0	0	0	0	0
<b>TOTAL</b>	<b>8703</b>	<b>46678</b>	<b>13524</b>	<b>7072</b>	<b>75978</b>

In the dry season their revenue from fishing reached its high point of the year, reflecting the productivity of the collective fishing season. Households were still gathering wood, and were involved in handicraft production, building a house for the fishing cooperative and also collecting grass from the floodplains to make into huts which they sold to seasonal visitors, and sold for forage. In the rainy season fishing provided the most value and wood gathering took on increased importance.

Table 38 on Page 396 shows that half the value of their production came from cereal production, a third from fishing and 14% from wood gathering. In 1980-81 therefore, they were literally farmer fishermen while by 1985 they had become fishermen farmers.

Table 38: The Value of Major Economic Outputs, Farmer Fishermen, FCFA Per Capita, 1980-81

Outputs	Value FCFA Per Capita	% of Total Value of Production
Fish	24407	32%
Cereals	36863	49%
Livestock sales	0	-
Wood	10568	14%
Wild Food	0	-
Flood field crops	0	-

Table 39 on Page 397 breaks down the value they derived from their activities by attribute of the resources they came from. Together with Figure 100 on Page 398 and Figure 101 on Page 398 they show that well over half of the value of their production came from 'restricted' resources (cereals and fish) above all in the falling water season, over a fifth from 'open' assets (woodfuel and fish) principally in the rising and falling water periods, and only 14% from 'concentrated' assets (fish in the dry season) and from housebuilding.

Table 39: Value of Resources by Physical Attribute, Farmer Fishermen, by Season, FCFA Per Capita, 1980-81

	RISING/HIGH WATER (Sep-Nov)	FALLING WATER (Dec-Feb)	DRY SEASON (Mar-May)	RAINS (Jun-Aug)
<b>OPEN RESOURCES</b>				
Dryland Forest	4775	2634	0	0
Floodplain Pasture	0	0	761	0
Floodplain Forest	0	0	1903	0
Fisheries	0	5980	0	0
<b>Total Open</b>	<b>4775</b>	<b>8614</b>	<b>2664</b>	<b>0</b>
<b>RESTRICTED RESOURCES</b>				
Dryland Pasture	0	0	0	0
Dryland Forest	0	0	0	0
Dryland Wild food	0	0	0	0
Floodplain wild food	0	0	0	0
Fisheries	3746	0	0	4629
Rice fields	0	36863	0	0
Floodplain Forest	0	0	0	2005
<b>Total Restricted</b>	<b>3746</b>	<b>36863</b>	<b>0</b>	<b>6634</b>
<b>CONCENTRATED</b>				
Millet fields	0	0	0	0
Flood Fields	0	0	0	0
Floodplain pasture	0	322	0	0
Floodplain Forest	0	0	0	0
Rice Fields	0	0	0	0
Fisheries	0	0	10051	0
<b>Total concentrated</b>	<b>0</b>	<b>322</b>	<b>10051</b>	<b>0</b>
<b>OTHER</b>				
Construction	201	887	806	437
<b>Total other</b>	<b>201</b>	<b>887</b>	<b>806</b>	<b>437</b>
<b>Grand Totals</b>	<b>8722</b>	<b>46686</b>	<b>13521</b>	<b>7071</b>

Figure 100: Proportion of Total Value of Production, by Category of Resource, Per Capita, Fishermen Farmers 1980-81

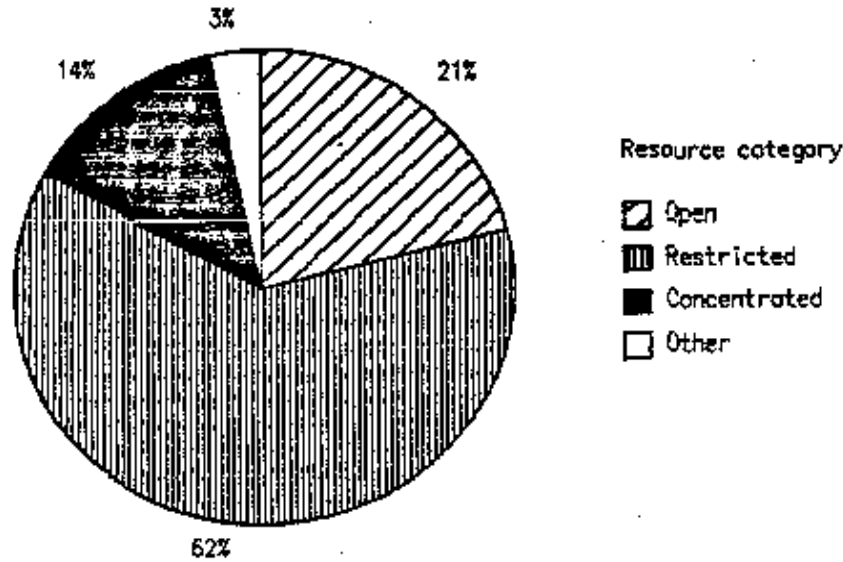
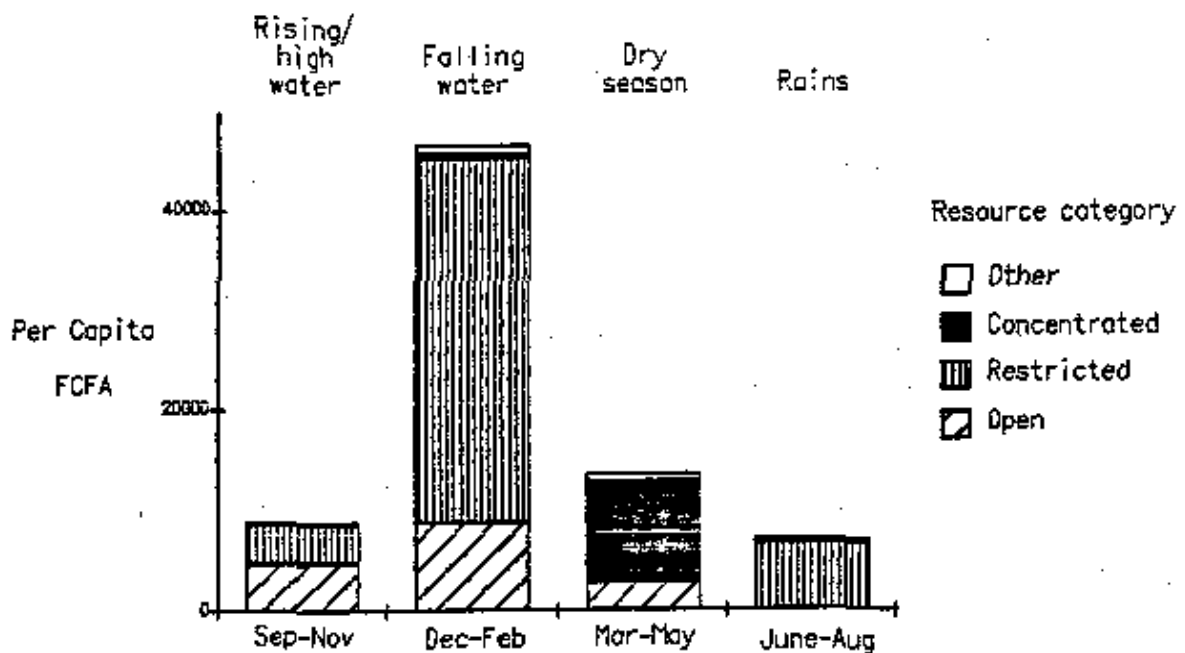


Figure 101: Per Capita Value of Production, By Category of Resource and by Season, Fishermen Farmers 1980-81



This compares with farmer fishermen deriving the greater part of the value of their production from 'concentrated' assets and the value of their production actually rising due to intensified fishing effort in the dry season of 1985-86.

#### **A.5.1.2. Production for exchange and subsistence**

Table 40 on Page 400 presents the data for their production for subsistence compared to what they produced for exchange. Together with Figure 102 on Page 401 and Figure 103 on Page 401 they demonstrate the extent to which subsistence dominated their productive strategies, accounting for 64% of the value of their production, and how the body of this production took place in the falling water season, when the rice harvest came in.



Table 40: Per Capita Value of Production for Subsistence and Exchange,  
Farmer Fishermen, PCFA, 1980-81

	RISING HIGH WATER (Sep-Nov)	FALLING WATER (Dec-Feb)	DRY SEASON (Mar-May)	RAINS (Jun-Aug)	TOTAL
<b>SUBSISTENCE</b>					
Millet harvest	0	0	0	0	0
Fonio harvest	0	0	0	0	0
Melon harvest	0	0	0	0	0
Rice harvest	0	36863	0	0	36863
Paillottes/forage*	0	0	0	0	0
Water lily harvest	0	0	0	0	0
Wood gathered	4755	2603	1204	2005	10567
Fish consumed	185	294	503	231	1213
<b>Total Subsistence</b>	<b>4940</b>	<b>39760</b>	<b>1707</b>	<b>2236</b>	<b>48643</b>
<b>EXCHANGE</b>					
Livestock	0	0	0	0	0
Wood fuel sold	0	0	0	0	0
Handicrafts	0	31	699	0	730
Garden Products	0	0	0	0	0
Fish	3518	5578	9548	4398	23042
Construction	201	877	806	437	2321
Paillottes/forage*	0	322	761	0	1083
<b>Total Exchange</b>	<b>3719</b>	<b>6808</b>	<b>11814</b>	<b>4835</b>	<b>27176</b>
<b>Grand Total</b>	<b>8659</b>	<b>46568</b>	<b>13521</b>	<b>7071</b>	<b>75819</b>

Figure 102: Proportion of Production for Exchange, Fishermen Farmers 1980-81

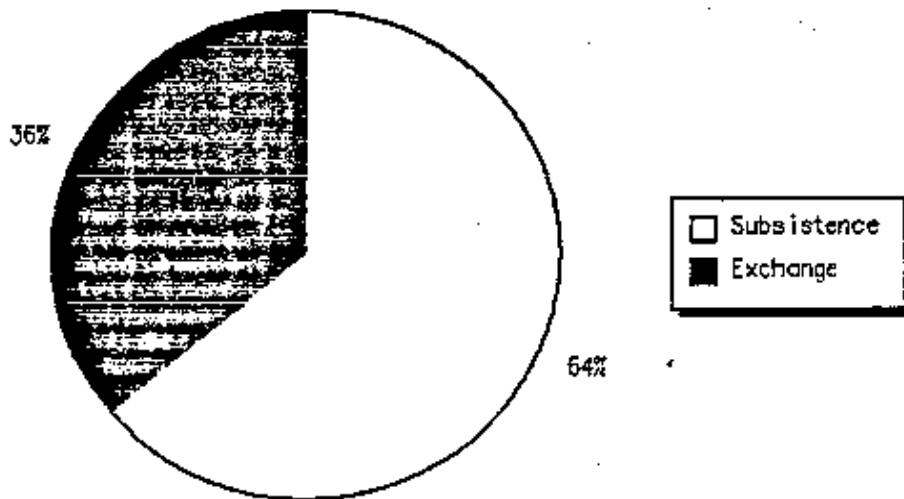


Figure 103: Value of Production for Subsistence and Exchange, by Season, Fishermen Farmers 1980-81

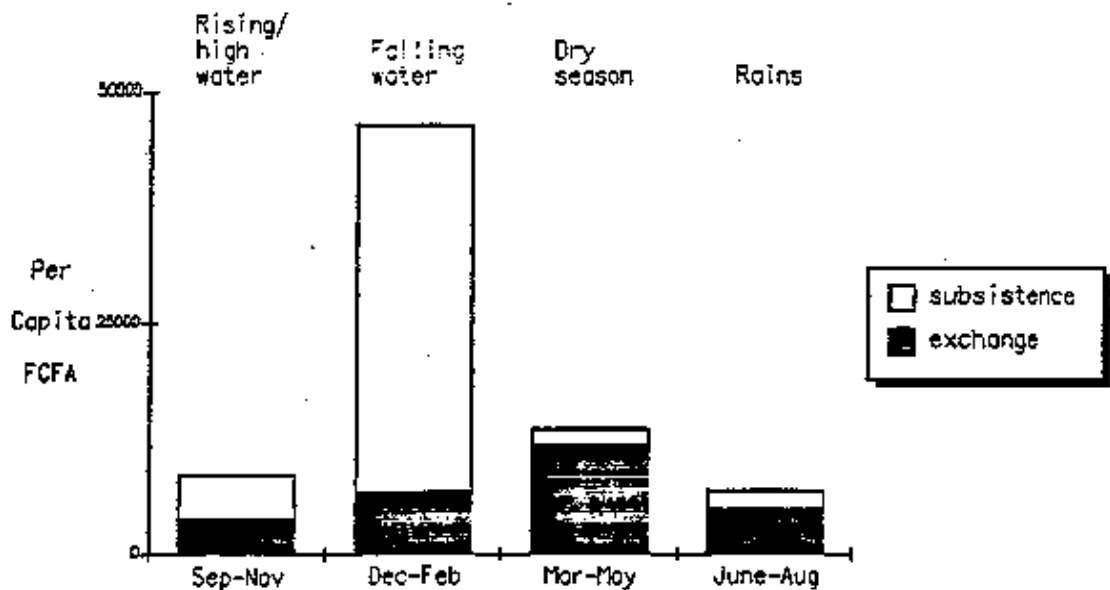
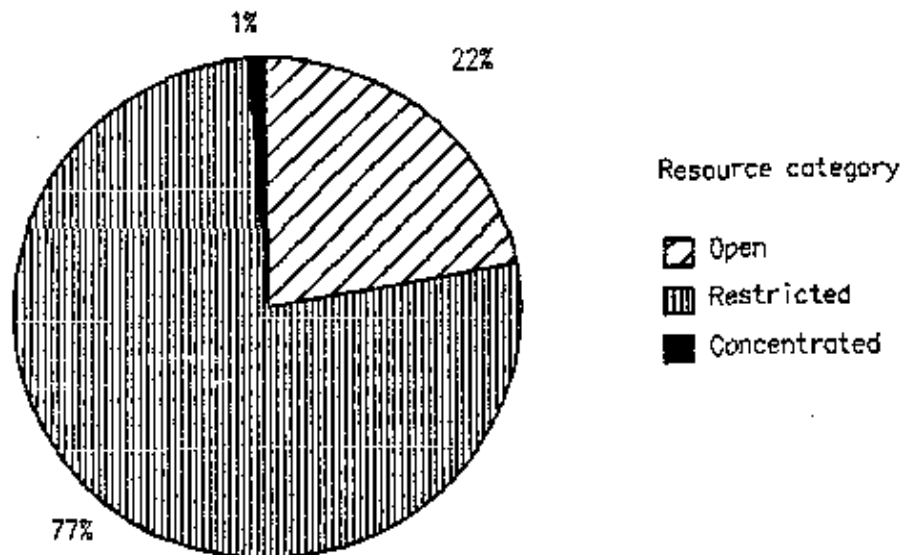


Figure 104 on Page 402 shows the overwhelming proportion of the value of subsistence production came from 'restricted' resources - primarily their rice fields - followed to a much lesser degree by 'open' resources - the wood they gathered for their own consumption. 'concentrated' resources - which accounted for over half the value of subsistence production in 1985 - in 1980 contributed only 1%, made up of the fish they consumed in the dry season.

Figure 104: Proportion of Per Capita Value of Production for Subsistence, by Category of Resource, Fishermen Farmers 1980-81



The attributes of the resources they used for exchange production shown in Figure 105 on Page 403 present a more varied picture. Over a third of what they produce in this category is 'concentrated', over a quarter 'restricted', and 26% 'open' - all consisting primarily in the fish they caught. Only 9% of their income came from other sources. It will be recalled that in 1985-86 nearly three quarters of their income derived from 'concentrated' resources.

Figure 105: Proportion of Per Capita Value of Production for Exchange, by Category of Resource, Fishermen Farmers 1980-81

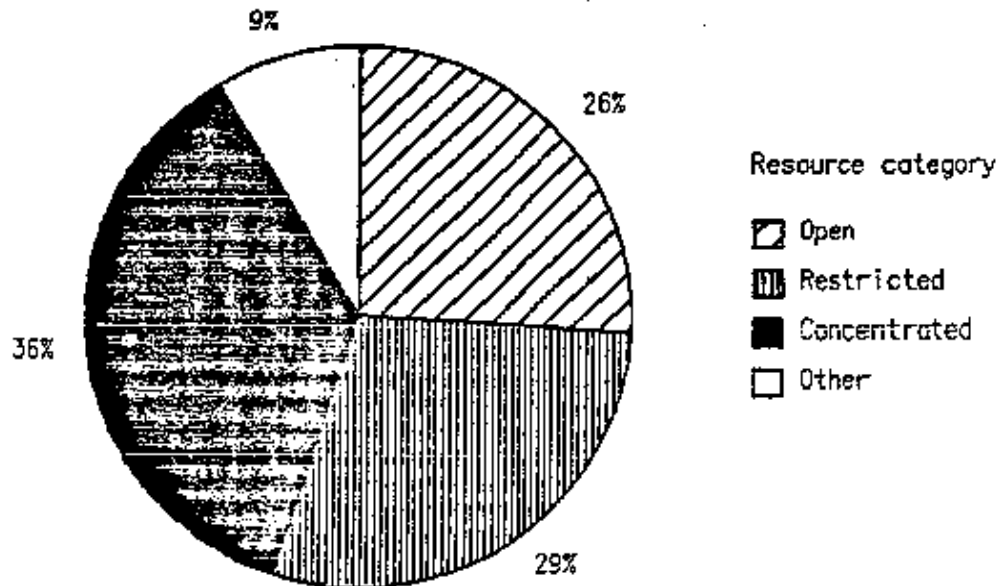


Figure 106 on Page 404 and Figure 107 on Page 404 show the switch from subsistence to exchange production operated in the earlier period as well as in the later, the significant difference being, of course, in the relative importance of production for these two categories, and the attributes of the resources they exploited to produce these goods. In 1980-81 subsistence production dominated exchange activities and 'restricted' and 'open' assets were of greater value than 'concentrated' ones, while the reverse was true in 1985-86, when there were no 'open' resources left.

Figure 106: Per Capita Value of Production for Subsistence, by Category of Resource and by Season, Fishermen Farmers 1980-81

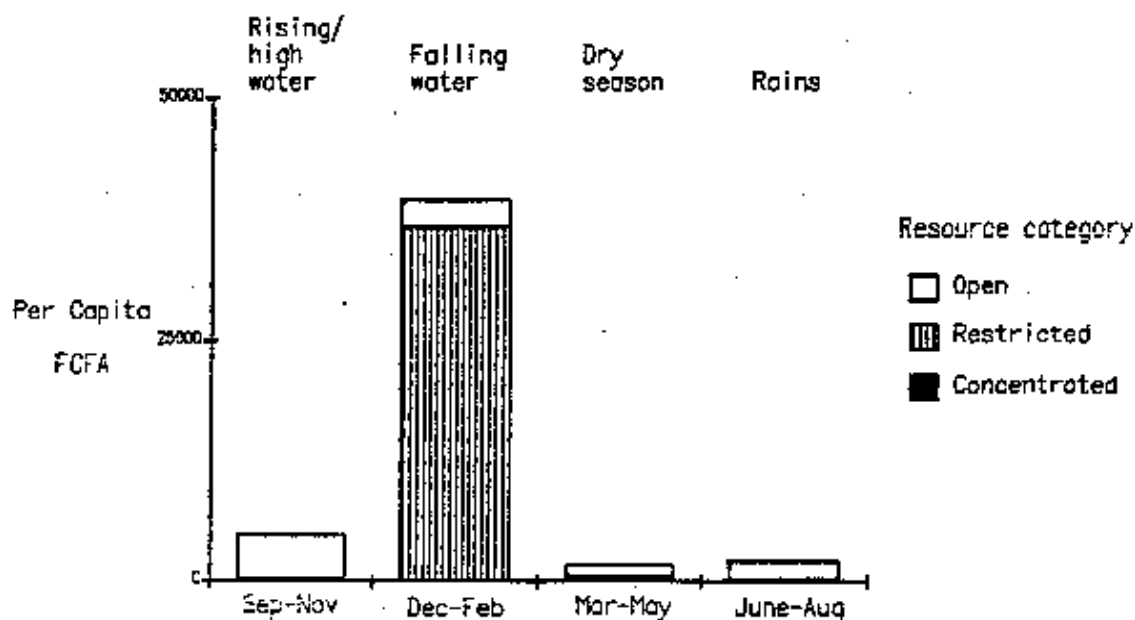
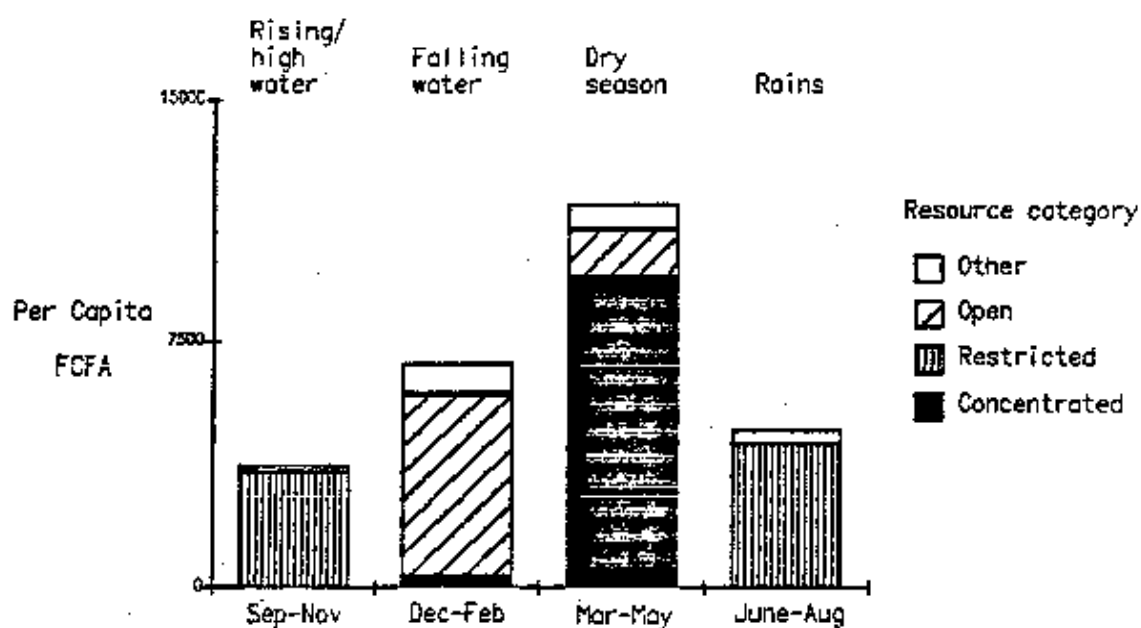


Figure 107: Per Capita Value of Production for Exchange, by Category of Resource and by Season, Fishermen Farmers 1980-81



## A.5.1.3. Income and expenditure

Table 41 on Page 405 shows the income and expenditure of farmer fishermen in 1980-81. Together with Figure 108 on Page 406 it demonstrates they spent significantly less (as a proportion) on food than in 1985-86, considerably more on energy, less on clothes, and considerably more on small luxuries. Whereas in 1985-86 they were spending over 80% of their total expenditure on essential goods, in 1980-81 they devoted only 70% of their expenditure to this end.

Table 41: Income and Expenditure of Farmer Fishermen, FCFA Per Capita, 1980-81

	RISING HIGH WATER (Sep-Nov)	FALLING WATER (Dec-Feb)	DRY SEASON (Mar-May)	RAINS (Jun-Aug)	TOTAL
<b>INCOME</b>					
Livestock	0	0	0	0	0
Wood fuel	0	0	0	0	0
Handicrafts	0	31	699	0	730
Vedgetables	0	0	0	0	0
Fish	3518	5578	9548	4398	23042
Construction	201	877	806	437	2321
Paillettes/ Forage	0	322	761	0	1083
<b>TOTALS</b>	<b>3719</b>	<b>6808</b>	<b>11814</b>	<b>4835</b>	<b>27176</b>
<b>EXPENDITURE</b>					
Cereals	1331	434	5684	1651	9100
Condiments	985	1049	951	901	3886
Clothes	88	400	206	247	941
Non essential	1141	2520	1865	1114	6640
Energy	570	1281	1496	625	3972
Other Food	297	846	764	399	2306
Other	107	89	658	191	1045
<b>TOTALS</b>	<b>4519</b>	<b>6619</b>	<b>11624</b>	<b>5128</b>	<b>27890</b>
<b>BALANCE</b>	<b>-800</b>	<b>189</b>	<b>190</b>	<b>-293</b>	<b>-714</b>

Figure 108: Proportion of Per Capita Expenditure on Different Items, Fishermen Farmers 1980-81

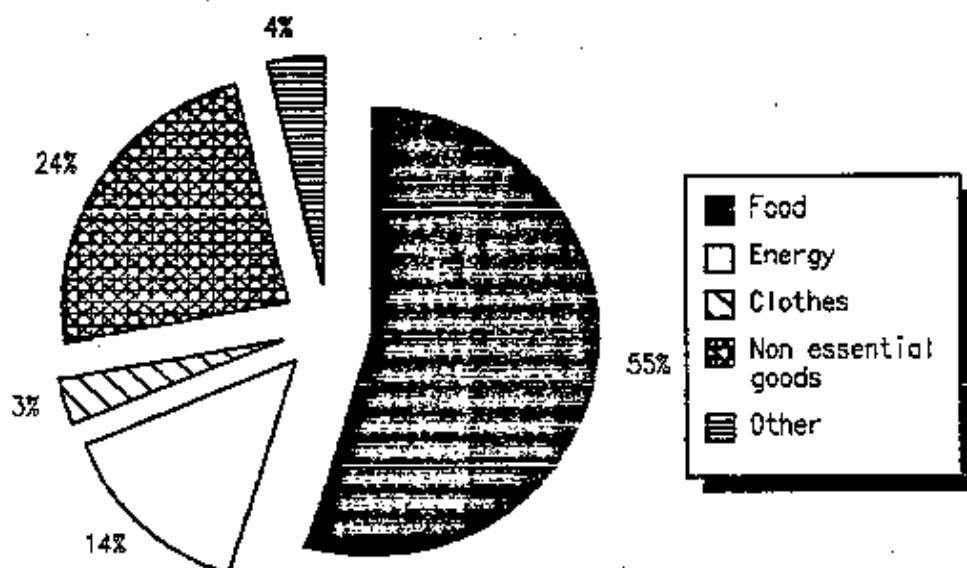


Figure 109 on Page 407 and Figure 110 on Page 407 show the bulk of this expenditure fell in the dry season (when fish production was most valuable). This can be compared to 1985-86 when their expenditure rose to its peak in the falling water season and remained high for the rest of the year, while in 1980-81 it remains comparatively low in the rainy, rising and falling water season. In 1980-81 farmer fishermen bought more local goods as a proportion of their total acquisitions. A significant proportion of this was on wood ('open' in nature), in the dry season, which they needed principally to smoke their fish.

Figure 109: Per Capita Expenditure, by Category of Resource and by Season, Fishermen Farmers 1980-81

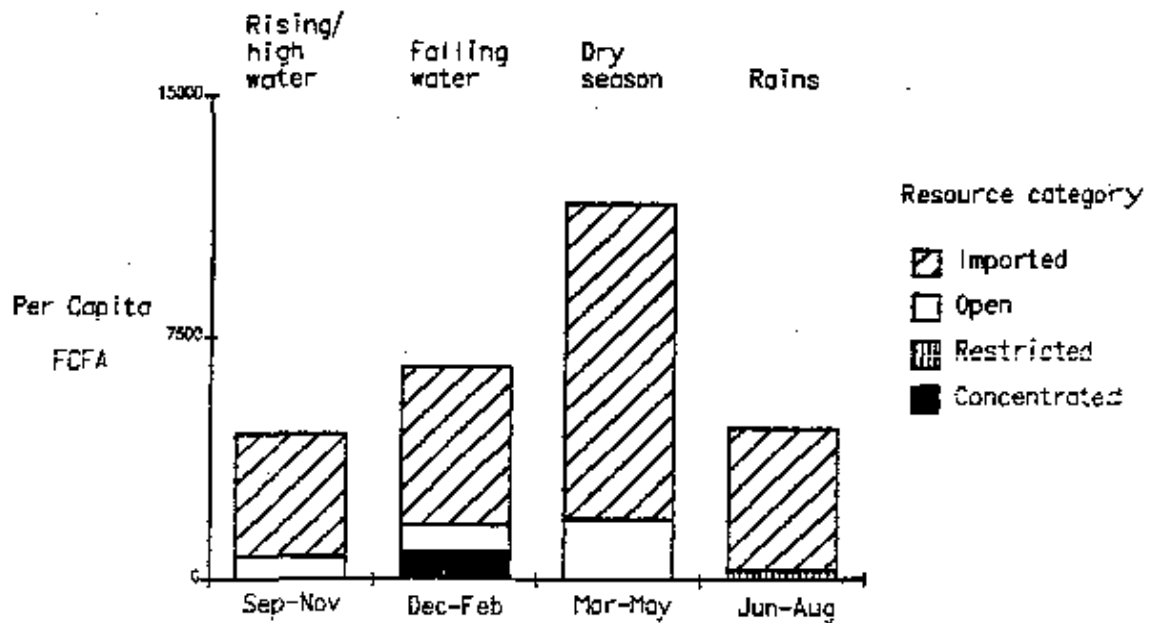
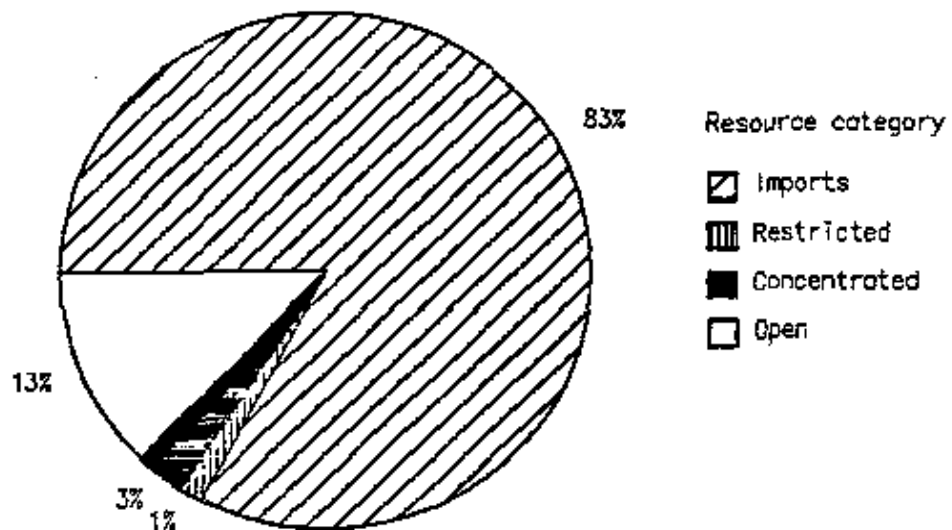


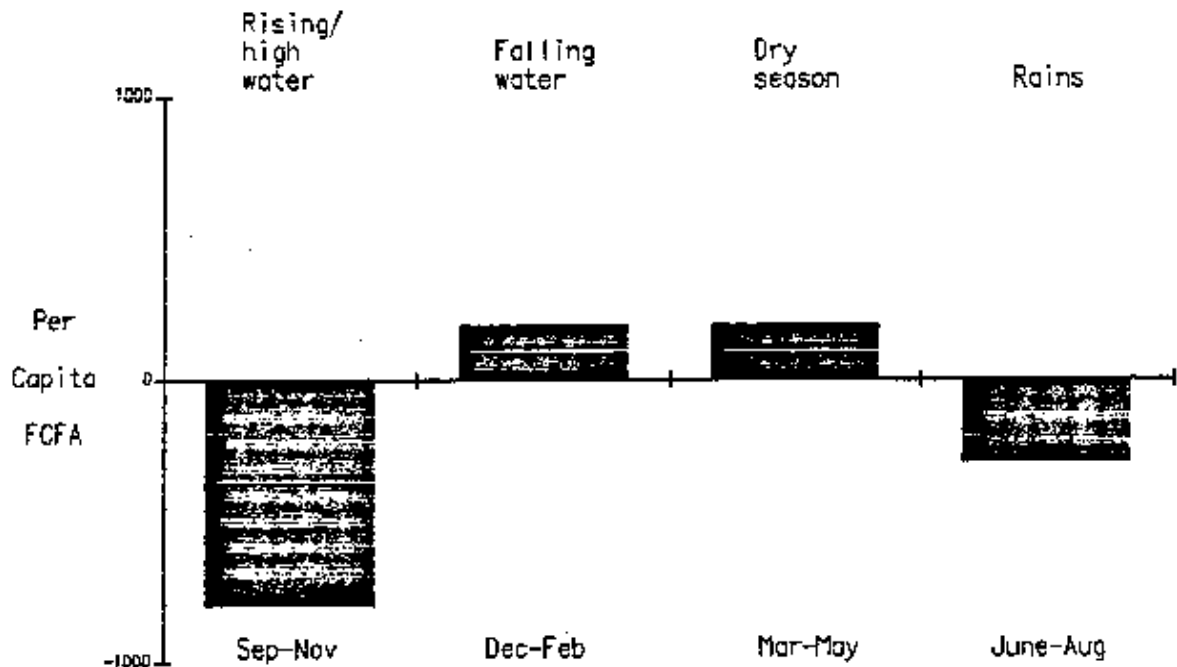
Figure 110: Proportion of Per Capita Expenditure on Imports and Local Products, by Category of Resource, Fishermen Farmers 1980-81





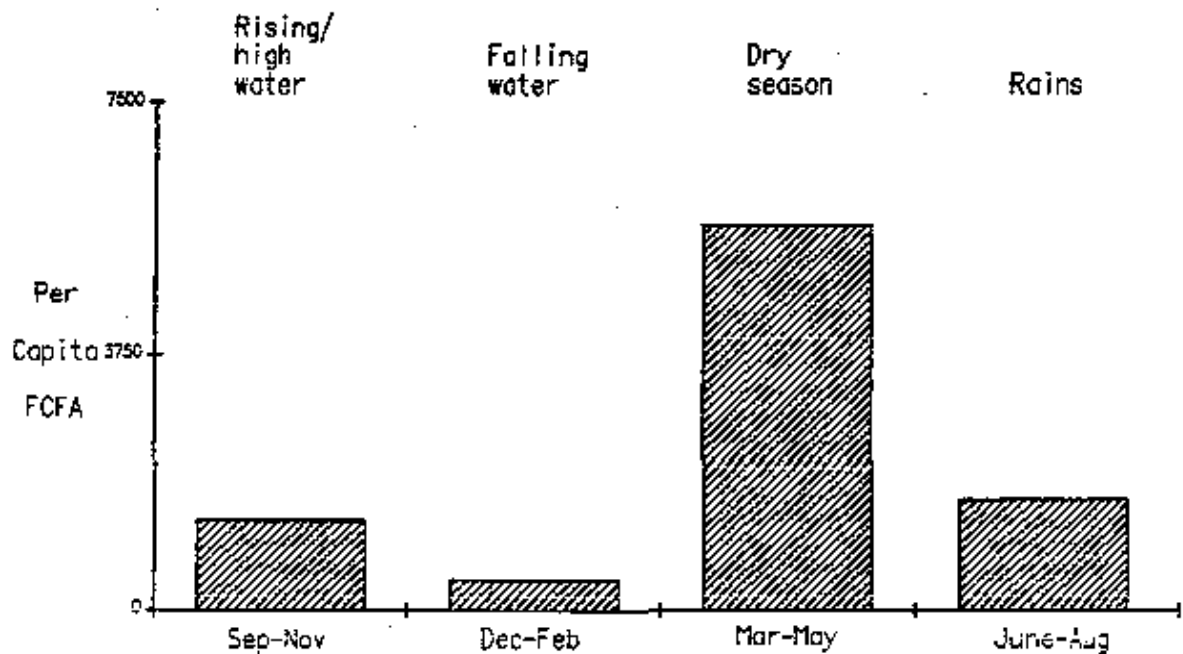
Turning to their balance of income over expenditure presented in Figure 111 on Page 408 it might seem surprising to note that in two seasons of the year they are in deficit, and as Table 41 on Page 405 shows they are also in deficit over the entire year. This situation, however, is not as serious in its implications as in 1985-86, simply because of the secondary role production for exchange takes in their economy in 1980-81, and the size of their rice harvest.

Figure 111: Balance of Per Capita Revenue and Expenditure, Fishermen Farmers 1980-81



That said, Figure 112 on Page 409 shows they invested significantly in cereals in 1980-81, most of all in the dry season, when their income from the collective fisheries provided them with their greatest inflow of cash. In 1985-86, it will be recalled, cereal acquisition rose continuously through the year, from the rising/high water season through to the rains.

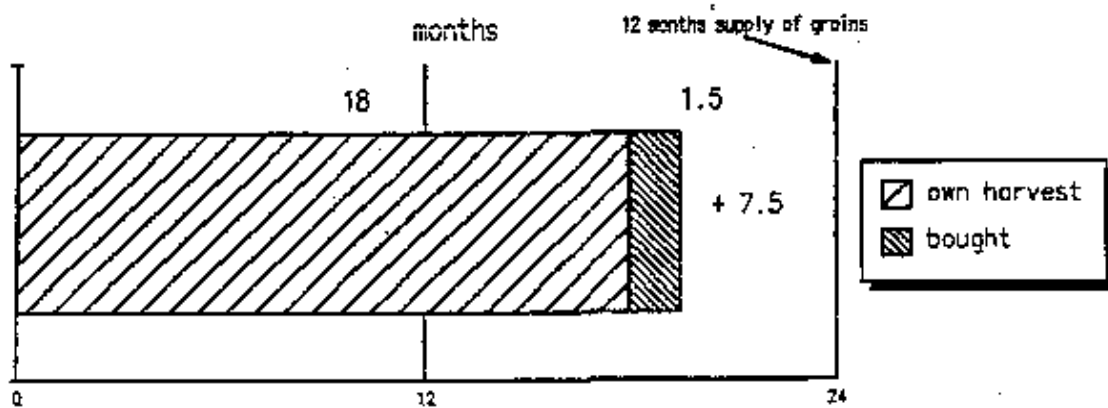
Figure 112: Per Capita Expenditure on Cereals, Fishermen Farmers 1980-81



#### A.5.1.4. Access to cereals and wild grains

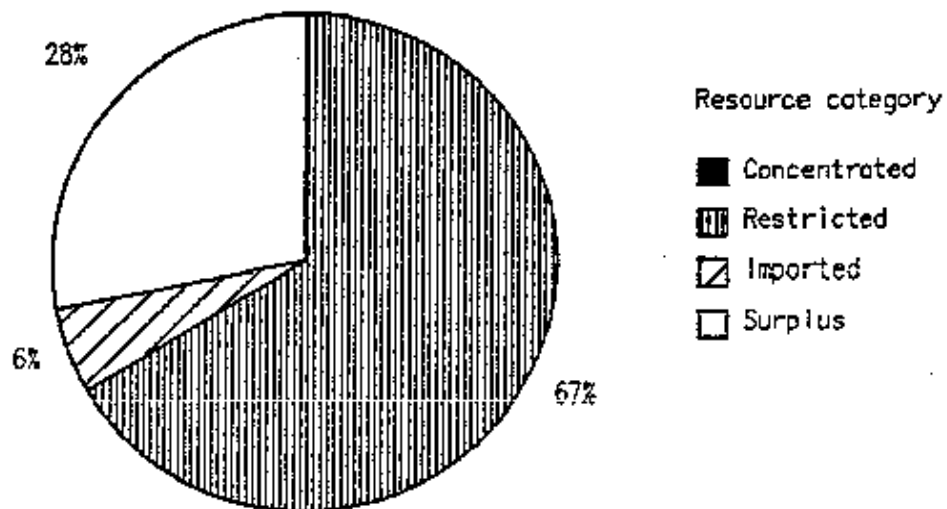
In their access to cereals in 1980-81 one of the clearest distinctions can be drawn between conditions pertaining in this year compared to 1985-86. Farmer fishermen in the first period on average grew a year and a half's supply, and added a further one and a half months supply through the market (Figure 113 on Page 410), so that at the end of the study period it can be estimated they had at least enough grains to take them through another six months, if not more.

Figure 113: Per Capita Access to Cereals and Wild Grains, Fishermen Farmers 1980-81



Some households in the sample harvested over two years supply of rice in 1980-81. Households reported that in good years they like to stock up to two years supply as a hedge against future harvest failures. On average they bought 10% of what they produced themselves. Figure 114 on Page 411 shows the overall importance of 'restricted' resources in providing their access to grains. In 1985-86, it will be recalled, half of what they acquired they bought, and they produced only 14% of the total from their own fields.

Figure 114: Proportion of Per Capita Access to Cereals and Wild Grains, by Category of Resource, Fishermen Farmers 1980-81



#### A.5.1.5. The economy of farmer fishermen in 1980-81

This review of the farming and fishing economy in the 'pre-drought' period has provided clear evidence of how between 1980-81 and 1985-86 these rural producers went from being farmer fishermen to fishermen farmers, and the backbone of their economy shifted from a reliance on farming rice to fishing. In the process they moved from a subsistence-based to a market-orientated livelihood, and the resources that were of most value to them changed from being 'open' and 'restricted' to 'concentrated' in nature.

In addition to the attributes of their resources changing, so has the timing and the span of their activities. Whereas before their subsistence-related activities were concentrated on their rice production, culminating in the harvest in December, in the 'post-drought' period they were exploiting wild food resources in the rising and high water season as well as migrating to outside harvests in the falling water period. With regard to their exchange-related

activities, whereas before the period of greatest productivity lay in the dry season when collective fisheries took place, in 1985-86 the most productive period lay in the falling water season, in line with the manner in which water drains from the Delta more rapidly with the advent of lower flood levels. Significantly, they have intensified their fishing effort in the rainy season and concomitantly to this process more intensive equipment is being used to capture their prey. At the same time other sources of income including trade, agricultural labour and Maraboutage have taken on increasing importance. Fishermen farmers have become more food insecure - although they did produce or gather enough in 1985-86 to meet their yearly needs - and arguably they have fallen more into debt.

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ISSN 1357-9274