

**Land, Water and Local Governance in Mali: Rice Production and
Resource Use in the Sourou Valley, Bankass *Cercle*.**

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by

**Pippa Chenevix-Trench,
Moussa dit Martin Tessougué,
and Philip Woodhouse**

ISBN: 1 900728753
Institute for Development Policy and Management
University of Manchester
Crawford House, Precinct Centre
Oxford Road, MANCHESTER M13 9GH

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FOREWORD

This case study is one of four conducted within a research project titled *Dryland Degradation in Africa: land, water and local governance*, funded by the UK Economic and Social Research Council under its Global Environmental Change Programme. The project's overall aim is to determine what forms of local governance are likely to promote sustainable land and water use in dryland areas of Africa. To pursue this aim the case studies focus on management of "wetlands in drylands" - relatively small-scale water resources (swamps, valley bottoms, small dams, rivers) in predominantly dry landscapes - in Botswana (Clayton, 1995), Kenya (Southgate and Hulme, 1996a,b,c), South Africa (Lahiff, 1996) and Mali (reported in this paper).

The authors of this paper worked in close collaboration with the British non-government development agency, SOS Sahel, whose environmental protection project (*Projet Protection de l'Environnement à Bankass - PPEB*) has been working in the area since 1991. During this time the project has undertaken a number of studies (David et al. 1995; Konate and Tessougué, 1996), which proved an invaluable foundation for the primary research reported here. The study also made use of important natural resource surveys undertaken in the area (PIRT, 1983; PIRL, 1990) for Malian government departments, farming systems research reports produced by the Institut d'Economie Rurale (de Frahan and Diarra, 1987), documentation of village resource-use planning exercises (PGRN, 1993) and project identification reports (FENU, 1992).

The authors acknowledge with thanks the assistance received from many people in Mali, and particularly the government authorities and officials in the *cercle* of Bankass, who provided their time and access to local statistical records. The assistance of the director and staff of the Programme Gestion Ressources Naturelles in facilitating the acquisition of aerial photographs is also gratefully acknowledged. The development of the field study owed much to the support of successive SOS Sahel directors, Nigel Cross and Duncan Fulton, and depended fundamentally upon the logistic efforts of Yacouba Kourouma, in Bamako, and the intellectual and material input from staff at the *Projet Protection de l'Environnement à Bankass*: Aly Bacha Konaté, Mary Allen, and Mamadou Diakité. Finally, we wish to acknowledge the essential role undertaken in the fieldwork by Idrissa Gana, and PPEB *animateurs* Bintou Yaro and Anje *dit* Jean Somboro.

1. INTRODUCTION

Recent changes in ecological understanding has brought a re-appraisal of the opportunities and constraints for production in African environments (Scoones, 1991, 1994, 1996; Behnke and Scoones, 1992). Fundamental to this new understanding is a greater recognition of the importance of water-related variability in the development of management strategies in African drylands. This variability has a temporal dimension determined by acute rainfall seasonality, and large and erratic changes in total annual rainfall. It also has a spatial dimension characterised by “wetlands in drylands”: relatively small-scale water resources (swamps, valley bottoms, small dams, rivers) in predominantly dry landscapes (Scoones, 1991). These are regarded as “key resources” which underpin the viability of livelihoods using the surrounding, drier, areas.

Competition for access to these “key resource” patches in the landscape can be expected to be more acute than for other types of dryland resources. As a result, decisions over such resources can be expected to be particularly illuminating about the existing patterns of governance - understood to mean: the structures and processes of power and authority, cooperation and conflict, that govern decision-making and dispute resolution concerning resource allocation and use, through the interaction of organisations and social institutions (government and non-government, formal and non-formal).

This case study focusses on changes currently taking place in land use in the valley of the river Sourou, in the *cercle* of Bankass in southern Mali, near the frontier with Burkina Faso (maps 1 and 2). Since 1988, the construction of a dam downstream in Burkina Faso has caused a rise in the level of the Sourou, which has extended upstream into Mali and presented Malian cultivators with an opportunity to supplement their staple dryland millet crop with an additional rice harvest. This opportunity has been taken up rapidly, resulting in the clearance of much of the riverine forest in the Sourou floodplain for rice cultivation.

This paper first sets out the context for these developments through a review of the economy and administrative and environmental policy framework at national level (section 2), and the local ecological, social and economic background for the Sourou valley (section 3). The paper then describes a programme of field research undertaken in the Sourou valley in January-April 1996 (section 4).

The remainder of the paper sets out the findings of this research. Section 5 summarises changes in land use and vegetation cover interpreted from aerial photography. Section 6 presents the results of a detailed study of rice farming in two villages in the Sourou valley, which provides evidence that the expansion of rice farming has greatly improved local food supply and brought economic benefit not only to the riverine communities of the Sourou valley, but also to the growing number of seasonal and permanent migrants to the area. The rapid evolution of rice farming has transformed the value of floodplain land and raised new issues about access to such land under the prevailing conditions of customary tenure. A number of instances of conflicts within and between villages over access to floodplain are

documented in section 7, which examines the role of different agencies (customary, government, and foreign) in the “governance” of evolving local resource use, and particularly in the interpretation of customary land tenure.

Section 8 considers the evolution of local control over the Sourou floodplain in the light of wider current developments, particularly the national programme of decentralisation of natural resource management to elected local authorities, the regional demographic pattern of southwards migration, and the local development of the rice economy.

2. ENVIRONMENTAL POLICY AND LOCAL GOVERNMENT IN MALI: THE INSTITUTIONAL CONTEXT

2.1 INTRODUCTION

The territory occupied by the Republic of Mali stretches from deep in the Sahara (25 degrees N) to the transition between Sudanian and Guinean vegetation zones (11 degrees N). Desert covers 30 percent of the territory and 59 percent of country is classified as having annual rainfall less than 400mm (Maiga et al. 1995:17) The Sahelian (400-600mm) and Sudano-sahelian (600-800mm) zones together account for almost a quarter of the country with the remainder covered by the savanna woodlands of the Sudanian (800-1200mm) zone in the south. The Sahelian zone running east-west through the centre of the country is dominated by two major rivers: the Senegal, flowing west, and the Niger, whose flow eastwards makes a loop northwards into the Sahara associated with a major wetland complex - the interior delta of the Niger - before flowing SE into Niger and Nigeria (Map 1).

Modern Malian society and culture is strongly identified with successive phases of government stretching back through the past two millenia. Until the 17th century, the area was governed by a series of powerful states whose wealth was based on control of trans-Saharan trade, particularly between the Mediterranean and the gold-producing areas of the Guinean zone. The most commonly identified of these ancient states are the Ghana empire (5th-11th century) ruled by the Soninké, the Mali empire (13th-14th century) whose islamic rulers are identified as “Mande” or “Marka”, and the Songhai empire (15th-16th century) centred at Gao. The destruction of the Songhai imperial authority by Moroccan expeditions in 1591 at Tondibi resulted in disruption of trans-Saharan trade and began a 300-year period of instability in the region that coincided with the growth of European-controlled maritime trade from the West African coast. During this period the area was dominated successively by the pagan Bambara kingdoms centred on Segou (1670-1810), the islamic Fulani state centred on Macina (1810-1863), and the islamic Toucouleur empire which stretched from Senegal to Timbuctou (1863-1896). Occupation of the area by the French exploited hostilities between these entities, as when they provided guns to the Bambara against the Toucouleur (Toulmin, 1992:23). However, French administration was imposed in the face of armed resistance from all three of these entities during the 1890's. In the case of the Tuareg pastoralists in the Saharan zone, armed resistance continued throughout the period of French administration.

The “French Sudan” was proclaimed independent from France in 1960, initially as a federation with Senegal. Within a few weeks Senegal withdrew from the federation and the first republic of Mali was proclaimed within the current boundaries. The first republic's socialist government led by Modibo Keita was ended by a military coup in 1968, and the second republic was established by the coup's leader, General Moussa Traoré. The country returned to civilian rule as a single-party state governed by the UDPM (*Union Démocratique du Peuple Malien*) headed by Moussa Traoré, and a new constitution was drafted in 1979. In the 1980's the UDPM government met with increasing opposition, in the form of Tuareg insurrection and guerrilla activity in the north, and calls elsewhere in the country for multi-party democracy. Violent government repression of student protests in March 1991 was followed by a general strike and a military revolt which resulted in the imprisonment of Moussa Traoré and

the establishment of a multi-party constitution for the third republic. Elections held in 1992 resulted in victory for the ADEMA (Alliance pour la Democratie au Mali) party and the installation of its leader, Alpha Oumar Konaré, as president. The Tuareg insurrection ended with the negotiation and signature of a series of pacts between the Tuareg and the new Malian government which by 1994 had restored peace to the north of Mali in return for a degree of regional self-government (Thompson and Coulibaly, 1994:39).

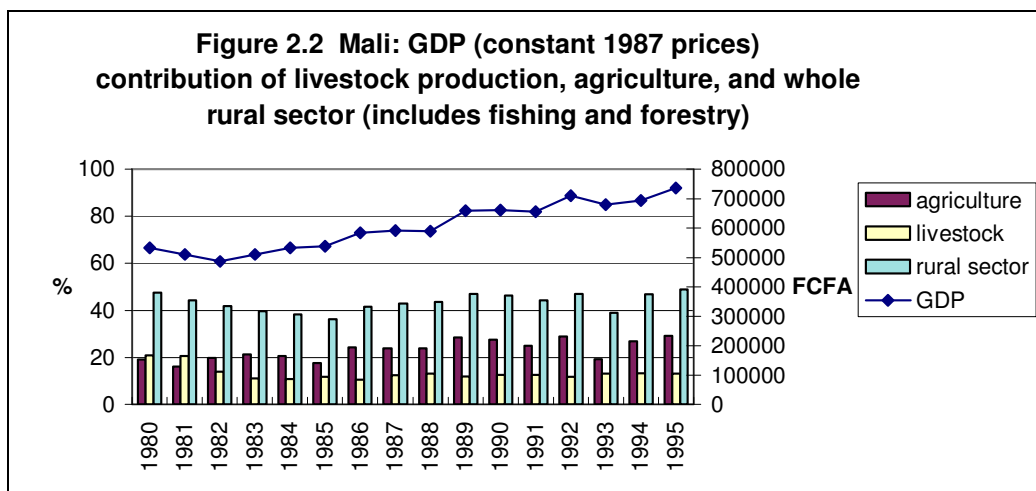
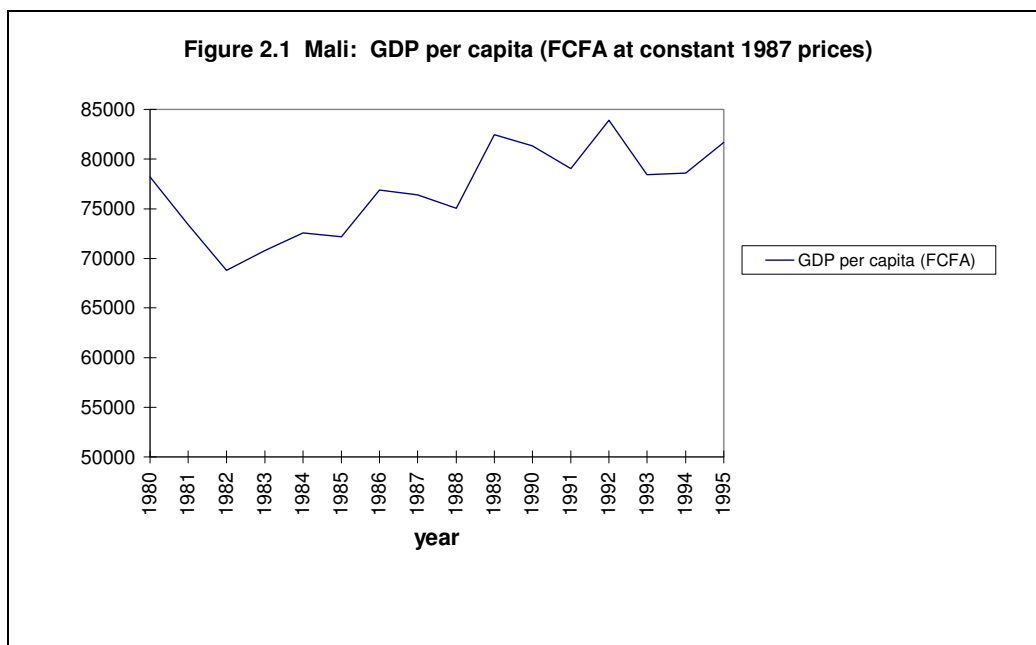
2.2 THE MALIAN ECONOMY

With the demise of the trans-Saharan trade routes, the Malian economy began a dependence on agriculture and livestock production which continues to this day. Staple cereals millet, sorghum, and rice were supplemented under French administration by government action to develop cotton production. The Office du Niger was established in 1932 to develop water control for rice and cotton in the NW corner of the interior delta, eventually allocating 54000 ha to smallholder settlers in the 1950's (Maiga et al. 1995:55). The Compagnie Française pour le Développement des Textiles (CFDT) established input supply and marketing facilities for smallholder cotton production in the southern, higher-rainfall, region around Sikasso and Koutiala. Studies reviewed by Davies (1995: 79) indicate that output of seven principal crops rose in volume terms by 40 percent between 1945 and 1959 as a result of increased cultivation area. At independence, Mali was the leading exporter of cereals in the Sahel, with 20 000t of millet and 5000t of rice exported in 1959 (Lecaillon and Morrison, 1986, quoted in Davies, 1995:79). Livestock, reared largely under conditions of transhumance between the main river valleys and the drier hinterlands, were exported to the more humid coastal areas to the south.

Post-independence Malian governments retained the development agencies inherited from the French administration: the Office du Niger became a Malian parastatal, and the CFDT became (in 1972) the Compagnie Malienne pour le Développement des Textiles (CMDT) - a Malian-French joint venture (Maiga et al. 1995: 46). In addition, from the 1970's a number of loan-funded rural development agencies Opérations de Développement Rurales (ODR) were established by the Malian government to promote agricultural and livestock extension for specified areas or products. In common with other Sahelian countries, Mali's economy deteriorated following the rise in oil prices in the 1970's, and by 1980 a number of "stabilization and adjustment" measures had been agreed with international funding agencies (IMF, USAID, and the World Bank). Through the 1980's a series of measures aimed to liberalise prices and trade, particularly in agricultural inputs and cereals, to reduce government budget deficits, to restructure and improve the financial performance of parastatals, and disengage ODRs from production and commercial activities (Maiga et al 1995:42). Finally, in January 1994, the Malian currency, the Franc Communauté Financière Africaine (FCFA), was devalued by 50 percent.

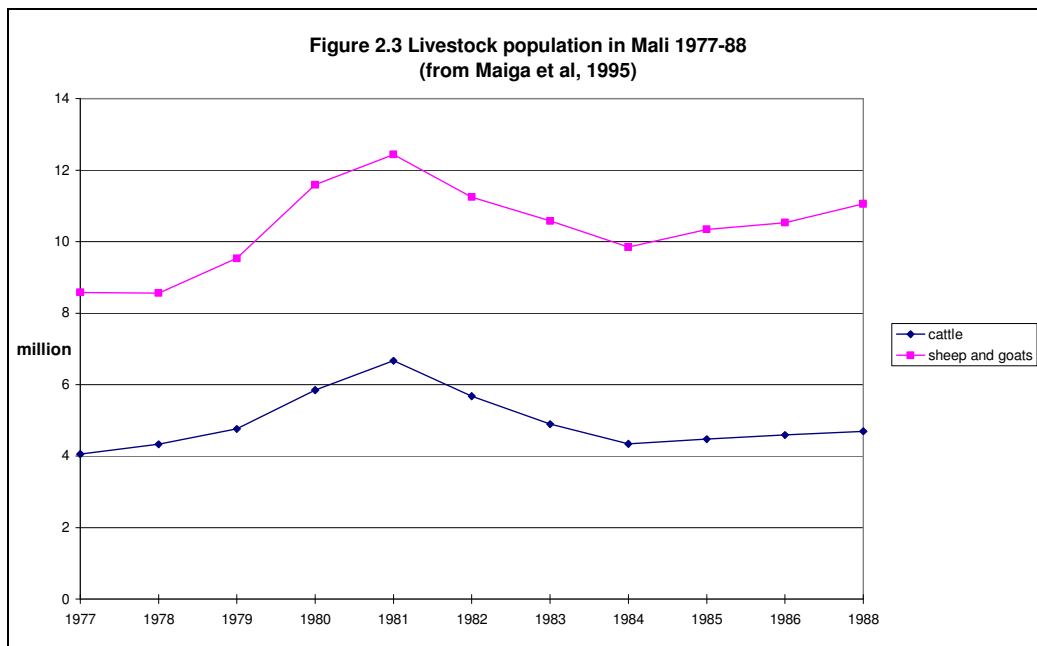
During the 1980s per capita GDP fell (fig 2.1), only exceeding its 1980 value at the end of the decade. In the 1990s GDP, while higher than in the 1980s, has shown little overall growth trend. Maiga et al (1995:34) show GDP growth averaged 3 percent per year from 1982 to 1991. This may be optimistic, however. GDP adjusted for inflation (constant 1987 prices) averaged only 2.5 percent between 1980 and 1995 (fig 2.2).

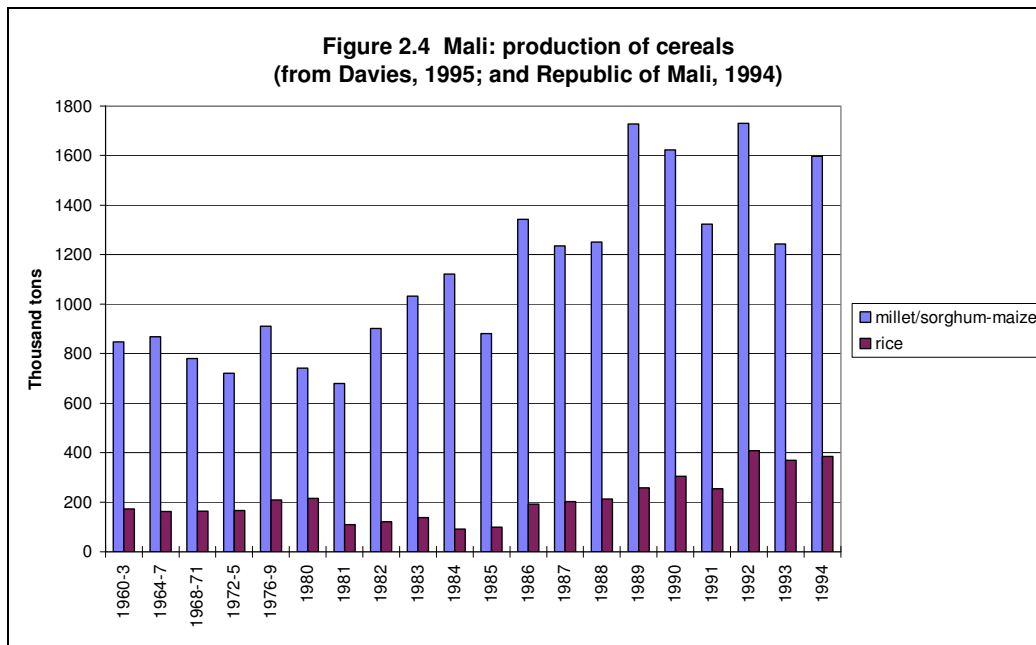
The fluctuations in GDP largely reflect the impact of year to year rainfall fluctuation on output from the rural sector, which continues to account for 40 percent of GDP, down only slightly from 48 percent in 1980 (fig 2.2). The rural sector also accounts for over three-quarters of Mali's exports, mainly in the form of cotton and live cattle (Maiga et al. 1995:35). Development aid increased throughout the 1980's from US\$215 million in 1983 to US\$467 million in 1990, contributing to a positive balance of payments since 1986 (Maiga et al. 1995: 44). Between 1992 and 1994 the value of exports covered between 49 and 53 percent of the cost of imports (Republic of Mali, 1994:13).



In common with other Sahelian economies, Mali's economic growth has suffered from an overall reduction in rainfall since the 1970s, following a period of generally higher rainfall in the 1950s and 60s (Maiga et al, 1995:21). Compared with the 30-year period 1931-60, average annual rainfall in the Sahel for the period 1961-90 decreased by about 30 percent, equivalent to a southwards shift of about 120km in the rainfall isohyets (Hulme, 1996:92).

Davies (1995:313) quotes reports that livestock numbers doubled between 1945 and 1959. Data for more recent years (Maiga, 1995:26) shows slower rates of increase (Fig 2.3). Despite lower rainfall generally and the incidence of severe drought in 1972-3, 1984-5, and 1993, agricultural output has grown over the past thirty years (Fig 2.4). Much of this increase has resulted from an increase in cultivated areas. However, the past ten years has seen significant productivity increases in cotton, where average yields have increased from 200-400 kg/ha in the 1960s to 1200-1300 kg/ha since the mid-1980s (Maiga et al 1995:49). In the Office du Niger increases in rice yields have been even more marked, with average yields, which had remained at about 2 t/ha from the early 1970s to the late 1980s, increasing to 4.9t/ha in 1994 (Maiga et al. 1995:57). Davies (1996: 86) shows that the overall trend is that food imports have fallen from 15 percent of food production in the 1970s to around 10 percent in the 1990s, and, over the same period, food aid has declined from 50 to 30 percent of food imports. Despite this picture of improving national food security, however, supplies are critically affected by large year-to-year fluctuations in rainfall.





The most recent census (1987) gives Mali's population as 7.7 million, with an annual growth rate estimated at about 1.8 percent and a projected population in 1995 of 8.7 million (Republic of Mali, 1994; Davies, 1995: 84-5). However, higher figures for population growth are frequently encountered in the literature: 2.5 percent (Maiga et al 1995:11), 3 percent (World Bank, 1992) or even 3.6 percent (Meyer et al. 1993:3).

Some 80 percent of the total population was estimated as rural in 1987, but with an urban population growing at 4.6 percent, against rural population growth of 1.3 percent, the percentage of population in rural areas is reckoned to have fallen to 73 percent by 1995 (Republic of Mali, 1994). UNDP (1994) estimates the economically active population of Mali, including the informal sector, at 3.37 million, of whom three-quarters work in agriculture (UNDP, 1994:36). Agriculture is predominant particularly in male employment (85%): while men have most of the formal urban industrial jobs, these account for only 5.4 percent of total male employment. In contrast, agriculture accounts for just 59 percent of women's employment, with non-agricultural production, commerce, and services - mostly in the informal sector - accounting for the remaining 41 percent (33 % in rural areas).

In 1987, literacy rates were estimated at 8 percent in rural areas and 36 percent in urban areas, with these percentages being halved in the case of women (Maiga et al, 1995:37). School enrolment rates are 61 percent in Bamako and 43 in other urban areas, but only 12-17 percent in rural areas (Meyer et al., 1993:34). Overall, school enrolment rates declined from 28 percent in 1979 to 25 percent in 1990 (Hall et al. 1991:22).

While rural unemployment is considered low to inexistent, unemployed are estimated at 6.7 percent of the urban workforce (UNDP, 1994: 10), with Bamako containing 39 percent of all those considered unemployed in Mali (ibid: 14). The phenomenon of urban unemployment is considered to have been exacerbated by the decision in 1983

to discontinue automatic recruitment of secondary and higher education graduates into the civil service (Hall et al. 1991:22): 47 percent of the unemployed are aged less than 25 and a third have secondary education (UNDP, 1994:18).

External migration has long formed a critical part of the Malian economy. Toulmin (1992:26), for example, records the emigration of Bambara villagers on foot to Senegal in order to earn cash to meet tax obligations during the 1930s Depression. The 1987 census estimated that migrants living abroad (65 percent of whom are less than 25 years old) accounted for 24 percent of the Malian population (Maiga et al., 1995:40). Estimates for 1992 suggest about 3.5 million Malians living abroad, of which 2.5 million in West Africa, 800 000 elsewhere in Africa, and 80 000 in Europe (Maiga et al., 1995:41). Taking the projected 1995 population within Mali as 8.7 million, migrants would thus account for 28 percent of all Malians.

Estimates of national population growth mask the fact that population in the northernmost regions of Mali has been declining by about 5 percent in 1980-92 (Republic of Mali, 1994), as people have moved into the more southern regions of the country, where annual population growth in the 1980's was estimated at 2.3 percent (Davies, 1996: 85). The movement from north to south appears to be the consequence of reduced rainfall and insecurity associated with Tuareg insurrection.

2.3 LOCAL GOVERNMENT

2.3.1 Pre-Independence

Discussion of the relationships between local and central authorities in the great historical empires of the Sahel remain speculative. The most plausible model is one in which urban-based ruling groups devolved power to village authorities in return for tax payments and allegiance in time of war (Thompson and Coulibaly, 1994:7). More recent administrations, notably that of the Fulani centred on Macina in 19th century, involved the nomination of supra-village authorities (*dioro*) by the central state (Crowley, 1991:27). Bambara administration also involved supra-village authorities in the form of an assembly representing villages with contiguous territories (*kafo* or *canton*) presided over by the *Fama*, a senior member of the most senior lineage, who had considerable powers over agriculture, commerce, taxation, justice, and the conduct of alliances and war with outside entities (Crowley, 1991:46). While government above village level appears to have taken a number of historically or ethnically specific forms, the *village* still appears as the basic unit of governance throughout Mali, with the exception of the most mobile of the pastoralist groups in the Saharan zone.

Village authority is derived from the same basic sources in most of the different language groups in Mali. These are religion, kinship, age, and conquest.

- Religious authority derives from animist traditions in which the first to clear land using axe or fire has necessarily established a special relationship with the spirits of the land and descendants of the first cultivator are thus uniquely placed to seek the spirits' favour, and hence the land's fertility, on behalf of present users of the land.
- Kinship authority is that of the oldest male member of a lineage over all members of that lineage. Lineage authority governs rights to land and other resources. Lineages are traced back to the founders and early settlers of the village, and often constitute separate wards (*quartiers*) of the village. The most recent arrivals in a village may form new *quartiers*, or may attach themselves to existing *quartiers*, and may ally themselves with or negotiate membership of existing lineages (Crowley, 1991:24).
- Within the village all youths within a five to ten-year age group are constituted as an age set, and older age sets have authority over younger age sets. This authority is exercised principally in the sphere of "public works", activities of collective interest to the village.
- The final source of authority in villages stems from conquest. This may refer to the simple subjugation of one village by a neighbour or by small invading groups, or to larger scale conquest of an area by a centrally-organised entity, as when the Fulani pastoralists established their Macina state over the Bambara, Bobo, and Bozo villages of the Interior Delta in the early 19th century. In all instances the conquerers establish themselves or their nominees as the village authority (*chef du village*), though this does not always include an appropriation of religious authority held by the lineage of the land's first cultivator (see for example the case of

Songoré village in the Sourou valley in section 6.1). Between the conquerors' authority and the other forms of authority there is, therefore a degree of negotiation over the exercise of power.

Thus, French administration installed European administrators (*commandant*) at *cercle* level but left African authorities at the more local village and *canton* level (Hall et al. 1991:9), although appointment of chiefs of villages (*chef de village*) and *cantons* was subject to approval by the *cercle* administration. Moreover, colonial *cantons* were in some instances drawn so as to undermine existing African lines of authority, as in the case of the *canton* of Pana established under the chieftainship of Baye village in the Sourou valley (see section 3). The *canton* chiefs were responsible for tax-collection, supply of *corvée* labour for building roads and administration buildings, and military conscription, and had a position of authority over the village chiefs under their jurisdiction

2.3.2 The First and Second Republics

At independence in 1960, the socialist government of Modibo Keita reorganised administration into the present hierarchy of *regions*, subdivided into *cercles*. Within the *cercle*, the *cantons* were replaced by *arrondissements*, each administered by a centrally-appointed *commandant*. This move was intended to diminish the power of *canton* chiefs, whom the national government perceived as anti-progressive (Hall et al. 1991:10), and whose control over local resources was to be taken over by the local socialist party committee on behalf of local community production cooperatives (*Groupements Ruraux de Productivité et de Secours Mutuel* -GPRSM). In practice, the implementation of the cooperative policy was under way in very few places before it was aborted by the 1968 coup (Riddell et al 1986:116).

A Commission for the Reform of Public Administration was established by the new government in 1969, but took until 1977 to propose a series of reforms. These retained the administrative tiers established in the first Republic but envisaged the decentralisation of economic planning to regional government, created municipal authorities (*communes*) at *arrondissement* level for urban areas, and proposed greater deconcentration of government to regional, *cercle* and *arrondissement* levels. This latter was to be through the establishment of Development Committees at each administrative level, made up of public service heads and representatives of public organisations. The development committees had two tasks: to execute instructions from the national authorities, and to elaborate a local development plan (Hall et al. 1991:11). The 1977 reforms also envisaged elected local councils. However these had a consultative, not legislative, role, and were to be presided over by the responsible administrative officer (*commandant*) at each level. In practice, elected councils were often inoperational and development committees were more accountable upwards, to regional or central levels, than to their local constituencies (Hall et al. 1991:20).

The effect of 1960 administrative changes which substituted *canton* chiefs by *arrondissement* commandants was unequivocally to bring local administration more directly under central government control. Despite the rhetoric of decentralisation, the 1977 reforms (enacted by legislation in 1981-2) are now regarded as further consolidating a *centralisation* of power because they emphasised deconcentration of

central authorities, rather than any devolution of power (*Democrate Malien* July, 1995:10). Further insight into the relationship of central and local government is provided by Hall et al. (1991), who analysed Malian government revenue and expenditure budgets just before the overthrow of the second Republic. Important elements which emerge from their study are:

Firstly, 96 percent of government revenue was accounted at regional and central level and consolidated into the National Budgets. Regional administration (and *cercle* and *arrondissement* administration below it) had no financial autonomy from central government, and regional budgets were funded by transfers from central government.

Secondly, responsibility for revenue collection is divided between central administration, whose revenues were dominated by import/export taxes (36%) and consumption taxes (21%), while regional revenues were dominated (88%) by income taxes (IGR, deducted from salaried employees), the rural poll tax (*minimum fiscale* - MF), and livestock tax. Much of the regional revenues, namely the MF and the livestock tax are assessed at *arrondissement* level and collected by the *chefs de village*.

Thirdly, the 20 municipal *communes* (six of which are in Bamako) in the second Republic were legally-recognised corporate entities whose revenues and expenditures did not form part of the national budget. In practice, the municipal authorities achieved paltry income, mainly from the issue of commercial licences, amounting to only 4 percent of the total public sector revenues. This was due principally to low rates of collection (50% for business licences and only 10% for the urban poll tax - *taxe municipale*), but also to legal restrictions on the ability of municipal authorities to charge for services. As a consequence, Hall et al (1991) concluded, the elected municipal councils did not constitute local government: most services were provided by centrally-funded agencies, municipal administration and finance was largely controlled by seconded officers from central government or treasury officials at regional or *cercle* levels, and council decisions were subject to the approval of officials of the relevant *cercle* administration.

Finally, the fact that most infrastructure for health and education are concentrated in urban areas or at *cercle* administrative centres, coupled with taxation collection rates which are low in urban areas and high in rural areas (10% collection rate for urban poll tax contrasted to 90% collection rate for the rural poll tax cf Hall et al. 1991:36,39) means that rural taxation was supporting urban living standards.

The National Seminar on Decentralised Planning, held in 1987 in Gao, observed that the 1977 reforms had produced little progress towards decentralised government, and recommended a revitalisation of the local development committees through a greater transfer of staff and financial resources to local levels. As a consequence, the Fund for Regional and Local Development (FDRL) was established. This is a national state budget funded from a number of existing sources of tax revenue (eg the APE contributions for local schools, and the development tax), consolidated into a Regional and Local Development Tax (TDRL) which was to finance local

development initiatives. Disbursements from the fund were to be requested by local administrators (*commandants*) and managed by treasury officials at regional and *cercle* level. Hall et al. (1991:44-46) argue that the effectiveness of the FDRL in responding to local priorities was undermined because the authority to access the FDRL was located at *cercle* level, while the requests for funding were supposed to emanate from *arrondissement* level. Even more important, in practice “local” projects continued to be dictated by “central” political and administrative priorities, with some 50 percent of FDRL earmarked for presidential instructions alone (Hall et al. 1991:13).

2.3.3 The Third Republic: Decentralisation

The overthrow of the Traoré regime in March 1991 was followed four months later by a constitutional conference in which decentralisation was a central issue, given added weight by the continuing Tuareg struggle for secession. A referendum approved the constitution for the Third Republic in January 1992 and the newly-elected government established the *Mission de Décentralisation* (MDD) in January 1993 to work out the details for a devolution of local government to elected local councils. The principles of this decentralisation were set out in the *Loi des Collectivités Territoriales* (93-8), with more detailed regulations governing financial, electoral, and staffing aspects published as the *Code des Collectivités Territoriales* (*loi no. 95-34*) in April 1995.

The legislation establishes the transfer of certain powers and resources to three different levels of *Collectivités Territoriales* (CT) : regional, *cercle*, and *commune* - the latter replacing the *arrondissement* level of administration. Each CT is a legally-recognised entity (*personnalité morale*) with fiscal authority (*autonomie financière*), constituted by an elected council. At the most local level, that of the *commune*, members of the council (numbering between 11 and 45, depending on the size of the *commune*) are elected every five years by direct universal suffrage. The *conseils communaux* each elect a mayor as the chief executive of the *commune*, and also 2-5 members of the council for the *cercle*. In turn members of the *cercle* councils will elect representatives to serve on the relevant regional assembly. The 1993 legislation states that no CT has control over another (ie *communes* are not subordinate to *cercles* and *cercles* are not subordinate to regions), but that each CT has different areas of authority. However, the *affaires locales* set out for each level of CT shows degrees of overlap (fig 2.5), which has led to suggestions that the *cercle* level may prove to be redundant (*Le Démocrate Malien*, July 1995:38). A further question which the law raises is the concept of property (*domaine*) belonging to the different levels of CT, which has been criticised as problematic (Ribot, 1995). This is a point discussed further below.

The autonomy of the CTs is in fact to be circumscribed in various ways: by the fact that their powers and procedures must conform to those established by national law; by the fact that at least part of their budgets will come from the transfer of centrally-collected tax revenue, and transfers from ministerial budgets to accompany the transfer of responsibilities for services such as education and health; and finally through the auditing role which will be played by representatives of the central state in each CT. These centrally-appointed officials, referred to as *délégué at commune*

and *cercle* level and *haut commissaire* at regional level, will have the role of ensuring the rule of law and observance of national interests (“*il a charge des intérêts nationaux...du respect des fondements de la Société démocratique et républicaine....du respect des lois. Notamment en s’assurant de la légalité des décisions des autorités décentralisées.*”) within the CT. They will essentially substitute the *commandants* of the past, and, although they will have no authority over the elected executive of the CT, they will continue to have authority over deconcentrated agencies of line ministries at local level, including those of security (*Le Démocrate Malien*, July 1995:33).

Figure 2.5 Areas of authority for different levels of local government in Mali (from <i>Le Démocrate Malien</i> , July 1995 : 35-6)		
<p>Commune</p> <ul style="list-style-type: none"> • planning use and development of commune areas (<i>l’espace communal</i>) • literacy and pre-school education • primary education (years 1-6) • health services and public health • traffic regulation • rural and urban water supply • markets • police. 	<p>Cercle</p> <ul style="list-style-type: none"> • protection of the environment • primary education (years 7-9) • health centres • rural water supply 	<p>Region</p> <ul style="list-style-type: none"> • regional development plan • protection of the environment • secondary education, professional training. • regional hospitals, welfare programmes • energy
<p>All levels</p> <ul style="list-style-type: none"> • <i>communel/cercle/regional</i> budgets and accounts • management and acquisition of <i>communel/cercle/regional</i> property • road infrastructure on <i>commune /cercle/regional</i> property • promotion of rural productivity, crafts, tourism • definition and collection of <i>communel/cercle/regional</i> taxes within the limits established by law • administration of grants and subsidies • implementation of civil service staff regulations • cooperative projects with other Malian or foreign communities 		

The process of establishing the CTs was begun in 1995, with a mobilisation campaign conducted by the MDD through regional teams (*Groupements Régionaux d’Etudes et Mobilisation - GREM*) whose task was to set up *cercle*-level committees to inform and mobilise discussion of the reforms at village-level. From the village-level discussions (*concertations villageoises*) were to be generated proposals for groupings of 15-25 villages which would constitute the new *communes*. These proposals were submitted to a *cercle*-level boundary commission (*commission de découpage*) constituted by the *commandants* of *arrondissements* and resource persons drawn from local organisations of “civil society”.

Criteria to be used in approving proposals for new *communes* were that they should:

- respect community links of solidarity or cultural affinity
- include a sufficiently large population
- provide a centre that was easily accessible from all the area of the commune

- have a capacity to provide necessary economic, social, and cultural services
- constitute a coherent and unitary area.

The boundary commission was responsible for resolving boundary issues arising from the submissions made, and for reporting the proposals for new *communes* to regional level for subsequent ratification by the national government. Although the procedures suggest that *commune* boundaries may differ from those of the existing *arrondissements*, in practice an assumption of administrative continuity is evident (*Manuel de Formation au Decoupage Territorial*, 1995:7). This, coupled with conditions that *commune* centres must already possess a level of infrastructure development (schools, health centres etc) found in *arrondissement* administrative centres, and the preponderance of *arrondissement* administrators on the boundary commissions made it likely that in many cases *arrondissements* would simply be converted to *communes*. This proved to be the case in Bankass *cercle* in 1995-6 (see section 7.3.1). Significantly, where *commune* boundaries did not follow those of existing *arrondissements*, they often showed a reversion to earlier *canton* groupings.

Elections to the new *commune* councils were scheduled to have taken place in 1996, but were postponed until 1997. The impact of local elections on political and economic development in Mali is the subject of much debate nationally in periodicals such as *Cauris* and *Le Démocrate Malien* and at the level of the Sahelian region (Thompson and Coulibaly, 1994). We will return to this debate in section 7. We will note two concerns here. The first is that reform of local government has left the the lowest tier, that of the village, untouched. Here the customary authority established by religion, kinship, and age interfaces with the nominated delegate of the (central) state. In the proposed *communes rurales* the *chef du village* will continue to be nominated by the state representative (*délégué*), not by the elected council.

The second concern is about the financial resources which the communes will have. The *Code des Collectivités Territoriales* makes clear that the rural *communes* will have greater autonomy than the municipal communes of the Second Republic, particularly in relation to their capacity to levy local taxes and charge for the provision of local services, and to enter into loan or other funding agreements with development agencies (*Democrate Malien*, July, 1995:40-41). Communes will also receive financial transfers from central government, either to match the transfer of responsibility for service provision (eg health, education), or as part of special assistance to meet particular development problems (eg rehabilitation of the northern areas of Mali). A critical issue needing further definition is the destination of “national” taxes, of which the most important are the rural poll tax (MF), livestock tax, and the TDRL, collected in each village by the *chef de village*. The principle of dividing tax revenue to meet local and national goals is recognised, but the issue of allocation of shares to local and national authorities will be critical:

Beaucoup de citoyens pensent qu’une conséquence fondamentale de la décentralisation réside dans le fait que tout impôt ...recouvré dans une collectivité doit être intégralement investi dans celle-ci, sans risourne aucun pour le Trésor central....Certes, l’essentiel de ces recettes devra servir à couvrir les besoins de fonctionnement et d’équipement de la collectivité. Mais...il est indispensable de procéder à des investissements régionaux et même nationaux....La responsabilisation dans les choix stratégiques en matière du développement local ne doit... occulter l’exigence de participation à l’œuvre de construction nationale. La solidarité entre régions d’un même pays doit prendre le pas sur la culture d’égoïsmes locaux ou régionaux. (*Democrate Malien*. July, 1995:41)

2.4 ENVIRONMENTAL POLICY

2.4.1 The Policy Apparatus

Recognition of the centrality of rural natural resource management to both the economy and the environment in Mali resulted in the creation in 1994 of the Ministry of Rural Development and the Environment (Maiga et al. 1995:31). This ministry brings together all government technical departments concerned with natural resource management in rural areas. The different technical departments and their presence at local levels is indicated in table 2.1. The Institute for Rural Economy has research stations outside its regional and national centres, but these operate under regional or national research programmes. Similarly, the Plant Protection Service may operate teams outside its regional centres in areas with particular problems (eg locust attack). The main agencies at *cercle* and *arrondissement* level are those concerned with Agriculture, Livestock, Cooperatives, and Water and Forests. These agencies are represented on local development committees.

Figure 2.6 Ministry of Rural Development and the Environment: Technical Departments

National level:	Agriculture	Livestock	Cooperatives, Local and Regional Development	Water and Forests	Rural Engineering	Plant Protection Service	Research: Institute for Rural Economy (IER)
region	X	X	X	X	X	X	X
<i>cercle</i>	X	X	X	X	-	-	-
<i>arrondissement</i>	X	X	X	X	-	-	-

Since the droughts of the 1970s, Mali, in common with other Sahelian countries, has been a focus of study and support by a number of international organisations, notably the Sahel Institute, Club Du Sahel, and the Inter-state Committee for Drought Control in the Sahel (CILSS). External funding has been particularly important for a series of national resource management projects operating at a local level. Maiga et al (1995:29) identify twelve of these “Rural Development Operations” (ODR), including projects on water development (Office du Niger, and Office of the Upper Niger Valley -OHVN), rice development (Opération Riz Mopti, Opération Riz Ségou), cotton development (CMDT), livestock development (ODEM -Mopti, PRODESO in western Mali), and the Natural Resources Management Project (PGRN). This last is funded by the World Bank, and, together with a similar project (Gerenat) funded by GTZ, is of particular interest as they have pursued the development in Mali of village-level natural resource management using the *Gestion de Terrior* (GT) approach (Toulmin, 1994; Evers, 1994), an important initiative in efforts to materialise the decentralisation of natural resource management in the Sahel. The experience of GT and its implications for local governance of land and water is discussed further in section 7.2.2.

2.4.2 Land Policy

Land Policy in Mali has been described as “a confusing and haphazard mix of customary and state land allocation” (Riddell et al, 1986:114), and reform of land policy is widely seen as central to the success of current development policy:

“In Mali, policies of State disengagement, liberalisation and decentralisation aim to make the population much more responsible for their own development. Among the measures to be taken...one can note the clarification of the land-tenure issue and the application of ownership rights. These measures could contribute in reducing the ill effects of the present communal management of resources.” (Maiga et al, 1995:85).

Discussion of land tenure in Mali usually counterposes “customary” with “modern” tenure. The former is understood to refer to unwritten rights established by precolonial authorities, while the latter refers to rights established by written texts of colonial and post-independence legislation. In practice, the definition of both customary and modern tenure is often not as clear as this duality implies. Both customary tenure, which incorporates administrative codes imposed by earlier conquest (see for example the DINA code discussed below), and “modern” tenure have evolved considerably since French rule at the turn of the century and each shows the influence of the other. This process is reviewed briefly below.

Colonial and Post-independence land policy.

The period of French colonial administration is characterised by moves to assert private (ie exclusive) ownership rights (Riddell et al, 1986:115). Early steps were decrees in 1904 and 1906 by which the colonial state claimed ownership of all unoccupied land: “*terres vacantes et sans maîtres*” (Ould Sidi Mohamed, 1992:189). In order to identify this “private property” of the state, the 1906 decree attempted to codify in written form the existing African land tenure, particularly in the Interior Delta (Ould Sidi Mohamed, 1992:183). Further colonial legislation in 1935 and 1955-6 established a system whereby occupation of land could be formally registered and subsequently converted into a full title of ownership (*titre foncier*). These measures were only implemented to any extent in urban areas, however, for the acquisition of ownership titles to land for residential or commercial premises (Riddell, 1986:115). Outside the towns, colonial legislation on land was largely ignored, although colonial administrators increasingly became involved in controlling, or at least taxing, access to certain resources through legal requirements for state permits, for example for transhumance (Ould Sidi Mohamed, 1992: 190).

French land legislation was not repealed by the first Republic of Mali, but extended, with the state claiming ownership of all the national territory (Riddell, 1986:116) and abolishing what were perceived as exploitative elements of customary tenure such as sharecropping (Crowley, 1991:54) and grazing fees (*tolo*) for dry season pasture (Moorehead, 1989:32). Further, under 1959 legislation the state was empowered to expropriate land held under customary tenure by administrative, rather than legal process. The policies of undermining the power of customary authorities in favour of those of the governing party and the state, adopted by both the First Republic and the Second Republic which succeeded it in 1968, are widely believed to have resulted in degradation of land, pasture, and fishing resources (Moorehead, 1989:267; Ould Sidi Mohamed 1992, 190-4; Crowley, 1991: 20; Riddell, 1986:116). This was because

erosion of customary authorities' power to exclude outsiders was not matched by an alternative framework of clear and effective rules governing access, and led to indiscriminate pressure on resources and a diminution in local responsibility for resource conservation: "*déresponsabilisation de la population sur son espace*" (Ould Sidi Mohamed, 1992:190).

Growing concern with improving the management of land, water and pasture, particularly following the drought of the 1970s, resulted in the setting up of a series of national projects - the Rural Development Operations (ODRs) - many of which subsumed land tenure issues by establishing project management as the authority allocating land rights within its area of jurisdiction. Through the ODRs, therefore, land tenure reform was undertaken on an *ad hoc* basis within specified areas. Some ODRs, such as the Office du Niger, pursued a policy of leasehold tenure for irrigated plots, though cultivators' lack of autonomy in the management of land and water, together with the relatively low reliability achieved in water supply, is believed to have left leaseholders less secure than under customary tenure (Riddell, 1986:118; Crowley, 1991:55-60).

In the 1980s pressure for reform of land tenure was exerted by international financial institutions funding Mali's structural adjustment programme, and in 1986 resulted in the *Code Domaniale et Foncier* (CDF). This attempted to harmonise within a single legislative framework tenure rights deriving from a number of different historical periods. Thus, the CDF recognises customary tenure as taking precedence over any claims by private individuals to register land as private property, but as subordinate to any claims the state may make on land "in the national interest" (Ould Sidi Mohamed, 1992:179-81). The CDF reinforces the property rights of the state, not only in the form of ultimate *de jure* ownership of "national assets" (*domaine national*) or public property (*domaine public*) but also in the form of property from which the state may generate income (*domaine privé immobilier de l'état*). Although the CDF recognises customary tenure, it does little to define its role within a perspective of future development of natural resource management. Ould Sidi Mohamed (1992) identifies a number of ways in which the CDF leads to a marginalisation (*banalisation*) of customary tenure.

Firstly, the code is imprecise on whether holders of customary tenure rights have the legal authority to exclude outsiders, so that in practice security against encroachment is subject to whether or not local state administrative officials wish to allow new settlement. Toulmin (1992:202-3) has observed that such decisions can rest on the ability of customary authorities to bribe government officials.

Secondly, the CDF forsee the conversion of customary rights into private property rights. This is to be through an initial registration of a lease from the state (*concession rurale*), which includes a development plan, usually involving fencing, well-digging and other investment (*cahier de charges*) for the land. On completion of the terms of the lease, and payment of the value of the land, the lease is adjudicated to full property title (*titre foncier*). While the process may have been of benefit to individuals and businesses in urban areas, the financial and literacy requirements of the registration of a *concession rurale* are well beyond the means of most rural land users, and, because the state may confiscate land where the investments specified in the

terms of the *concession* are not implemented, may involve a reduction in security in relation to that under customary tenure (Ould Sidi Mohamed, 1992:185-7).

The Third Republic enshrined recognition of customary rights in the 1992 constitution, subject to any needs the state may have to acquire and manage the land in the national interest. While many see land tenure reform as central to the decentralisation of government in Mali, there is evidence of confusion over responsibility for such a reform. Thus, an exposition of the activities of the Mission for Decentralisation (*Le Démocrate Malien*, July 1995: 17) lists land tenure legislation (*législation domaniale et foncière*) as one of the outputs expected of the Mission for Decentralisation in 1997. In the same month, an official at the Mission for Decentralisation asserted that the Mission had no responsibility in this area, since the CDF was undergoing review by the Ministry of Finance (N Diarra, interviewed 27.7.95). The review of the CDF was still in progress in 1996 when this research was completed.

Customary land tenure

Customary land tenure in Mali hinges on two basic elements of rural society: the organisation of settlement in villages, and the exploitation of certain resources through transhumance. For the main groups of cultivators (Bambara, Dogon, “Marka”), the village is the site of authority over land, and a senior (male) member of the founding lineage of the village is the ultimate holder of that authority as a result of the covenant made between the first settlers and the spirits of the area. The village lands are divided among the principal lineages, who occupy separate wards (*quartiers*) of the village. Lineage heads allocate land to extended household units, whose heads (*guatigi*) direct the cultivation of collective fields (*foroba*) and allocate lands for cultivation by individuals and their immediate family. Control of land by heads of extended households is closely linked to control of labour of members of the extended household (Toulmin, 1992; Crowley, 1991). Their allocations of individual fields could therefore be subject to the provision of adequate household labour for the *foroba* fields. Later settlers in villages can access land in various ways. If unclaimed land is available, they may seek an allocation from the founding lineage. Otherwise they may seek a loan of land from one of the existing landholding lineages. They may also seek to join an existing lineage (eg through adoption) (Crowley, 1991:45). These forms of access by outsiders underline that village land is regarded as inalienable, and allocations to newcomers are generally made on the condition that they become members of the village community and hence subject to the mechanisms of social control of the village (Toulmin, 1992:58). Land loans generally involve only token or ritual payments but conversely offer no security to borrowers beyond whatever social obligations they can establish with the lenders. In certain areas of Mali, more formal contractual payments such as sharecropping whereby cultivators give a third or a half of the harvest to the landholder, are common, as among the Songhai, for example (Crowley, 1991:52). Such arrangements may also originate in the historical practice, particularly among Fulani and Tuareg pastoralists, of taking captives to undertake cultivation (Crowley, 1991:25; Cissé, 1985:147).

The practice of transhumance, seasonal movements from a permanent base in order to exploit more distant seasonal resources, is a fundamental aspect of resource management in the Sahel, imposed by the extreme seasonal variation in rainfall and

flood levels in the river valleys. While pastoralists are the most prominent transhumant resource users, fishing communities also follow transhumant production strategies in the Interior Delta, for example, where the annual flood peak moves from one end of the Delta to the other during a five-month period from October to February (Moorehead, 1989:262; Davies, 1996:155). The issue of reconciling the rights of “sedentary” groups permanently resident in an area with those of seasonal visitors has presented a challenge to governments in Mali at least since the fifteenth century, when the Songhai emperor Askia Mohamed sought advice from a north African legal authority Al Maghili about the legality under Islamic law of excluding outsiders from access to pastures and water (Ould Sidi Mohamed, 1992:192). The Dina code established by the Macina state under Sheik Ahmadou in the early nineteenth century is the most commonly quoted model of the successful resolution of this issue in African “customary tenure” (Moorehead, 1989; Crowley, 1991; Ould Sidi Mohamed, 1992), and for this reason it is described below in a little more detail.

The Dina code was devised in a context in which Fulani pastoralists achieved military domination of the Interior Delta and established a theocratic (Islamic) state. Despite their military success, the Fulani constituted a minority: at present they are estimated to be between 20 and 38 percent of the Delta population (Moorehead, 1989:261; Crowley, 1991:29). Moreover, as transhumant pastoralists they needed to secure access to pastures in the face of land tenure claimed by existing villages of cultivating (eg Bambara, Marka) and fishing (eg Somono, Bozo) people (Cissé, 1985: 142; Moorehead, 1989:264). Finally, the Macina state needed to minimise conflict over pasture between rival Fulani clans.

To achieve these goals, the Dina code introduced a degree of sedentarisation of the Fulani clans in the Delta by partitioning them into administrative units (*ouro*) and allocating to each a “home range” (*leyde*) containing a mix of wet season (*harrima*) and dry season (*burgu*) pastures as well as residence sites (Crowley, 1991:22; Moorehead, 1989:264; Ould Sidi Mohamed, 1992:193). The Macina state was divided into 37 *leyde* (Crowley, 1991:28), each administered by a centrally-delegated official (*dioro*) whose principal duties were to regulate access by outside herds, including the levy of grazing fees (*tolo*), and to organise the transhumance of all livestock from the *ouro*, including the negotiation of access to other *leyde*. The *dioro* of all the Macina territories together constituted a central council to coordinate herd migrations, by defining transhumance routes and schedules, and negotiating reciprocal relations of access between specific *ouro* (Crowley, 1991:23-7). The *ouro* embraced all villages within its boundaries, including those of captives (Rimaibe) and non-pastoralist people, as well as those of the Fulani themselves. Land and pasture was controlled by village and lineage authorities, who shared with the *dioro* the fees paid for grazing by outside herds. Crowley (1991:27) has commented that the *dioro* powers were significantly limited because it carried no jurisdiction *within* the *ouro*. Thus, primary rights to land and pasture rested with villages and lineages, so that the *dioro* controlled only secondary use rights: the access to pasture for herds migrating between *leyde*. As a consequence the *dioro* had no authority to intervene in disputes between villages or lineages. In contrast, Cissé (1985:145) asserts that, because the office of *dioro* became hereditary, there was from the outset a tendency for the *dioro* to manage the lands he administered for private gain.

Under French administration, the Dina code was at first recognised, in the convention no. 88 of 1904, but subsequently modified to allow outsiders such as Touareg, Bella, and Maure access to the pastures of the Delta during the severe droughts of 1913-1919 (Riddell, 1982:42). Cohesion of the Dina had been undermined when the Macina authority was overrrun by the Tucouleur army in 1862, and many Fulani were dispersed. The weakening of central Fulani authority which had underwritten the Dina resulted in the use of land and pasture being increasingly contested between herders and between herders and cultivators. These were compounded by the new herds coming into the Delta due to drought, and the colonial policy of expanding rice cultivation. From the 1930s onwards the colonial authorities intervened increasingly to stop violent clashes over land and pasture (Riddell, 1982:43)

Changes in customary tenure

Maiga et al. (1995:30) estimate that customary tenure applies to 90 percent of the cultivated area of Mali. The precise form in which customary tenure operates reflects the response of customary authorities to the wider legal and economic context. As noted above, over the past century this has been characterised by continuing attempts to undermine local monopolies on resource exploitation exercised by powerful customary authorities, notably by the 1960 declaration of rights to use land and water on the basis of Malian citizenship, not membership of a particular lineage (Toulmin, 1992:34). This prising open of resource access has been taking place against a backdrop of increasing resource scarcity. The prevalence of low rainfall in the last 25 years has resulted in large numbers of migrants seeking resettlement and new land due to the desiccation of the more northern regions of the country and lower flood levels in the Interior Delta. At the same time, the widespread adoption of animal-drawn ploughs has greatly extended the area farmed by village households beyond that historically cultivated by hoe (Crowley, 1991:45; Toulmin, 1992:66-70). In addition, according to Maiga et al. (1995:70), increases in fertilizer prices following market liberalisation in the 1980s have prompted farmers in southern Mali to reduce fertilizer use but maintain production by increasing the area under cotton to compensate for lower yields resulting from smaller fertilizer applications.

Reports of the evolution of customary tenure can be broadly classified under three broad headings:

1. The maintenance of control by customary authorities
2. The loss of control by customary authorities
3. The transformation of tenure relations within customary structures.

1. The maintenance of control by customary authorities

The survival of customary tenure is evidenced by the continuation of sharecropping in Fulani and Songhai areas, despite the practice being outlawed by the First Republic (Riddell, 1986:117). Similarly, in a Bambara village north of Ségou, Toulmin (1992) found that the broadening of access to resources proclaimed in 1960 had been interpreted to apply only within the village itself - all village members, not just the chief, were allowed to dig wells - but not to outsiders. The village council refused to allow immigrants to farm on the village land because of concern that they would not settle permanently in the village and so escape effective social control. Similarly, settlement by Fulani was refused (except under the terms of herding contracts) because of the perceived impossibility of subordinating them to Bambara social

authority (Toulmin, 1992:58). However, Toulmin notes that the ability of the village authorities to impose their customary rights over the constitutional rights of individuals to settle anywhere depended on their ability to bribe government administrators at *arrondissement* or even higher levels to obtain state support (Toulmin, 1992:202-3). A similar picture emerges in the CMDT cotton-growing area in southern Mali, which is subject to high rates of immigration from the north. Maiga et al (1995) report that land allocation to immigrants is undertaken by customary chiefs but that communities “have begun to want to lay their hands on all the land in their possession (ibid: 51) and have expanded the areas ploughed “to occupy all the land they possess under customary law so as to prevent other farmers from taking it over.” This need to reinforce *de jure* customary rights with *de facto* land occupation is a response to the situation typified by these words from a customary chief quoted by Ould Sidi Mohamed (1992:184):

“malgré mon refus categorique d’admission de ce nouvel occupant, le Commandant me demande de revoir ma position, puisque la terre appartient avant tout à l’État.....(O)n nous invite à accepter de bon coeur les propositions du Commandant qui sont manifestement contre l’intérêt de toute notre communauté villageoise.”

2. *The loss of control by customary authorities*

An important erosion of customary authority control of access to resources in the Interior Delta has been described by Moorehead (1989), who argues that successive attempts to establish government administrators to replace the *dioro* function, particularly in controlling the access of outside herds to dry season (*burgu*) pasture, has meant that access is no longer restricted by reciprocal arrangements but open to all outsiders with the money to pay the grazing fees. Cissé (1985:151) argues that the ODRs in the Interior Delta, which extinguished customary tenure rights in the areas under their jurisdiction were particularly damaging in that they demonstrated the inadequacy of customary tenure to protect the interests of land users while failing to substitute an adequate alternative. As a consequence, Moorehead (1989: 265-7) observes, there is a process of privatisation whereby powerful individuals or groups assert exclusive rights over the use of, or rent from, the more reliable resources. Similar trends have been noted by Crowley (1991: 31) in instances of abuse of *dioro* authority to privatise grazing lands or grazing fees (*tolo*).

3. *The transformation of tenure relations within customary structures.*

Other processes of social and economic change, and particularly changes in relations of production, lie behind profound shifts in the nature of “customary tenure”. Two important shifts discernable in the literature on Mali are the trend towards fragmentation of the extended household and the changing pattern of livestock ownership. Toulmin (1992: 257-61) has analysed in detail the effect of household size on vulnerability, and concluded that the large extended household “production units” typical of Bambara villages provide scope for investment in diversification while maintaining a secure staple food production. The maintenance of these units depends, however, on the control of younger men’s labour (notably the 4 to 5 days weekly work on the *foroba* field) by their fathers and uncles, and therefore on the ability of these latter to offer sufficient incentives for younger men to postpone their independence. Crowley (1991:47) sees the development of agricultural markets and the associated increase in opportunities for cash cropping (food crops often being the most important cash crops) as leading younger men to seek earlier independence from the extended household, and that this process is greatly accelerated in ODR areas,

such as that of the office du Niger, where land allocation is geared to small nuclear household units and does not easily accommodate growing household size (ibid:56). Control of land and labour are tightly linked in customary resource management, and the fragmentation of control over labour can be expected to have profound repercussions on the operation of customary land tenure.

The second fundamental change in production relations has seen an erosion of the distinctions between cultivators and those whose livelihoods are based on herding livestock. The reasons for this are complex, and to some extent may reflect a continuing process of sedentarisation of pastoral societies, already evident under the Dina code, and the impoverishment of transhumant pastoralists by successive years of drought. The key feature of the change is a growing heterogeneity in herd size due to a concentration of ownership and a growing proportion of livestock owned by sedentary populations (Crowley, 1991:32; Maiga et al. 1995:66). These trends are leading towards fewer, larger herds for whose owners the maintenance of reciprocal access to diverse resources is less attractive than the securing of exclusive rights over reliable grazing.

Evidence of changes in the operation of customary tenure are evident in a regional review of current land tenure issues (Soumaré et al. 1995) undertaken by the project *Observatoire du Foncier au Mali* (OFM), funded by the Caisse Française de Développement and undertaken by the Malian NGO AVES. This noted that in Koulikouro, near Bamako, village authorities' claims for the restitution of customary rights to land incorporated earlier into a state forest were being supported by local businessmen who hoped subsequently to buy the land from the village authorities. In Koro, adjoining Bankass *cercle*, a review of land holdings found 50 percent were loaned, 10 percent were rented, and 5 percent had been sold (Soumaré et al. 1995:17). Tightening of land scarcity was manifest in inter-village disputes, which required the intervention of government administration officials. In Bandiagara, some 45 percent of all land disputes were between villages and 40 percent of land disputes had taken more than 15 years to resolve (ibid: 17-8). This picture of contested tenure is perhaps the consequence of state ambiguity in relation to customary tenure rights during the past century coupled now with growing land scarcity in the areas with more reliable rainfall.

2.4.3 Forestry Policy

Under colonial administration, forested areas were the principal "unoccupied" lands to which the colonial state laid claim, formalised in the 1935 Forest Code. As with many aspects of land policy, the post-independence state continued and extended this claim in the Forest Codes of 1968 and 1986. In all these texts the Forest Domain of the state included classified forests (*forêts classées*), and "protected forests". In classified forests, such as parks and reserves under direct state management, individuals have the right to circulate, collect dead wood and medicinal plants, pasture animals, but not to cut pasture or browse, or to residence. Protected forests were all other forests not specifically registered as the property of individuals or collective entities. In practice the non-state forest domain was restricted to sacred groves and trees planted by their owner (Ribot, 1995:16-7). In protected forests people are allowed to have their houses and to cultivate, but otherwise the rules of use of wood

and pasture use are the same as for classified forests. All commercial woodcutting was controlled by the state Directorate of Water and Forests (*Direction Nationale des Eaux et Forêts* -DNEF) which was responsible for levying taxes and charges for woodcutting permits. The local agents of DNEF were also responsible for policing forest use and collecting fines for infringements such as cutting without permits and bush fires.

Ribot (1995:32) observes that the implementation of the Forest Code was influenced by the particular role of environment policy in the international and domestic political arena. For President Moussa Traoré, a policy of strict policing of tree-cutting with heavy fines for transgressors provided an opportunity to establish his government's environmentalist credentials in support of claims for financial assistance from international development funding agencies. Delegates to the National Assembly voted for the policy as a means of confirming allegiance to, and prospects of advancement in, the Party, while later maintaining credibility with the electorate by seeking redress for the sense of injustice inevitably generated by the punitive fines imposed under the policy.

The Forest Code concentrated considerable power in the hands of local officials of the DNEF, reinforced by the president's personal assessment of the environmental record of individual *cercles* which, if deemed unsatisfactory, could result in a *cercle* being designated *sous tutelle*, that is: under intensified policing by DNEF (Ribot, 1995:32). A 25 percent share of fines levied under the Forest Code was paid to the DNEF officials identifying and registering the infraction. However, despite this incentive, the official fines were so high that they could be successfully levied on groups or on individuals with valuable assets that could be confiscated (eg herders with livestock). Otherwise, officials charged individuals smaller amounts in order that the official fine not be levied. Widespread abuse perpetrated by local DNEF officials was fostered by ignorance among the population and DNEF officials of the detail of the Forest Code and its revisions. Thus, while the 1986 Code allowed cultivators to cut trees in their own fields subject only to issue of a free permit from DNEF, many DNEF officials continued to apply in cultivated areas the charges and fines applicable to forest domains (McLain, 1991; McLain and Sankaré, 1993).

The oppressive implementation of the Forest Code under the Second Republic generated deep resentment, which, during the 1991 National Conference which followed the Republic's collapse, was manifest in calls for abolition of the state forest service. These calls were resisted at national level, but enacted in instances of violent local reprisals against DNEF officials and a climate of hostility that prompted a withdrawal of DNEF from active policing of forests (Ribot, 1995:33). In 1994 a new Forest Code was elaborated within the framework of the Third Republic's decentralisation policy. Under the new Code, the state "classified forests" are to be retained under direct state management, but the "protected forests" are to be transferred to the new decentralised government authorities (CT, see section 2.3). The Code establishes a differential taxation regime for forests under CT authority, whereby the more intensively managed a forest is, the higher the proportion of revenue from woodland use retained locally. Thus, in the most closely managed category of forest, the forest management body (*structure rurale de gestion*) would retain 60 percent of charges to woodcutters, with 30 and 10 percent going to the CT

and DNEF respectively. In the least managed category of forest, charges to users would be split 50/50 between the CT and DNEF (Ribot, 1995:31).

Ribot (1995:20) argues that the new Code gives CTs important powers to protect forests in their jurisdiction, including the power to exclude commercial cutting, but that DNEF continues to have a powerful role as the authority that must approve technical aspects of CT plans for forest management (ibid:39). Further, he observes that there remains considerable ambiguity about the allocation of authority over forests between the different CT levels (*commune, cercle* and region), and about the relationship of CT authority to village (customary) authority. One model under active exploration is for CTs to subcontract local forest management to village authorities (McLain and Sankaré, 1993:5). This approach has been prompted by research on local customary forest management institutions in Mali (Dennison and Thompson, 1992; McLain and Sankaré, 1993; Konaté and Tessougué, 1996). These studies have shown that customary regulation of access to woodland resources such as wood, fruit and browse, was widespread. These regulatory institutions operated at village or supra-village level to establish rules of access, organise policing, and punish infringements through confiscation of tools and illegally acquired forest products, fines, and ostracism.

While many of these institutions have been weakened by decades of forest regulation by DNEF, the commitment to decentralised resource management asserted by the Malian government since 1991 has encouraged a number of development agencies to seek to revive and “re-empower” them as the basis for local forest management. International NGOs working in Mopti region, notably CARE-International, SOS Sahel (GB) and the Near East Foundation have taken a lead in exploring the practicalities of achieving a legally-recognised role for customary authorities in forest management, through the negotiation of formal management contracts with DNEF, and the promotion of local fora in which different interests can negotiate about acceptable forms of renewed customary authority. The issues raised in this experience are reviewed in section 7.

2.4.4 Conclusion

This section has reviewed the evolution of policy and legislation governing natural resource use in Mali against a background of economic and political change in the colonial and post-independence period. Present tenure regimes bear the imprint of past government. In the Malian case this is manifest particularly in the continuing dichotomy between modern and customary tenure originating in French colonial administration, which has simultaneously recognised and undermined local customary authority over land and other resources. The resulting absence of a consistent framework of resource tenure has been compounded by economic changes associated with population movements and more commoditised forms of rural production.

The resulting inconsistency in the regulation of rural resource use has been linked to instances of increasing insecurity of tenure, overexploitation of resources under conditions of “open access”, and assertion of individualised control by more powerful resource users. In this context, the change in state policy since 1991 from one of punitive policing to one of decentralisation of resource management is seen as

offering a route to a more legitimate and effective regulatory framework under local control. It is as yet unclear how the decentralisation process will confront the issue of land tenure reform, but the national commitment to decentralisation has established a climate allowing the experimentation of formal arrangements for local regulation of resource use by customary authorities.

3. THE STUDY AREA

3.1 GEOGRAPHICAL LOCATION AND NATURAL RESOURCES

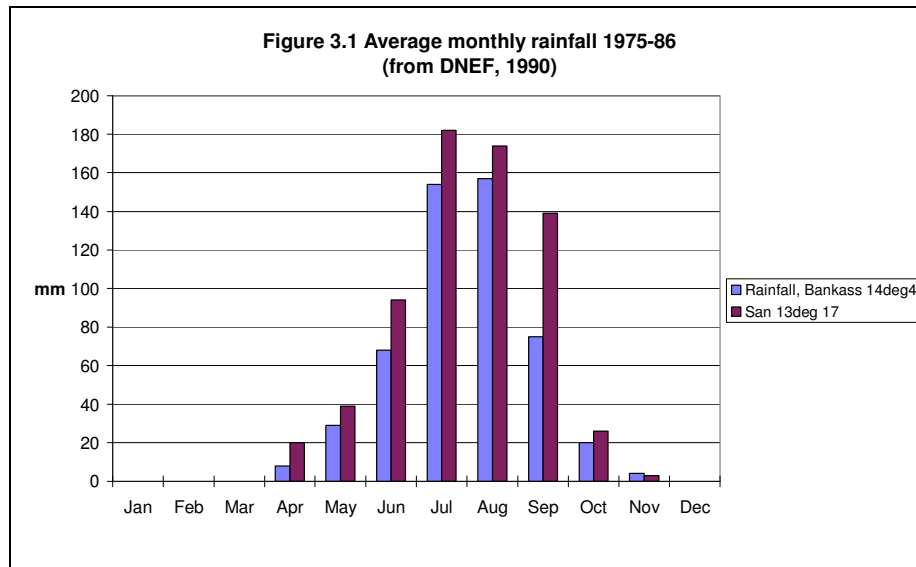
3.1.1 Introduction

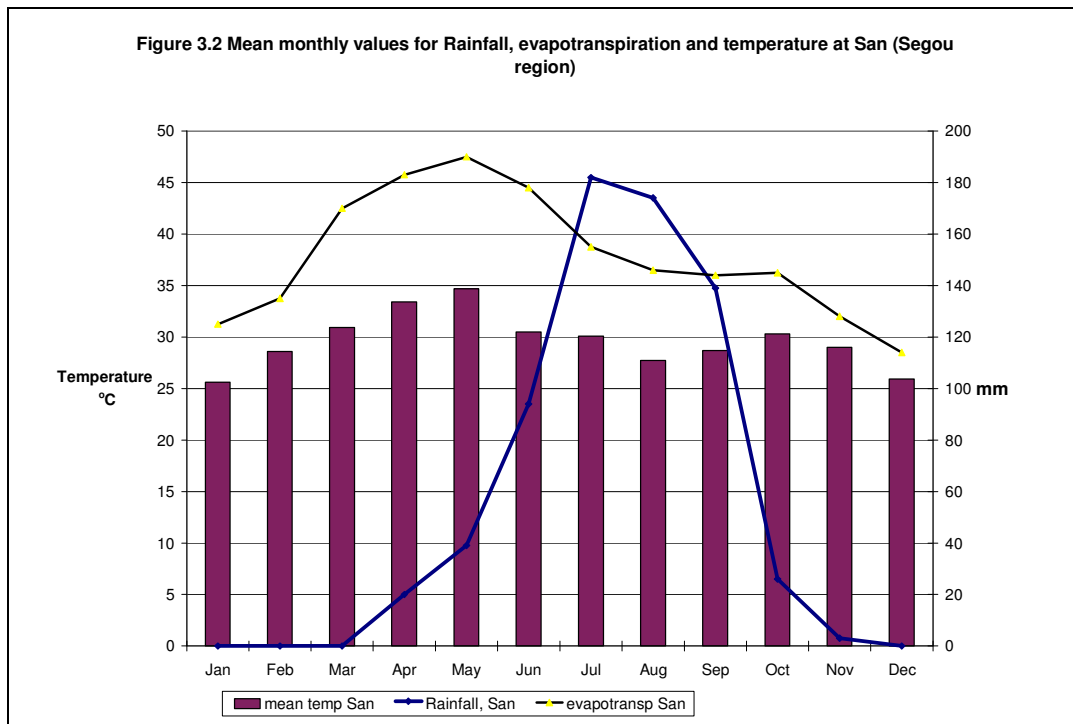
This study focusses on changing resource use in the valley of the Sourou river, in the south-east corner of the *cercle* of Bankass, in Mali's Fifth (Mopti) Region (Map 2). The Sourou flows south for approximately 60km before entering Burkina Faso where it joins the Mouhoun (previously called the Volta Noire). Administratively, the river valley in Mali lies entirely within the *arrondissement* of Baye (Map 3).

The Sourou valley lies in an area known as the "Samori" (map 3), a relatively flat low-lying area of sandy clay soils at 200-300m altitude between 13°10' and 13°40' North and 3°15' and 3°45' West, at the southern edge of a wide sandy plain, the Seno (also referred to as the Gondo in the east). The Seno and Samori are bounded by the escarpment of the Bandiagara (Dogon) plateau (400m altitude), to the north and west, and the Yatenga (Mossi) plateau in Burkina Faso, to the south-west. The Sourou valley contains a narrow alluvial plain consisting of heavy black clays on either bank of the river.

3.1.2 Climate

The climate is Soudano-Sahelian with an annual rainfall of 500 to 600mm over the period 1977-86 (de Frahan and Diarra, 1987), declining northwards. The year can be roughly divided into a rainy season from June to September and a dry season from October to May. Within the dry season a cool period, *Fonené* (November-February), precedes a hot period *Tilimiya* (March-May).





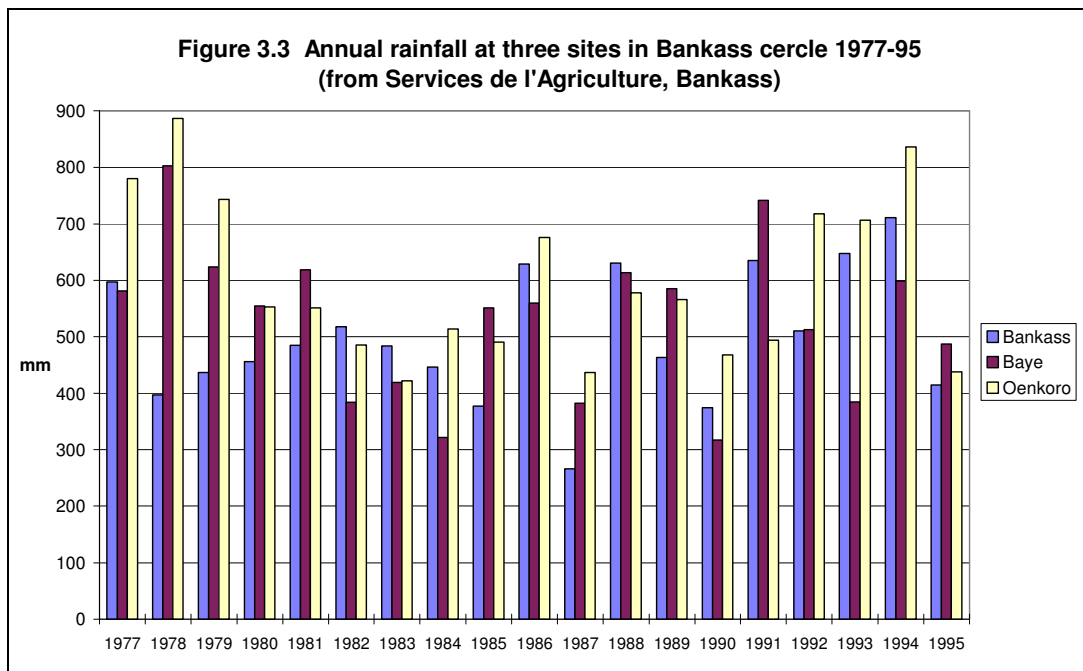
There is evidence of declining rainfall in recent decades. Veeneklaas and Stol (1989) and Gosseye et al. (1990) report a 30-year average rainfall for Bankass of 532mm, and an average for the ten years 1979-88 of 422mm. PIRL data (DNEF, 1990) also show ten-year averages for annual rainfall falling from 610mm in the 60s to 545mm in the 70s and 398mm in the 80s. According to de Frahan and Diarra (1987:11-2) rainfall data for the 1977-86 period situates the 500 mm rainfall isohyet at the latitude of Diallasagou and Baye, and the 600mm isohyet at the latitude of Ouenkoro. They note that this represents a drop of about 100mm in relation to the 1922-80 average rainfall, which situated the 600mm and 700mm isohyet at the latitude of Baye and Ouenkoro respectively. Figure 3.3 summarises annual rainfall since 1977 in Baye, Ouenkoro, and Bankass.

3.1.3 Soils and Vegetation

Three main agroecological zones can be identified in the immediate study area: the Bandiagara plateau, the Seno, and the Samori.

The **plateau** is dominated by broken, rocky terrain, with occasional areas of soil in depressions and faults. In the rainy season there is a little grass cover (*Loudetia togoensis*, *Andropogon* spp, *Eragrostis tremula*) and sparse shrubs of *Combretum glutinosum*, *C. micranthum*, *Boscia* spp, and *Guiera senegalensis*. Although cultivation has been estimated to account for less than ten percent of this zone (PIRT, 1983), the historical conditions of settlement of the plateau by the Dogon people during the 18th and 19th century (see below) have given rise to a particularly intensive form of fruit and vegetable farming, often involving irrigation, in isolated valleys within the plateau (Gallais, 1975; Critchley, 1990).

The **Seno** plain is derived from old and worn down sand dunes. A sandy surface soil overlies subsoil with a higher clay content, which results in temporary flooding in some areas during the rainy season. The area has been extensively cultivated since the turn of the century. In the 1970s, estimates of cultivation intensity suggested 31-60 percent, falling to 11-30 percent further from the plateau (PIRT, 1983). More recent data (DNEF, 1990) suggest that in arrondissements that fall completely within the Seno plain (eg Bankass, and Diarrassagou), land under cultivation and short fallow amounts to 82 and 69 percent of the total land area respectively (table 3.1). As a result of this intensive agricultural land use, the wooded savanna dominated by *Combretum* spp and *Pterocarpus lucens* has been largely replaced by fields cultivated principally for millet, *wanzou* (*Voandzea subterranea*, "bambara groundnut"), *niebe* (*Vigna unguiculata*), and groundnut. The cultivated area supports a dispersed tree cover constituted by Boabab (*Adansonia digitata*), *Acacia albida*, tamarind (*Tamarindus indica*), *Nere* (*Parkia biglobosa*) and, in the more southern parts, the Shea nut (*Vitellaria paradoxa*). Less frequent large trees of the following species are also found in crop fields: *Ficus platiphylla*, *Kaya senegalensis*, *Pterocarpus erinaceus*, *Lannea microcarpa* (DNEF, 1990).



The boundary between the Seno and the **Samori** is marked by transition to soils with a higher clay content. The natural vegetation for the zone is savanna woodland - the "Forest of Samori" - (Konate & Tessougue, 1996) with patches of gallery forest dominated by *Anogeissus leocarpus*, *Mitragyna inermis*, *Pterocarpus santalinoides* dominant on the well drained black clay soils of the alluvial plain and *Acacia seyal*, *Pterocarpus lucens*, *Anogeissus leocarpus*, *Combretum micranthum*, *Dalbergia melanoxyton*, *Ziziphus mauritiaca* dominant on the more sandy clay soils. Close to the river, there are also areas of poorly drained soils with little woody vegetation dominated by *Vitiveria* spp and *Panicum* spp. There was until recently very little cultivation in the Samori. This has been attributed to obstacles to settlement (see 2.2.1 below). However, it may have been due in part to plans to designate 72000 ha of this area a classified forest (*Foret Classé*), which have existed since 1948 (Konaté, pers

comm), and has had an influence on “technical” classifications of land use capability. For example, in maps of agricultural land use (PIRL, 1990) the area is not classified among those with potential for agriculture, and there is no mapping unit for cultivated land for the clay soils of the Samori. Consequently, cultivated areas in the *arrondissements* of Baye and Ouenkoro, with 80 and 50 percent respectively of their area in the Samori, are allocated to mapping units of the Seno. This classification appears informed more by an intention to exclude agriculture from the planned *Forêt Classé* than by ecological characteristics of the Samori.

Table 3.1 Classification of vegetation cover in the *cercle* of Bankass (from DNEF, 1990)

<i>Arrondissement</i>	Distribution of <i>arrondissement</i> land area between agroecological zones (%)						
	Land area (1000ha)	Plateau		Seno		Samori	
		cultivated	n/cultivated	cultivated	n/cultivated	woodland	floodplain
Bankass	28.6	0	0	82	15	0	0
Kani-Bonzon	59.7	1.7	15	60	22	0	0
Segué	138.0	2.7	74	14	7.1	0	0
Diallasagou	106.3	0	0	69	24	6.7	0
Sokoura	82.7	0	21	23	23	30	0
Oenkoro	84.6	0	0	14	31	50	2.7
Baye	161.4	0	0	9.3	4.4	75	4.3

Table 3.1 summarises the occurrence of the three agroecological zones in the seven *arrondissements* of Bankass *cercle*. It should be noted that estimates of the land area covered by these administrative units vary considerably. For example, estimates of area made in 1986 by the Ministère de l’Administration Territoriale et du Développement à la base (quoted by de Frahan and Diarra, 1987) are over 40 percent higher than those used in table 3.1, which were produced by the PIRL (DNEF, 1990) study from analysis of SPOT satellite images.

3.1.4 Hydrology

The Sourou river is the largest surface water resource in Bankass *cercle*. Outside the valley, apart from villages which are close to seasonal streams flowing off the Bandiagara escarpement, the population of the *cercle* is dependent on infrequent small lakes (*marés*) which occur in the Seno, or groundwater. Groundwater depth has been estimated at between 35 and 85m in the Seno, and 35-65m in the Samori (PIRT, 1983). Establishing a reliable well is therefore a considerable investment, and, under customary tenure, permission to dig a well is a key element in the authorisation and validation of new settlements.

Upstream of Baye, the head of the Sourou valley is constituted by three tributaries: the *Yawa*, flowing from the south-east, the *Wasso* from the north-east, and the *Wonvosso*, from the north. Downstream of Baye the principal tributaries joining the Sourou are the *Yirèkèrè*, from the west just north of Songore, the *Bouba* from the east at Guinigan, and the *Kossin*, which forms the frontier with Burkina Faso, from the west. Between Goéré and Oula the Sourou floodplain is relatively narrow, but becomes more extensive in the region of Souhé, and to the south, in Burkina Faso

There are no streamflow data for the Sourou in Mali, but, according to local tradition, the Sourou was historically subject to a cycle whereby seven wetter years, in which the river flowed throughout the dry season were followed by seven dry years, in which the flow stopped before the end of the dry season.

The water level of the Sourou river rose significantly in 1989 with the construction of a new dam at Lery, in Burkina Faso. The new dam (there had been a smaller dam on the Sourou previously) is located downstream of where the Sourou joins the Mouhoun, previously the Volta Noire. This has been achieved through the construction of a canal to divert the Mouhoun northwards to join the Sourou upstream of the dam site (Map 5). A dyke has been constructed across the old course of the Mouhoun, which now serves as a spillway for the reservoir created by the dam.. The dam, constructed with funding from the European Union, was intended to enable the irrigation of 30 000 ha of gravity-fed and pumped irrigation for market gardening, rice, and cotton production in the floodplain of the Sourou and its seasonal tributary, the Débé, in the area south of Di in Burkina Faso.

The Lery dam has effectively diverted water from the Mouhoun up into Mali, where the Sourou valley forms the northern extremity of the reservoir. As a consequence the Sourou in Mali has changed from a seasonal river to a perennial watercourse with an annual flood. The flood level of the Sourou is principally determined by rainfall and thus is subject to the considerable year-to year variations in annual rainfall. Unfortunately no data are available on the fluctuations of the water level. In general, the water starts to rise from July, reaches its highest level in September at the end of the rains, and starts to decrease from the end of October, reaching its lowest levels again in March (Gana, 1995).

A total of 3000ha, 10 percent of that planned, is currently under irrigation from a reservoir created by the Lery dam. Irrigation development is the responsibility of the parastatal *Autorité pour la Mise en valeur de la Vallée du Sourou* (AMVS), which allocates irrigated land to farmers cooperatives. These vary in size. In the area of Niassan, for example, three cooperatives manage, respectively, 50ha (Coopérative Agricole Pilote de Niassan), 140haha (Coopérative Agro-pastorale de Sorakadi) and 500ha (Coopérative Agricole de Débé). In addition to irrigation, managers of the dam are obliged to provide a minimum dry season flow for downstream hydroelectric power generation and irrigation in Burkina Faso and Ghana.

The impact of the Lery dam on the Sourou valley in Mali appears not to have been foreseen by the dam's designers and no irrigation was planned in Mali. An important question is whether the present water levels of the Sourou in Mali are likely to be maintained in the future. There are two reasons to suppose that they will. Firstly, the water in the valley is supplied by rainfall not only in the Sourou catchment, but also that in the much wetter Mouhoun catchment to the south. This should make levels of water in the Sourou less variable than the rainfall in its catchment in Mali. Secondly, the irrigated areas which the dam was designed to serve are upstream of the dam. Therefore, while water levels might drop if the Lery dam were required to release more water for downstream use during the dry season, this would be constrained by the need to maintain water levels to avoid increases in irrigation pumping costs. It is nonetheless the case that any reduction in water levels behind the dam would be felt

most acutely at the upper end of the Sourou valley, in the area of Baye, Songoré, and Goéré.

3.2 HUMAN SETTLEMENT

3.2.1 History

The current population of Bankass is Dogon on the Bandiagara plateau, predominantly Dogon with a Peulh (Fulani) minority in the Seno plain. In the Samori an indigenous “Dafing” and Peulh population is being augmented by a growing number of Dogon immigrants. This distribution reflects historical processes of depopulation and repopulation over the past three hundred years.

According to oral history, the area has been populated for 800 years, being originally settled by cultivators migrating from the west (Mande) and the south (Mossi). In the Samori settlement was organised under three historical entities: Ouladougou, Diendougou, and Tiendougou, based on the villages of Oula, Dien, and Tionou, respectively (see Map 4). The Sourou provided a natural boundary between the largely Marka and Bobo population of Tiendougou on the west bank of the Sourou and the largely Samogo population of Diendougou and Ouladougou on the east bank (with the exception of Songore which was largely Samogo and situated on the west bank). Together, Diendougou and Ouladougou were called Panadougou, the population often referred to as Pana.

During the 17th and 18th century the Seno and Samori underwent a period of extensive depopulation. This appears to have been due to a number of factors which contributed to prolonged insecurity in the area. The area lay at the periphery of the Islamic Peulh empire of Macina - and became the scene of conflicts between the forces of the empire and groups resisting conversion to Islam, such as the renegade Peulh clan Bodinkobé who settled at Libé. At the same time the area was subject to raiding by Mossi from the south seeking captives for the coastal slave trade. During this period the ancient villages of the Samori survived as enclaves in the relatively inaccessible wooded areas close to the Sourou. The agricultural population of the Seno plain took refuge in the clifftop margins of the Bandiagara plateau where the pattern of fortified walled villages, strong clan identity, and intensive agriculture that characterised the Dogon developed (Gallais, 1975).

In the second half of the 19th century the expansion of the Toucouleur kingdom, under El Hadj Omar Tall and his successor, Tidiani, brought the Panadougou, the Tiendougou, and the Dogon of the Bandiagara plateau under a single authority based at Louta, near Tougan (Burkina Faso). Toucouleur administration of the Seno and Samori was later transferred to Bandiagara. The resulting stability was associated with the start of a recolonisation of the Seno plain by the Dogon clans from the plateau. This accelerated under French administration which began in 1905 (1895-1904 having been a period of Toucouleur administration of a French protectorate), and 43 new villages were created on the Seno plain between 1900 and 1914. A French administrative *cercle*, centred at Bandiagara, subdivided the Seno and Samori into 19 *cantons*. The area of the Panadougou was constituted as the *canton* of Pana, with Baye as its headquarters (*chef-lieu*). However Baye was never part of the

Panadougou, having been founded by Dogon from Kani-Bonzon, to the north. The Peulh settlements at Libé and Nassari, and the Dogon village of Pissa were other non-Pana elements of the colonial *canton*. At independence, in 1960, the *cercle* of Bankass was established and the *canton* of Pana, together with a number of villages on the west bank of the Sourou (Karé, Woro, Dian, Niamia), became the *arrondissement* of Baye, still with Baye as its administrative centre, although the villages of Oula and Dien continued to command a role of cultural importance as the centres of the historical entities of the Panadougou.

The recolonisation of the lightly populated Seno plain continued throughout the colonial administration, further accelerated by periods of drought and famine, which afflicted the Dogon villages of the plateau particularly severely. Gallais (1975:106) cites colonial administration reports which indicate that in the 1913-14 "Kittangal" famine some of the plateau villages lost half of their population through death or emigration. Many did not recover their turn of the century population until the 1950s. The emigrants seeking to escape starvation by using the fruits and leaves of trees on the plains settled, established villages, and cleared land for cultivation. Gallais (1975) has described the resettlement of the Seno plain as a return of Dogon clans to their ancestral lands, particularly in the NE (Gondo) part of the Seno, where he traced clan colonisation as corridors stretching in lines perpendicular to the cliffs which form the edge of the plateau.

In the western Seno the pattern of recolonisation was more complex, as the incoming Dogon encountered existing villages established by much earlier Dogon and Mossi migrants (eg Tori, Sokoro, Pissa and Baye), and Peulh pastoralist settlements (eg Libé, Ouenkoro, and Nassari), as well as the ancient villages of the Panadougou and the Tiendougou. In different instances the immigrants settled in existing villages or established new villages, and existing villages split to form new settlements. This process of immigration to the Seno and the Samori continued throughout the half-century of French administration, with profound effects on the identity of the population. The Dogon settlements on the Seno tended to retain distinct linguistic and cultural links with their "home" villages on the plateau. Similarly the pastoralist Peulh retained a distinct language and culture. In the mid-1980s de Frahan and Diarra (1987:4) estimated the population of the Seno to be 80 percent Dogon and 15 percent Peulh. Elsewhere, however, in the villages of the southern Seno and the Samori, intermarriage between Dogon, Pana, Marka, and Mossi produced a culturally hybrid group identified as "Dafing", the name of the dialect of Bambara which has become the language of the area (Konaté and Tessougué, 1996). As a result, whereas those living in Baye, Oula, or Dien would have most likely identified themselves as "Samogo", or "Pana", during the early decades of the colonial period, only people in the villages of Diendougou continue to speak Pana. Elsewhere in the Samori on both sides of the Sourou the population have since independence referred to themselves most frequently as Dafing. The great majority of this population is Islamic but people retain certain animist beliefs concerning cultivation and land rights. There are also strong taboos against marriage between people from certain villages (eg between the villages of Baye or Para and those of Da or Tionou) and different immigrant groups (eg Dogon and Bozo).

3.2.2 Recent settlement of the Samori

Writing in 1975, Gallais described a “pioneer front” of Dogon settlement which had advanced southwards across the Seno from the plateau since the turn of the century. However, he noted that the front appeared to have stalled at the boundary between the Seno and the Samori, due to the inhospitable conditions in the latter:

"Dans le Seno meridional, il semble que le front dogon ait atteint une limite qu'il dépassera malaisément dans le cadre d'une migration spontanée. La vallée du Sourou est peu peuplée mais les conditions agrologiques sont décourageantes pour des cultivateurs de mil, sols lourds, marecages en saison des pluies. Sur le front pionnier meme, les difficultés pour obtenir de l'eau sont considérables: profondeur des puits, presence d'une couche épaisse et dure de dolomie, eau magnésienne.....désagréable et dangereuse en saison seche. De façon générale, les établissements du front pionnier sont instables, il suffit d'une année particulièrement seche pour qu'ils soient abandonnés." (Gallais, 1975:121)

The PIRT and PIRL surveys of the 1970s and 1980s respectively confirm that, as recently as 1987, the limit of extensive land clearing for cultivation coincided with the transition from sandy, easily-worked soils of the Seno to the heavier clay soils of the Samori.

In the mid-1990s, however, it is clear that obstacles to settlement and cultivation in the Samori have been overcome, and the area has received a major influx of migrants. This is evident in the much higher rates of population increase between 1987 and 1996 in the *arrondissements* whose area includes parts of the Samori, particularly those of Oenkoro and Baye (table 3.2).

Table 3.2 Population change in the *arrondissements* of Bankass cercle 1976-96

<i>arrondissements</i>	population ¹		
	1976	1987	1996
Bankass	20969	21519	21165
Kani-Bonzon	14765	17298	17443
Segué	15971	17275	18524
Diallasagou	47989	48102	48435
Sokoura	19780	22279	22945
Oenkoro	10047	11618	17945
Baye	17252	17908	21634
Total	146783	155999	168091

¹ data for 1976 and 1987 from census (DNSI, 1980, 1990)

data for 1996 from *recensement administratif* (Bankass cercle administration, 1996)

The rapid increase in population in these *arrondissements*, which were relatively sparsely populated in 1987, contrasts sharply with the slow rates of population growth during the past nine years in the *arrondissements* covering the more densely settled Seno, such as Kani-Bonzon and Diallasagou (table 3.3)

Table 3.3 Population density and change in the *arrondissements* of Bankass cercle 1987-96

Arrondissement	Cultivation ratio ¹ , Seno, 1987	Area in Samori (%) 1987	Population density (inhabitants/km ²)		Increase in population 1987-96 (%)
			1987	1996	
Kani-Bonzon	3:1	0	29	29	0.8
Segué	2:1	0	12	13	7.2
Diallasagou	3:1	7	45	46	0.7
Sokoura	1:1	30	27	28	3.0
Oenkoro	1:2	53	14	21	54.4
Baye		80	11	13	20.8

¹ ratio of area under permanent cultivation and long fallow to area uncultivated

The identity of the migrants and their relationship with the indigenous Dafing villagers of the Samori has been studied in some detail by Konaté and Tessougué (1996). They have identified the main immigrant cultivators as Dogon from villages in the Seno or the plateau. The main groups of pastoralists are Bella and *Foulankriabé*, from the Gourma, to the north, in addition to the long-established Peulh pastoralist communities in the Samori. The main immigrant fishing communities are Bozo, from the inner Delta of the Niger.

A number of reasons can be advanced to explain the rapid influx of population into the Samori since 1987. Firstly, the rise in the level of the Sourou presents new opportunities for cultivation, pastoralism, and fishing. Secondly, the areas for the planned *Forêt Classé* in the Samori were marked with posts (*bornage*) in 1989, bringing closer the prospect of their permanent exclusion from settlement or cultivation. That this was followed, in 1991, by the democratisation of the Malian state, including the relaxation of the punitive controls which the Forestry service had exercised over forested areas, may have signalled to villagers and migrants of the Samori and Seno that this was a “window of opportunity” to establish cultivation rights throughout the Samori. From this perspective, the establishment of new settlements in the forest served the interests of both migrants and local village authorities in asserting their claims against those of the state. Finally, the promotion of animal draught for ploughing in the Seno by government extension services in the 1970s meant that many cultivators in the Seno became better able to deal with the heavier tillage workload required to cultivate the clay soils of the Samori.

An important feature of this recent immigration into the Samori is that, whereas earlier migrants, such as those fleeing the famines of 1913-14 and 1927-30, were mainly absorbed into existing villages, the migrants of the past twenty years have settled in satellite settlements, or “farming hamlets” (*hameaux de culture*), within the territory and under the authority of an existing “official” village. Members of a *hameau* may be registered under their original villages or the village in whose territory the *hameau* is installed. In reality, many are not registered under either, thereby avoiding paying the compulsory head tax. According to Konaté and Tessougué (1996), *hameaux* have often been installed in the “grey” area at the boundary between lands of two villages, where they serve to reassert “ownership” of land where there are no clearly defined boundaries. Konaté and Tessougué report that, of 86 *hameaux* they identified in the Samori, 73 percent had been established since 1970, and 49 percent had been established since 1985. One consequence is that different settlements have different claims over resources. In the Sourou valley,

villages that have customary authority over part of the floodplain are: Songoré, Para, Woro, Karé, Kawéré, and Souhé. Villages that have customary authority over part of the floodplain *and* over the resources (eg fishing) of a stretch of the river are: Baye, Goéré, and Oula. One village, Sogué, has customary authority over a stretch of the river, but weaker (ie contested) authority over floodplain land (see section 7.1.2). In addition, a number of *hameaux de culture* have been established close to the river. These are Tiron (or Tollé) on the territory of Songoré, Yara and Boila within the territory of Baye, Djimouté and Bissan on the territory of Goéré, and Leré on the territory of Woro. In each case, the residents are able to cultivate the floodplain only through the negotiation of loans of plots from local holders of customary land rights.

3.2.3 Customary Institutions in the Samori

The land tenure laws are described in section 2.4.2. In brief, under Law No 86-91 of 1 August 1986, all land is owned by the state, although it is possible to obtain title deeds to land through the process of registering a *concession rurale*. However, the process of registering land is a long and expensive one, and in the *arrondissement* of Baye, no property has been registered. All land remains under the jurisdiction of the State, managed under customary law.

Under this customary law, all land within the territory of a village is held by the “*Massa*” or “*Massake*”, also known as “*Chef de Terre*”, or the “Master of the land”. In the Panadougou tradition the original founding lineage is represented by the “*Zora*” and retains considerable spiritual power since the original founders would have made the initial sacrifices to the land and this link with the spirits remain with the descendants to this day. However, the descendants of the original founding lineage were often superseded by force in the course of time, the new leaders taking the title of *Massa*. Traditionally the *Massa* is responsible for all natural resources (although not always water resources) found within the territory of the village, whether in use or not (i.e. including pasture and forest). Spiritual leadership remains with the *Zora*, although it appears that in reality the *Massa* often takes on this role in the eyes of the villagers, which gives him considerably more weight. “Pour les villageois le sol est une divinité dont le principal prêtre est le “Massaké”.” (SOS Sahel 1995b)”¹ Among his many roles, the *Massa* will allocate unused land to any new-comers.

In reality, land allocated to a family head by the *Massa* systematically becomes his “property” and will be inherited by his descendants, although on the death of the head of the lineage the *Massa* must still be approached by the inheritors since the land still formally pertains to the *Massa* and remains his to allocate. This land may not be sold. However, it can be allocated on a temporary basis (*pret*) to others, whether or not of the same lineage or even village, by the head of the individual lineage without necessarily consulting the *Chef de terre*. In general, therefore, lineage heads have considerable autonomy in land allocation, and most land borrowed through friendship or kin ties is done so independently of the *Massa*. For outsiders without such friendship or kinship links with existing village lineage groups, and particularly for individuals seeking land on a longer term basis, it is usual for the borrower to consult both the *Chef de Village* (see below) and the *Massa*. However, unless there is land which has never been cleared

¹ “For the villagers, the soil is a divinity and the Massake its principle priest” - authors’ translation

within the village territory (*terroir*), allocation of a plot of land by the *Massa* is subject to the consent of the lineage or household with existing access rights to that plot.

Given the antiquity of many of the villages of the Samori, lineage rights to land often date back many generations, and the *terroir* of the village is commonly divided among the lineages of a relatively small number of early settlers. Under customary law the boundaries of a lineage's ownership of land are defined by the extent of burning when the lineage founder first cleared the land. This area was usually much more extensive than that in which trees were felled and land cultivated. Thus, typically, lineages have rights to land beyond that cultivated by lineage members. Over a number of generations the number of lineage members may grow to the extent that they cultivate all the "ancestral" land claimed by the lineage. Conversely, a lineage whose local membership has been depleted by mortality or emigration may have rights over areas much larger than can be cultivated by its members.

As a lineage grows with time, the households making up the lineage, either alone or together with one or more other lineages, form a *quartier*. Members of a *quartier* live in the same area within the village, but the land farmed by members of the same *quartier* is usually scattered in blocks throughout the territory of the village as new land was cleared under pressure of a growing population. While new *quartiers* may have been established by later immigrants to the village, the *quartiers* housing the founding lineages would normally hold rights to most of the land, particularly close to the village.

The *Massa* is assisted in his duties by a group of "*conseillers*", or councillors, respected elders usually from the older lineages within the village. Each *quartier* will have a *Chef de quartier* who make up the core of the village *conseillers*. These councillors, as well as being the first line of recourse within each *quartier* in the resolution of disputes, play an important role in modifying the absolute power of the *Massa*: the role of *Massa* is not directly passed from father to son, the name being passed instead to the individual within the lineage considered by the councillors most fit for the post. When a new village is established on the extended territory of an older village, a member of the older village will be nominated to take the role of *Massa* and be responsible for the natural resources within the territory of the new village, but subordinate in perpetuity to the *Massa* of the older village.

The *Chef de Village* (CV) is an administrative post which originated as the representative of the *Massa* to the Toucouleur administrative authority. It was utilised and strengthened by the the French administration and maintained after Independence. The CV is assigned by the government, usually after nomination by the village elders. He is paid a small salary by the Government and is officially responsible for all liaison between the village and outsiders. Under colonial administration the CV was responsible for collection of taxes, land tenure issues, recruitment of *corvée* labour and for school attendance and military service. Incorporating both customary and state authority, the current role of the CV varies from village to village dependant on a number of factors, among others, the importance of the traditional powers in the choice of the CV, the social standing and descendency of the CV (e.g. members of castes or ex-slaves may have standing with the Administration on the basis of friendship or education, but may be of little standing with the villagers); and the degree to which traditional powers may have been weakened, e.g. by the introduction of Islam (Konate & Tessougue, 1996). Where customary leadership is still very strong, the CV effectively answers to both the *Massake* and his counsellors and the Administration, and plays little

part in the day to day management of the community, the maintenance of order and the resolution of conflicts. At the other extreme, the CV may have a monopoly over the management of the community, collecting taxes, enforcing political and administrative measures, resolving land conflicts and managing collective activities among others. In reality, most villages lie somewhere in the middle with a fragile equilibrium between the customary and State powers.

3.3 ECONOMIC ACTIVITY

3.3.1 Dryland Farming on the Seno plain

The development and impact of rice farming in the Sourou valley needs to be understood in the context of the millet-based dryland farming system which underlies the local economy of the Samori and the Seno plain. Dryland farming in Bankass *cercle* is dominated by the Dogon cultivation system which spread across the Seno plain this century. In common with many other Sahelian farmers, Dogon on the Seno plain combine intensively cultivated infields (*lara*), close to the village, with less intensive cultivation of more distant outfields (*baracoum*).

The *lara* are generally planted each year with the main millet crop by extended family units (*Gin down* or “*unités de production*”). All present active men of the family (brothers, sons, nephews, grandchildren) and unmarried women can be called on to assist in the cultivation and production of these family crops called *foroba*. The harvest, managed by the household head - called the *Gua-tigi*, after the three stone fire used for cooking called *Gua* - is shared among all members of the household, and feeds all members of the family unit during the farming season and on family occasions. The *foroba* millet is often intercropped with cowpea (*niébé*), and manured with household waste and manure, from livestock kept year-round in the village and also from transhumant herds which graze on village fields during the dry season and are kept close to the village at night.

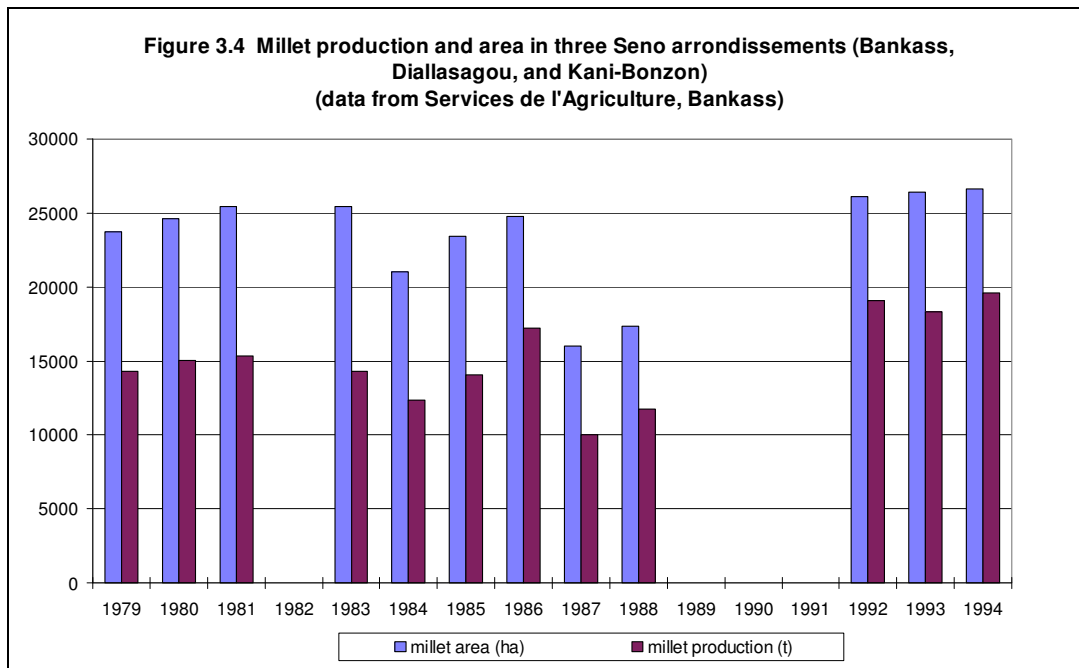
The *baracoum* fields are occupied by some *foroba* crops but also by *djonforo* crops farmed by adult men and married women for their own use, or to feed their immediate “nuclear” family during the period after the harvest and on Fridays. One day a week (generally Friday) is usually reserved for the cultivation of these individual fields. *Djonforo* crops include *fonio*, millet and cowpea, groundnuts, *wanzou*, sesame, or *dah* (*Hibiscus sabdariffa*). In the *baracoum* area crops are rotated and land is fallowed, typically three years fallow following two to four years of cultivation (Ruthven and Koné, 1995), and manured by grazing livestock. In addition to cultivated crops, fruits from trees in the *baracoum* are an important resource used by women for food and income during the rainy season.

The Seno is commonly described as “rich in cattle but poor in pasture” (de Frahan and Diarra, 1987:36), with the result that most livestock belonging to Dogon cultivators is transhumant, spending little time on the land of its owners’ villages. Herding is contracted to Peulh pastoralists, who may move the herds as far as the inner delta of the Niger during the dry season, and to the Bandiagara escarpment or the Samori during the rainy season. These herding services are paid for in the form of milk from the herd, which is processed and sold by Peulh women, or in millet: usually a portion of the herd owner’s millet crop, or an allocation of land for pastoralist families to

cultivate millet. Another form of payment reported is payment by the herd owner of the pastoralists' taxes (Konaté and Tessougué, 1995).

Livestock numbers are subject to fluctuation due to drought (fig 2.3), and the historic export markets in Cote d'Ivoire have declined in the past decade as a result of increased Ivoirian livestock production and competition from cheaper meat imports from Argentina and the European Union (de Frahan and Diarra, 1987; Maiga et al. 1995). However livestock continue to play an important role as a savings investment for the Dogon (Ruthven and Koné, 1995), and, although no figures are available, de Frahan and Diarra (1987:36) estimated that 80 percent of transhumant livestock in the Seno belong to Dogon cultivators.

The Seno is an important grain-producing region, Bankass *cercle* accounting for 20-30 percent of the millet, sorghum and fonio area of the 5th region. However, the farming system is commonly described as being in crisis as a result of "excessive" population pressure (de Frahan and Diarra, 1987: 12). Assertions of declining tree populations in cultivated areas, and increasing shortages of fuelwood (Ruthven and Koné, 1995) are taken as symptoms of resource degradation from increasing "pressure" on the land. Simple cause and effect relationships are difficult to establish however. The declining tree stands on cultivated fields appears to have been due, at least in part, to the predatory, and illegal, application of fines by the state forestry officials on farmers cutting trees or branches on their own fields (section 2.4.3), constituting a strong disincentive to the maintenance or replacement of trees on cultivated land. However, the statistical records do not provide evidence for declining land productivity in the Seno. As indicated above, (section 3.2.1), population growth rates in the Seno are estimated at less than one percent per year. Further, linear regression analysis of areas planted and yield of millet in Bankass *cercle* between 1974 and 1986 showed area planted increasing by 1136 ha (2%) per year and yield unchanged at roughly 550kg/ha (de Frahan and Diarra, 1987: 33) (a decline in yield was indicated by a similar analysis in Koro *cercle*, which covers a more northern part of the Seno). Existing statistics supplied by the *Services de l'Agriculture* in Bankass for the period 1979-94 show no trend in either area or yield of millet (fig 3.4). These observations do not endorse the reliability of the statistical record, but merely show that it does not supply evidence of decline in cereal production.



3.3.2 Migration and natural resource use in the Seno

In fact, village studies in the Seno do indicate changing farming practices, but these are intimately linked to evolving labour markets and their impact on patterns of migration from the Seno villages to urban areas to the south: historically Accra, currently Abidjan. Moreover, the impact of migration on agriculture and rural resource use is not straightforward. The main points emerging from the study by Ruthven and Koné (1995) are that migration has always been an important part of livelihood strategies in villages of the Seno, with some 75 percent of households counting at least one migrant among their members. Goals and outcomes of migration vary strongly however, according to age, gender, wealth, and even ancestral caste (skill or trade) of migrants. For older, married men, periodic migration may be part of a long-term strategy using well established family or client contacts in urban centres. For male youths migration has strong social motives, constituting a rite of passage: an acquisition of experience of urban culture and economy, as well as an opportunity to earn cash. For unmarried women, migration is seen as a way of paying for the increasing number of consumer goods they consider necessary for their *trousseaux*.

All forms of migration withdraw agricultural labour. Even seasonal migration may involve migrants staying in the village only for planting and the first weeding of millet, reducing the labour available for the harvest. Migrants who never return or who remit no income are a permanent loss to the agricultural workforce. Successful migrants may bring enough money back to compensate for their absence through hiring replacement labour or investment in labour-saving technology: draught animals, ploughs (to mechanize the critical first weeding of millet), and carts for transporting manure and the harvest. The impact of mechanization on land productivity is equivocal, however. Carts may improve rates of manure application, but mechanization of weeding, while enabling crop *production*, does not allow the *investment* in soil improvement achieved by hand weeding. This is because hand

weeding involves the incorporation of weeds into mounds (*buttes organiques*) which form the seedbed for the next year's crop, and also allows the survival of *Acacia albida* seedlings, germinating after dispersal in animal droppings, which are grubbed up by mechanised weeding (M Allen pers. com.). As a consequence, the improvement in short-run labour productivity through mechanisation, which migrants earnings may make possible, may exacerbate the longer-term challenge of maintaining land productivity under continuous cultivation in the Seno.

3.3.3 Resource use in the Samori

The cultivation system in the Samori is essentially the same as that described for the Seno, except that crops grown in the Samori vary according to soil type. Along the banks of the Sourou, the soil is principally a heavy black clay, difficult to till by hand. Prior to the rise in water level, the banks of the Sourou were principally under pasture and riverine forest with a few small fields of sorghum, maize and ground nuts. Since the rise in water level nearly all of the resulting floodplain has been cleared for "floating" rice cultivation. Plough cultivation has been critical to this change, with the ox-drawn plough taking the place of the donkey-drawn ploughs already widely used in the lighter soils of the Seno. The use of ploughs has also meant that farmers have achieved this expansion of rice cultivation while maintaining the area cultivated under other crops: maize and sorghum on the heavier fields outside the reach of the flood water, and millet, ground nuts, *wandzou*, cowpeas, sesame, and fonio grown on the clay-sand soils further from the banks of the Sourou.

Despite differences in the crops cultivated, dryland farming in the Samori is essentially the same as that described for the Seno, organised through the allocation of *foroba* and *djonforo* fields. This applies also to rice fields, although there appear to be some differences: many cases are encountered of women's fields cultivated on their behalf almost entirely by men, who would allocate a proportion of the field or the harvest to the women; also it appears more common in the ricefields to find unmarried men cultivating their own *djonforo*. For migrants to the Samori, both seasonal and permanent, all rice fields were found to be cultivated in the name of the household (*foroba*).

The general agricultural calendar for the Samori is shown for men and women in Figure 3.5. The introduction of rice cultivation has extended the agricultural year by 3-4 months from October/November with the main harvesting of millet and sorghum to January/February with the rice harvest, time previously spent in constructing and repairing housing or in migration to towns to find work. It is interesting that both men and women consider the rice harvest to be the most intensive work load. The work load during the wet season has undoubtedly increased, but this has in many cases been offset by the increased availability of ploughs and draught animals bought with the income from the sale of rice.

Rice cultivation in the Samori

Following the rise in the level of the river, rice cultivation is thought to have been started by a group of young migrants from the *cercle* of Koro, based at Kande on the east bank of the Sourou in 1989. Since then the area cleared for rice cultivation has been increasing annually as more people start cultivating the crop and increased levels of equipment allow greater areas to be managed. The rice now grown in the Sourou valley is "floating", or "swamp" rice, which grows rapidly as the water level rises and

matures as the water levels fall again. Prior to 1989, upland (ie non-flooded) rice (*riz pluvial*), known locally as *sanjimalo* or *malowoulema*, had been planted in the wetter patches of the Sourou valley. Although grown in small quantities, it was an early-maturing crop and therefore valued as a source of grain in September, when stocks were low in advance of the main millet harvest. People in the villages near the river recall how in the first season they bought seed for floating rice at Di (Burkina Faso) and tried to sow it in the same way as the upland rice with which they were familiar - a few seeds in a hole made with the hoe. The crop failed due to weeds, and realising that they had to control the weeds some tried cultivating the soil with the hoe before broadcasting the seed. Early success with this approach was swiftly followed by substitution of the hoe by the plough.

Three varieties of rice are planted in the Sourou Valley: Mali Sawn (3 - 71 - 20) called "*Malo ba*", KHAO - GAEW (92 - 5 - 23) called "*Malo mensin*", and "RM40", a rapid maturing variety developed at Mopti (Gana, 1995). *Malo ba* is a slower maturing variety and therefore preferred for fields closest to the river where water levels are high. *Malo mensin* and RM40 are faster maturing varieties and are therefore preferred where water levels are lower and retreat sooner. The water level is completely uncontrolled making production highly vulnerable to annual fluctuations in rainfall levels.

The rice production process starts with the clearing of land. Once a field is cleared it is cultivated continually. The only cases of rice fields left uncultivated found in this study were due to lack of labour (often the individual had been ill) and, in one case, weeds. In the 1994/5 season, water levels rose to unprecedented levels. Many fields were subsequently cleared for the 1995/6 season, but water levels failed to reach the same heights as the previous year and many fields failed. In Oula, a number of farmers would sow both rice and sorghum in fields further from the river where they were unsure of the likelihood of the field flooding.

Clearing new fields on the river banks is highly labour intensive: all woody vegetation must be cut at ground level. Larger trees are often cut at around 1m above the ground or burnt, leaving the trunk and roots in place. The cleared material is then burnt, but the field is often not cultivated for the first year, waiting instead for the first flood to clear the debris before planting the next season. Demand for rice fields have resulted in large areas being completely cleared of all woody vegetation. The consequences of this for soil erosion on the banks of the river have yet to become evident.

At the start of the season, during April and May, the field is cleared of the last years residues by burning. The rice seed is then sown broadcast before the ground is ploughed, thereby covering the seed. The precise timing of ploughing and sowing is highly dependent on the rains, but generally takes place from the start of July to the end of August. The density of seed sown is estimated at 100-150kg per hectare (Gana, 1995). The majority of seed is originally bought from fellow villagers or is saved from the previous season's harvest.

Ploughing is done mainly by hand using a simple hoe or with a plough drawn by oxen or donkeys. In some places it is possible to hire the use of a tractor, but at 17,500FCFA (approximately \$35.00) it is only a minority who can afford it. The heavy nature of the soil prevents people from preparing the soil before the first rains, creating a very high demand for labour at the start of the rains when all the fields need to be ploughed and sown in time to capitalise on the first rains. Ploughing earlier can

rapidly wear out the locally made equipment and often results in large clumps of soil which cover the seed and can prevent or delay germination. Hired labour is also scarce at this time, since all are involved in preparing their own fields for rainfed crops.

Figure 3.5. Work calendar for men and women at Songoré (Konaté and Tessougué, 1996)

		Tilimiya (dry season)											
		Samiya (winter)					Nene		Futuni				
I n t e n s i t y o f w o r k l o a d	MEN						Harvest, threshing, and transport of rice					M E N	
	Sowing millet and sorghum Sowing rice 1st weeding of millet & sorghum 2nd weeding millet & sorghum Weeding rice Harvest of local millet and sorghum								Clearing new fields Construction and repair of houses Clearing old fields Commerce and artisan				
	WOMEN						Harvest of beans, millet Winnowing rice Daily routine					W O M E N	
	Daily routine Cultivate bambara nuts, ground nuts, Oseille								Daily routine Collecting wood				
		June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
		Month											

If the crop is planted late, losses due to competition from weeds can be high. However, if the rice is planted in good time and the rains are not late, the rising water levels effectively kill most weeds. This is not true for wild rice (*Oryza longistaminata*), which is often quoted as an important problem limiting rice

production. Other limiting factors quoted include losses due to fish and birds (both major problems) and hippos. Chemical pesticides and fertilizers are not used.

The rice harvest starts in late December/January when the water levels have dropped. Where water levels remain high, harvesting can be done from *pirogues* (the local form of canoe). The rice is cut by sickle and threshed using sticks. Up to this point, the work is generally carried out by men. Women are responsible for winnowing and the rice paddy is then transported to the village in sacks using donkey carts. Much of the rice produced is sold, either at markets or to *commercants* who come to the village. A common reason stated for why people did not consume much of the rice produced within the home was the cost of ingredients necessary to make a sauce (the usual diet being millet or sorghum eaten with a sauce made from the leaves of a number of indigenous trees, particularly Baobab).

Many of the issues related to the production of rice, such as the main sources of labour and the destination of the harvest were investigated in the course of this study, described in the later sections of this paper.

Livestock production in the Samori

The Samori has historically been an important wet season grazing area for livestock from the Seno. In addition, Konaté and Tessougué (1995) identified three principal groups with grazing interests in the Samori.

Dafing cultivators, now joined by large numbers of Dogon immigrants, are believed to own more livestock than do the pastoralists. As in the Seno, a certain number of animals - most importantly draught animals and some sheep and goats - are kept on village lands (the barakoum fallows, and crop stubble after harvest) throughout the year, while transhumant grazing for larger herds is contracted out to Peulh pastoralists.

Long-established clan-based Peulh pastoralist centres on the fringes of the Samori, at Oenkoro, Nassari and Libé have historic rights to grazing in the SW, SE and N of the Samori, respectively. These rights were negotiated with the village authorities who have customary rights over land in the Samori, but are increasingly restricted by the expansion of cultivation (see section 7.1.2)

Migrant goatherds from the *Gourma* (Doentza), to the NE of the Seno feature strongly in current discussion of the Samori. Characterised as *Bellah* (a slave caste of the Touareg), *Foulankriabé*, or even Dogon from Doentza, this group is often accused of damaging the Samori through the practice of lopping trees (particularly *Acacia seyal*) to provide browse for their large herds of goats. The main culprits are referred to as *bagnarou*: young unmarried men whose mobility, and lack of concern with authorisation from villages across whose territory they move their herds, has earned them a reputation for delinquency among the sedentarised population of the Samori (Konaté and Tessougué, 1995).

With so many different interests in play, patterns of resource use for livestock in the Samori are inevitably complex, but also undergoing change. Historically, much of the *Foret de Samori* was a wet season grazing area for animals that would graze on village croplands after harvest - what Konaté and Tessougué (1995) refer to as the “*petite transhumance*”. Encroachment of the forest by cultivation, and the greater availability of water during the dry season, coupled with the additional forage provided by rice straw in the Sourou valley, are making the Samori more important as

a dry season resource for livestock and an attractive alternative for herds that might historically have undertaken the “*grande transhumance*” to pass the dry season in the inner delta of the Niger. This, coupled with increased numbers of animals purchased with the proceeds of the additional agricultural output from the Samori, implies a greater number of livestock using the Samori in coming years.

Fishing

Prior to the rise in water levels, fishing was carried out communally in the Sourou and its tributaries as the water retreated using rudimentary equipment such as harpoons and simple fishing traps under direction of the Massa, who had customary control and responsibility over water resources. Since the increase in water level, a series of 15 fishing settlements have been established on the banks of the Sourou, mainly by Bozo coming from the Inner Delta. These communities use canoes, sophisticated traps, and fine-mesh nets to catch fish all year round and, in addition to selling fresh fish to local Dafing villagers, the women prepare dried or smoked fish that is sold to traders from Burkina Faso or Mopti. Although these fishing activities require authorisation from customary village authorities, fishing requires a government permit issued by the Services des Eaux et Forêts. Konaté and Tessougué (1995) record allegations that the state authorities do little to monitor or prevent the use of illegal fishing equipment, and that as consequence there are concerns that fish stocks are being overexploited.

Exploitation of Wood Resources

The *Forêt de Samori* is one of the most important wood reserves in Mopti region (Konaté and Tessougué, 1995). Settlement and clearance in the wooded area was inhibited by the proposals originating in 1948 to establish a state forest reserve (*forêt classée*). However, despite notices marking the proposed boundaries of the reserve, the process was incomplete in 1991, when reform of the *Services des Eaux et Forêts* was instigated following the *coup d'Etat*. An immediate consequence of this reform process was the cessation of policing and application of fines for illegal woodcutting by agents of the SEF - which was deeply unpopular and widely seen to be corrupt and predatory (de Frahan and Diarra, 1987). While full reform of the SEF awaited revision of the forestry *code* Konaté and Tessougué (1995) report that state regulation of woodcutting in the Samori has become restricted to the issuing of licences with little monitoring of compliance with the limits on the volume of wood specified in the licences. As a consequence, in addition to clearance for new agricultural settlements (*hameaux de culture*), and tree lopping for browse by migrant goatherds, they document the development of a lucrative trade in wood cut in the Samori for sale in the villages in the Seno (cf Ruthven and Koné, 1995).

Commerce and economic development

According to Meyer et al. (1993:17), the Seno and Samori form part of the poorest zone in Mali, where 90 percent of the population are classified as “poor” (annual expenditure less than FCFA 100 000) and 60 percent are classified as “very poor” (annual expenditure less than FCFA 50 000). Even by the low standards of rural Mali, health and education provision are poor. A school headmaster in Bankass draws a comparison between the 18 schools to service the 150 000 population of Bankass cercle and the 60 schools to serve the 200 000 thousand population of Dioula cercle in the CMDT zone of southern Mali. In the Samori many villages have no access to schools at all. In Songoré, for example, at the time of our fieldwork village elders depended on visitors to the village to read their letters for them and write their replies.

Infrastructure in the Samori is poor with no permanent roads, many areas becoming completely isolated during the rainy season. The most important markets tend to be those on the edge of the Samori, either towards Bankass on the boundary between the Seno Plain and the Samori, or to the south and east over the frontier in Burkina Faso, at Di. As with villages in the Seno, seasonal migration to larger towns has historically formed an important part of livelihood strategies in the Samori. Commercial activity is generally limited to sale of rice. Prior to the production of floating rice, many women sold secondary crops such as ground nuts and some millet to provide them with supplementary income for themselves and their children. There is evidence that the development of rice production has had a major impact on the sale of grain, and the importance of rice production as a source of income was investigated in the course of the field study described below.

4. METHODOLOGY

4.1 AERIAL PHOTOGRAPH INTERPRETATION

In December 1992 and January 1996 the Projêt de Gestion des Ressources Naturelles (PGRN-GERENAT) took a series of aerial photographs of the Sourou Valley. In 1992 the photographs covered only a small area of the valley around the village of Baye (which was to become a focus village for the project) and south as far as Goéré (Map 3 and 5). In 1996, the survey covered most of the country and all of the Sourou Valley was photographed.

This study used these photographs to provide:

1. a measure of change in vegetation along the banks of the Sourou in the last three years for the area included in the 1992 survey from Baye to Goere (Map 5); and
2. an estimate of the area cleared for rice cultivation along the entire length of the Sourou to the border with Burkina Faso in January 1996 (Map 3 and 5).

Both sets of aerial photographs are essentially of the same scale: those taken in 1992 are 1:50,000; those from 1996 are 1:51151.

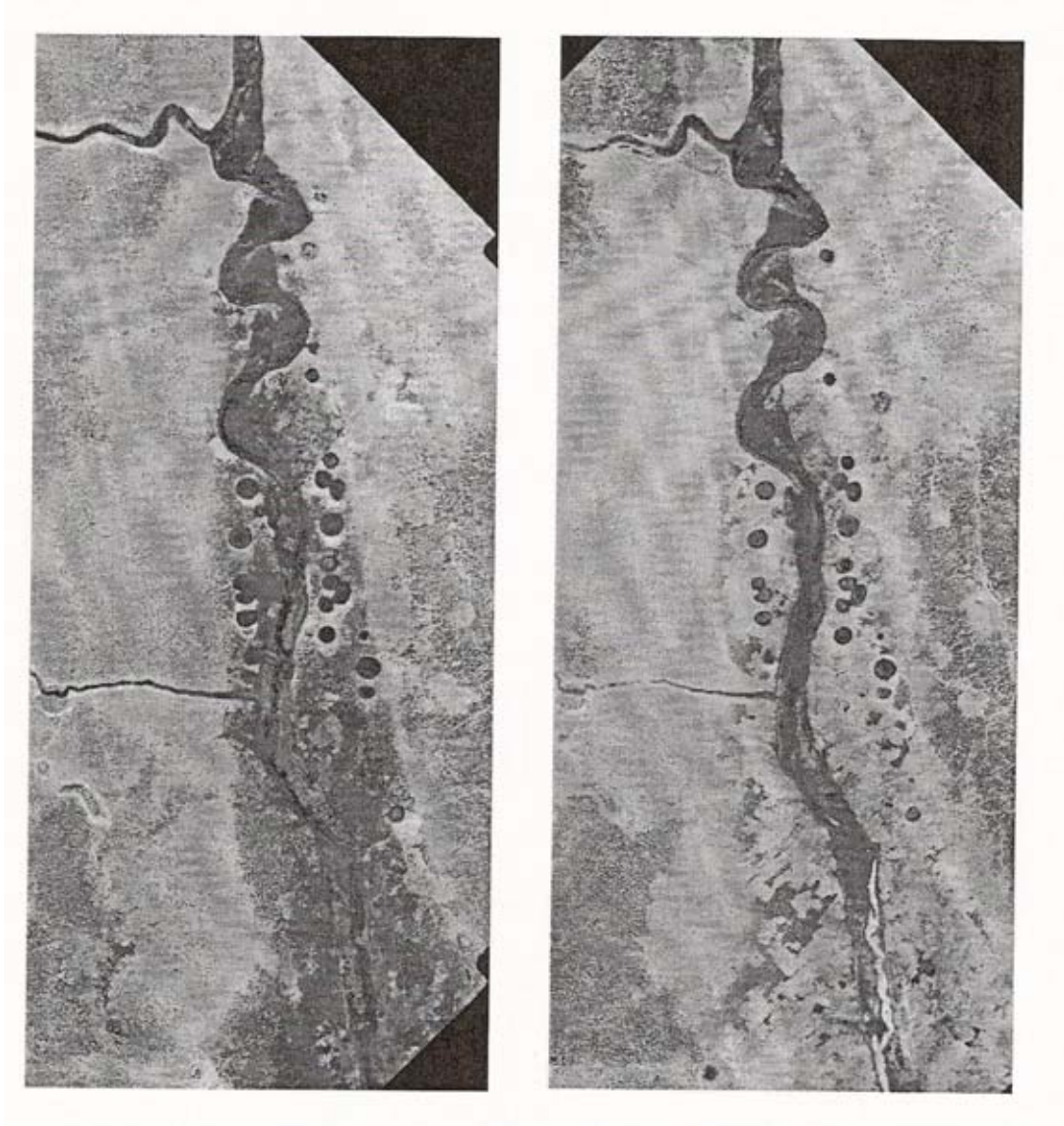
A simple line intercept method was used to estimate change in vegetation cover in both sets of photographs (Maling 1989). Lines were drawn onto the 1992 photographs at 1cm intervals (500m on the ground) on an east west axis, i.e. approximately perpendicular to the flow of the river. The position of each line was located and corresponding lines were drawn on the 1996 photographs using landmarks.

The vegetation along each line was examined under x8 magnification using a stereoscope and the boundaries between 6 categories of ground cover was defined and marked. Cover types were defined as: bush (more than 80% woody vegetation cover); grassland/bush (approximately 20% - 80% woody vegetation cover); grassland (less than 20% woody vegetation cover); cleared land (land cleared for cultivation distinguished from grassland by striations (evidence of ploughing) or a distinctive patchwork type pattern of oblongs); marsh (dry (seasonal) pool); and water (river). The total length of each line was determined by the limits of the floodplain which were clearly visible on the photographs (figure 4.1). Once again, careful comparison of the two sets of photographs ensured the same length was compared. The length (in m) of each cover type along the line was easily calculated using the scale for each year and the results from each year were compared using the Mann-Whitney U Test.

The photo-interpretation was completed for the whole length of the Sourou covered by the 1996 photographs to give a baseline figure for the total area cleared for cultivation in 1996. In this case an estimate of area (in ha) was calculated by multiplying the length of line (in mm) by 51 to convert to m on the ground, multiplying this by 500 (the distance on the ground between each line) and dividing by 10,000. It was not always easy to identify the edge of the floodplain on the later photographs. Without ground truthing it was necessary to guess the limit of the flood plain using the shade of grey as an indicator. Even were it possible to ground truth, the variability in water levels form year to year would make it impossible to identify

an absolute limit. The estimate of area is therefore, necessarily subjective. A map has been prepared from the aerial photographs (Map 5) showing the limits of the area interpreted for future comparison.

Figure 4.1: Aerial photographs of the Sourou valley taken in 1992 (left) and 1996 in the vicinity of Baye, showing reduction in tree cover (dark tones) as a result of clearing for rice cultivation.



4.2 FIELD STUDY SITES

The selection of sites for detailed field study drew heavily on earlier research undertaken by the environmental protection project (*Projet Protection de l'Environnement Bankass - PPEB*) run by SOS Sahel (GB) in Bankass, notably that by Konaté and Tessougué (1995). On the basis of this earlier work, study sites were selected to exemplify conditions contrasting:

- upstream and downstream locations in the Sourou valley
- different levels of village tenure rights over land and water
- different levels of immigration
- *dafing* and immigrant communities
- different degrees of contention over resource access.

Using these criteria, the following villages were selected (Map 3):

Songoré: an upstream *dafing* village with customary rights over land on the left (west) bank, but not the Sourou water, and with a large number (11) of *hameaux de culture* established by Dogon immigrants on its territory. Songoré authorities are in dispute with those of the neighbouring village of Baye over land claimed by the latter but previously cultivated by farmers from Songoré.

Oula: a downstream *dafing* village with customary rights over both the land on the right (east) bank and the water of its stretch of the Sourou river. There are relatively few immigrants on the territory of Oula, and the village is not directly involved in contention with neighbouring villages for land, though it has some indirect involvement as seat of the historic Ouladougou entity.

Baye: a large upstream village populated by successive waves of migrants since the early 19th century. Administrative centre for the *arrondissement*. Eight *hameaux de culture* established on the village territory. In dispute over land with the neighbouring villages of Songoré (see above) and with Yara, one of its *hameaux*.

Yara: a Dogon immigrant *hameau de culture* established in 1989 in a contested boundary area between the territories of Baye and Goéré. It has increased rapidly in size from 6 original families in 1989 to 96 families in 1996. Yara residents claim Baye landholders have unfairly and repeatedly revoked access they originally granted immigrants to rice land.

In each village the research team held preliminary meetings with the village authorities to explain the objectives of the study, to explain the proposed methodology and timetable, and to obtain authorisation to pursue the fieldwork within the village jurisdiction. The field study had three principal components:

- a *field census* identifying all those cultivating rice fields within the village lands;
- a *structured (questionnaire) survey* of a sample of rice cultivators drawn using the field census as a sampling frame;

- a series of *semi-structured interviews* with with members of different groups affected by, or involved with, rice cultivation.

In Songoré and Oula the preliminary meetings established a positive climate for the development of the fieldwork, doubtless reflecting a positive balance from 18 months of interventions by PPEB, with whom the study was closely associated, in terms of, for example, new wells and credit facilities. In Baye and Yara, however, it quickly became clear that tension among landholders in Baye over the status of land claims by cultivators in the *hameau* of Yara was going to block further progress. This also seemed, at least in part, to reflect the outcome of earlier contacts between PPEB and Baye, but the discussions with villagers in Baye, despite ending with a refusal to collaborate, provided important insights into perceptions of land tenure. These are presented in detail in section 7.1.1 .

After three days of discussion with various key members Baye of village, it was decided not to pursue the study further in Baye and to work instead in Goéré, 14 km to the south, which had also been subject to interventions from SOS Sahel similar to those in Songore and Oula. Despite an initial acceptance of the study team, a land holder from Baye very quickly introduced enough misgiving into the minds of key figures in Goéré for the study to be rejected in Goéré for much the same reasons as in Baye. The major cause for concern was the field census (described below) which was to form the basis of the sample for the main questionnaire survey. The community of Goere agreed in principle to answer the questionnaire survey on the local rice production system if not the census survey, however it was considered better to omit the village entirely from the formal part of the study as it would not be possible to select a sample in any way statistically comparable to the other villages, and the study team did not have confidence in the viability of the answers given. All semi-structured work was, however, completed successfully at Goere.

The research team's activities and questions undoubtedly promoted considerable discussion amongst all the villages in which we worked, particularly following our experiences in Baye and Goere described below, but in Songore and in Oula the consensus was to assist us in our work. In addition, four villages outside the flood plain and two *hameaux*, (one from Oula and one from Songore), all known to have households which cultivate rice fields on the Sourou flood plain in the territory of Songore or Oula were also included in the sample for both structured and semi-structured surveys. Finally, a number of interviews and questionnaire surveys were carried out with villagers and functionaries in Bankass, the administrative and economic centre of the *cercle*, who have rice fields in the Sourou Valley.

4.3 THE STRUCTURED SURVEY

4.3.1 Introduction

The structured questionnaire survey described here was carried out in conjunction with semi-structured informal discussions with a number of target groups which are described in section 4.3. The questionnaire survey was designed to compliment the information gathered from these less formal discussions, providing quantitative data relating to access to and the management of land and labour in the production of rice in a number of different groups implicated in rice production. Five groups implicated in rice cultivation were identified in the initial stages of the study:

1. Households, or "units of production", from the villages with land on the flood plain which cultivate fields "*foroba*" communally, under the direction of one household head, the production being for communal consumption;
2. Individual adult men (not always married²) from the villages with land on the flood plain, cultivating fields (*djonforo*) allocated to them by the head of the household, and managing the production independently of the main household;
3. Married women from the villages with land on the flood plain, with rice fields allocated to them by the head of the household, cultivated by them or in their own name, the harvest being entirely their own property;
4. Migrants living in "hameaux" (hamlets) installed on a semi-permanent basis within the territory of a village with land in the flood plain, often close to the flood plain itself; and finally
5. Seasonal rice cultivators from villages which do not have fields in the flood plain, who lease or borrow land under a variety of systems on a collective or individual basis from villages with land in the flood plain.

The objectives of the questionnaire survey were thus to quantify differences within and between the above groups in terms of:

1. access to land and security of tenure for rice cultivation;
2. access to and use of family and paid labour and agricultural equipment in the cultivation of rice;
3. the importance of rice in relation to other crops and/or income generating activities;
4. quality of land in terms of likelihood of flood and annual productivity; and
5. management of harvest.

² In this study, only 60% of the men cultivating a rice field independently were married.

4.3.2 The field census

Before determining the sample, to be stratified according to type of cultivator and mode of access, it was necessary to establish the sample population. The process of identifying the sample frame uncovered some interesting findings in itself, and is therefore presented in some detail here.

Given the importance of land tenure issues since the advent of floating rice cultivation (Konaté and Tessougué, 1996), it was decided to select a sample of the questionnaire based on tenure. An initial census of the number of rice fields cultivated by each group was therefore decided on to form the basis of the sample frame. A list of all the household heads was drawn up by a number of elders from each *quartier*. Each household head (88 in Songore, 102 in Oula) was asked: the number of rice fields farmed communally and whether each field was inherited or borrowed from another household; the number of men and women within the household who had individual fields and whether each field was inherited or borrowed from another household; the number of fields allocated to other members of the village; and the number of fields allocated to non-villagers "*étrangers*" (migrants) and where they came from. The results of the censuses are shown below in Tables 4.1, 4.2, 4.3 & 4.4.

The number of fields lent to other villagers ought to correlate with the number of fields borrowed. At Songore, two fields were borrowed from another village (Baye), leaving a total of 56 fields borrowed within Songore, very close to the 54 stated. At Oula, 25 fields were borrowed from another village (mainly Souhe). The total number of fields borrowed within Oula (excluding those at Souhe) was 111, whereas only 54 were counted as being lent in the field census. Either those people at Oula lending fields to others were not prepared to disclose all their fields under management by others, or else people did not want to say that the fields they were borrowing lay outside the territory of Oula. If the total number of fields lent to other villagers within Oula was 111, the average number of fields lent to households within Oula becomes 1.2, greater than the same figure for Songore and much greater also than the number lent to non-villagers. During the analysis, the number of fields said to be actually cultivated by the producers ("fields borrowed") was used rather than the number of fields lent.

Table 4.1 Average number of fields in each category per household

Village	Songore			Oula		
Total no Households (hh)	88			102		
	Total no fields (% inherited by category)	Av. no fields per hh	Sample size (% of category)	Total no fields (% inherited by category)	Av. no fields per hh	Sample size (% of category)
<i>Foroba</i> fields - inherited	146 (84%)	1.7	*	109 (57%)	1.0	
<i>Foroba</i> fields - borrowed	27	0.3	*	81	0.8	
<i>Djonforo</i> fields - inherited	57 (88%)	0.6	12 (21%)	46 (64%)	0.5	7 (15%)
<i>Djonforo</i> fields - borrowed	8	0.1	1 (13%)	26	0.3	7 (27%)
women's fields - inherited	96 (81%)	1.1	20 (21%)	26 (47%)	0.3	6 (23%)
women's fields - borrowed	23	0.3	4 (17%)	29	0.2	4 (16%)
fields lent to local villagers	54	0.6		54	0.5	
fields lent to permanent migrants (<i>hameaux</i>)	55	0.6	10 (18%)	10	0.1	3 (30%)
fields lent to seasonal migrants	71	0.8	17 (24%)	45	0.4	8 (18%)

* see table 4.2

Table 4.2 Mode of access to household fields (*foroba*) showing size of sample for questionnaire survey

Village		Songore	Oula	Overall
Mode of access				
Inherited only	No of households	66	52	118
	% of total hh	75%	51%	62%
	No in sample (% of category)	15 (23%)	9 (27%)	24 (20%)
Inherited and borrowed	No of households	13	19	32
	% of total hh	15%	19%	17%
	No in sample (% of category)	3 (23%)	6 (32%)	9 (28%)
Borrowed only	No of households	9	31	40
	% of total hh	10%	30%	21%
	No in sample (% of category)	1 (11%)	6 (19%)	7 (18%)
Total	No	88	102	190
	% of total hh	100%	100%	100%
	No in sample (% of category)	19 (22%)	21 (21%)	40 (21%)

4.3.3 The survey sample

The results of the field census were used as the basis for the sample for the main formal questionnaire survey. A sample of twenty percent was taken as adequate for representativeness and feasibility given the time available. The sample was stratified by category (household, individual man, individual woman, permanent migrant, seasonal migrant) and by access to land (inherited or borrowed) according to the data from the field census (Tables 4.1 & 4.2).

From the informal discussions it was known that cases of individuals or non-villagers cultivating more than one field was almost unheard of. By contrast, households often had more than one communal field or *foroba*. Thus, the sample drew 20% of the number of households for the household category and 20% of the total number of fields for the individual and migrant categories.

Of the 20 household heads interviewed in Songore there were four cases of discrepancies between the data from the questionnaire and those from the field census (2 households had one more (inherited) field than censused, one had one fewer (borrowed) field than censused and in one case the field was said to be inherited in the questionnaire where it had been censused as borrowed). In Oula, in only two cases of the 20 household heads interviewed were there discrepancies between the data from the questionnaire and from the field census (in one case the field was said to be inherited in the questionnaire where it had been censused as borrowed; in the second case the

household had one fewer (inherited) field than censused). With no clear pattern to these discrepancies, it is assumed that there is no directional bias in the results.

Table 4.3 Origins of migrants

Type of migrant	Village / hameau of origin	Songore	Oula
Permanent	Ganakanda	4	0
	Leri	10	0
	Tiron	20	0
	Wera	12	0
	Guiningan	0	10
	Other	6	0
Seasonal	Diallaye	12	0
	Ganida	19	0
	Hamdallaye	11	0
	Minima	8	0
	Sinsogou	4	0
	Saalo	0	10
	Sogue	0	20
	Yira	0	6
	Burkina Faso	0	6
	Other	20	3

For the seasonal and permanent migrants, given the limited time and resources, two villages and 1 hamlet were selected for both Songore and Oula for further investigation and where possible the total number interviewed made up approximately 20 % of the overall number of migrants. The villages and hamlets chosen were: Ganida, Diallaye and Tiron in the case of Songore; and Saalo, Sogue and Guiningan in the case of Oula. Given the sensitivity of the question of access to land in the Sourou Valley it was important to establish the reliability of the census data with respect to land lent to migrants, both seasonal and permanent. In the course of introducing the study and informal discussions in the six “migrant” villages and hameaux, the number of rice cultivators overall and specifically those with fields in one of the study villages were censused independently. There were a number of discrepancies between the two sets of results, the most extensive being, in the case of Songore, the number of fields lent to the people of Ganida and Tiron and, in the case of Oula, the number of fields lent to people of Saalo. These differences are shown in Table 4.5 below.

In the case of Tiron, the discrepancy is easily explained: the rice fields were lent by one family to the head of the Hameau to be allocated among the members of the hameau. Originally the area was cultivated by only a few families, but in the last two seasons, all members of the hameau showed an interest and the area was re-divided by the leaders of

the hameau among all the families according to family size. This was clearly done without the knowledge of the lender (see section 7.1.1). If the same scenario is true of any other hamlets, then the number of fields cultivated by permanent migrants is likely to be higher than suggested here.

In the case of Ganida, it is possible the number given by the villagers was lower due to misapprehension in which case the number of fields lent to seasonal migrants is also likely to be an underestimate. The close correspondence of the figures from Diallaye, however, suggests that this discrepancy might not be that large.

Table 4.4 Discrepancies between the results of the various field census data

Study Village	Village/hamlet	Number of cultivators from field census	Number of cultivators from second census
Songore	Ganida (V)	19	26
	Diallaye (V)	12	11
	Tiron (H)	20	50
Oula	Saalo (V)	10	4
	Sogue (V)	20	22
	Guiningan (H)	10	10

In the case of Oula and Saalo, the number of people from Saalo cultivating rice in Oula was apparently less than was initially quoted by the people of Oula (4 as opposed to 10) . In this case the land had been lent in a block to a small development NGO in the area and was not all being cultivated, i.e. a similar scenario to Tiron where all land management, including distribution was in the hands of the borrowers.

Finally, a small sample of farmers (4) and functionaries (3) from Bankass were also interviewed. Unfortunately, the size of the population of Bankass (approx. 5,000) made it impossible to census the total number of people engaged in rice cultivation and take a systematic sample.

The details of the number sampled for each category are summarised in Table 4.5 below.

Table 4.5 Total sampled for the questionnaire survey.

Category	Songore (% of total)	Oula (% of total)	Bankass	Total
Household	19 (22%)	21 (21%)		40
Individual men	13 (20%)	14 (19%)		27
Individual women	24 (20%)	10 (18%)		34
Permanent migrant	10 (13%)	3 (33%)		13
Seasonal migrant	17 (19%)	8 (18%)	7	32
Totals	83	56	7	146

The questionnaire survey took place over one week in each village during March 1996 at the end of the rice harvest.

The results of the surveys were entered using Excel 5.0 and analysed using SPSSWIN 6.0.

4.4 THE SEMI-STRUCTURED INTERVIEWS

The purpose of the semi-structured interviews was to explore in depth the perspectives of different social groups in relation to the development of rice cultivation, its social and economic impacts, and future perspectives. Groups were selected for semi-structured interview according to type of rice cultivator (see 3.2.1) and age and sex categories. As in the case of the structured survey, rice cultivators selected for semi-structured interview were initially identified from the field census undertaken with every *chef d'unité de production* in Songoré and Oula.

Within the villages of Songoré and Oula, three main social groups were interviewed separately:

- heads of extended families (*chefs d'unités de production*), who control *foroba* cultivation. This group included most older men in the village: those who by custom take the decisions.
- younger men, who may or may not have access to *djonforo* fields. This group is responsible for undertaking most of the agricultural work.
- women, by custom excluded from inherited land, but commonly holders of their own rice plots.

The fieldwork in Songoré and Oula was undertaken during the rice harvest, and for this reason the field census and the subsequent questionnaire survey, which took the form of interviews with individual respondents, were undertaken during the day. The semi-structured interviews, usually involving groups of informants, were conducted in the evenings. Semi-structured interviews were also conducted with one or two older individuals in order to establish the history of the villages under study, since the history of the lineages of the village is closely linked to rights over land.

In addition to residents of Songoré and Oula villages and their dependent *hameaux*, the following groups were interviewed:

- transhumant pastoralists with herds grazing in the Sourou valley. Groups encountered were: Peulh from Minimakanda (Seno) and from Nassari; Bella goatherds at Lagui.
- seasonal migrant rice cultivators whose village of permanent residence is distant from the Sourou valley but within the Samori (eg at Ganida, Diallaye, Sogué, and Saalo);
- seasonal migrant rice cultivators from the Seno (eg Bankass).

All interviews with migrant rice cultivators were conducted in the village of normal residence. All interviews, structured and semi-structured, were conducted in Bambara. Semi-structured interviews were tape recorded and later transcribed.

5. CHANGES IN RESOURCE USE

5.1 CHANGES IN LAND USE AND VEGETATION COVER, 1992 - 1996

The results of the aerial photograph analysis are shown in Figure 5.1.

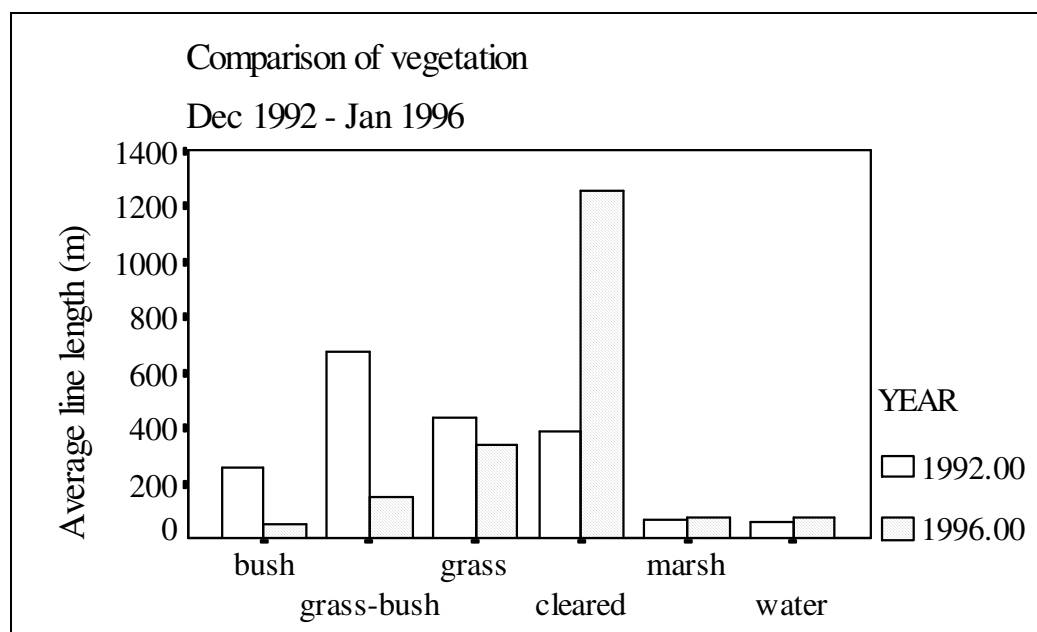


Figure 5.1

The results show that even within the last 3 years there has been a significant increase in land cleared for cultivation - mainly at the expense of bush and grass-bushland. Statistical analysis using non-parametric tests (the figures do not follow a normal distribution) support this (Table 5.1):

Table 5.1 Summary of results of Mann Whitney U test

Cover	Mean line length 1992	% total	Mean line length 1996	% total	U	Z score	2 tailed P
Cleared	387	20	1259	64	387	-5.06	.0000
Bush	258	14	52	3	548	-3.87	.0001
Grass	437	23	343	18	850	-1.31	0.189
Grass-bush	679	36	148	8	397	-5.15	0.0000
Marsh	72	4	77	4	986	-0.26	0.797
Water	59	3	75	4	918	-0.83	0.408
TOTAL	1892	100	1954	100			

The lack of change in grass land may imply that the land is already cultivated (where there was no evidence of cultivation, such as striations, the land was defined as grassland) or that the area is unsuitable for growing rice for another reason: the flood may be too high close to the river or not adequate further from the banks. The 1992 photographs were taken in December, before the start of the harvest whereas the 1996 photographs were taken at the end of January, well into the rice harvest. It is possible that cleared land was more easily identified in 1996 due to the more advanced state of

the harvest. The figures for grassland and cleared land were therefore also analysed together to ensure that the increase in cleared land could not be explained by error due to confusing grassland and cleared land in either year. Once again there was a significant increase in cleared land/grassland between 1992 and 1996. (mean of 824m in 1992 and 1603m in 1996, $Z = -4.09$, 2 tailed $P = 0.0000$).

On the basis of these figures, the area of cleared land on the banks of the Sourou have been increasing at a rate of 48% per annum over the last 3 years. The total area that can be cleared is obviously finite. The results suggest that almost all land suitable for growing rice in the Baye - Songore/Goere area has now been cleared. This is born out by evidence from interviews with local people:

"Ma maman vient de Baye. Au début de la riziculture il y a de cela environ 5 ans, ils m'ont informé que le riz réussissait chez eux, et ils m'ont dit de venir défricher un espace. Mais je leur ai répondu que ça ne m'intéressait pas du tout. Lorsque j'ai appris que certains paysans ont fait une bonne affaire en pratiquant la riziculture, cette année (en 1995) lorsque je suis parti les voir, ils disent qu'ils n'ont plus de nouveaux champs à me donner car tout ce qu'ils avaient comme jachère est défrichée et mise en culture, néanmoins ils m'ont donné un petit champs" - rice farmer from Diallaye.

5.2 CURRENT LAND USE ALONG THE SOUROU VALLEY.

A summary of the results of the second part of the aerial photograph interpretation showing the estimated area of land under bush, grass/bush, grass, cleared land, marsh and water is shown below in Table 5.2.

Table 5.2 Estimates of areas under different types of ground cover, 1996

Land use	Area (ha)	Percent of total area
Bush	357.00	3%
Grass bush	1236.75	10%
Grass	3230.85	25%
Cleared	6088.12	47%
Marsh	844.05	6%
Water	1130.93	9%
Total	12887.70	100%

The results for 1996 from the entire area from Baye to the Burkina Faso border give a lower overall proportion of space cleared for cultivation (47%) compared to that in the Baye/Songore area (64%), although including cleared and grass land together reduces this difference with 82% cover in the Songore Baye area compared with 72% overall. This may be explained by the fact that the river flows all year round in the lower stretches so it is not possible to cultivate in the river bed itself as at Baye. It is also possible that a lower population density and lower demand for land (given the increased isolation from trading centres) may also play a role in determining the proportion of land cleared for cultivation. A linear regression analysis shows a significant decreasing trend in the proportion of land cleared as one goes downstream towards the border with Burkina Faso ($F=10.84$, $P=0.0013$, 116df), however the correlation coefficient is low, distance downstream accounting for just 7.7% of the variation in proportion of land cleared. The only other categories to show a

significant correlation with distance downstream are marsh and water ($P = 0.0065$ & 0.0000 respectively), although again their correlation coefficients are low (adjusted $r^2 = 0.054$ and 0.27 respectively)

The proportion of area covered in bush has remained almost the same at 3%, while the proportion of area under water has increased (from 4% to 9%) as has the area under marsh (from 4% to 6%).

Conclusion

The results of the aerial photograph interpretation and analysis from 1992 and 1996 clearly shows a drastic reduction in woody vegetation in the three years, with an annual rate of reduction of 48%.

Throughout the entire river valley, almost half of the area (estimated at 6088 ha) is cleared from cultivation. A further 26% has been classified as under grass land. It is impossible to tell, without ground truthing, whether this land is under grass because it is unsuitable for rice growing, because it is protected for use by pastoralists or any other reason or whether it is in fact cleared. Only 3% overall remains under bush and 10% under less dense woody vegetation.

The implications of these results, both ecologically (in terms of the stability of the river banks) and economically (in terms of availability of woody vegetation for domestic use) are not yet clear. However, the fact that inhabitants of the area are benefiting from the rice (including, for example, women who collect firewood and young men who collect timber for sale), implies that any such loss may be, at present, compensated by rice production. Occasional years in which the flood is very high, such as 1994/95, encourages people to clear land further and further from the river and many are planting both rice and sorghum in the same field to be sure of a harvest regardless of the flood level. The very fact that people are prepared to potentially waste seed is another reflection of the high value with which a rice crop is regarded (see section 6.5). However, the area of land that can be cleared is finite, depending on the area of the flood plain itself, and the results of the aerial photograph analysis suggest that most of the land with potential for growing rice has already been cleared.

6. RICE CULTIVATION IN THE SOUROU VALLEY

6.1 DETAILS OF THE VILLAGES STUDIED

This section sets out a more detailed background for the villages studied in the Sourou valley.

Songoré

Songore is situated on the west bank of the Sourou River, about 15km south west and downstream of Baye. The village lands are bounded by Baye and the Sourou to the north and east, Diallaye, Lossogue and Gouari to the north and north west, Hamdallaye to the west, Ganida to the south west, Woro to the south and Goere to the south east (map 3). The shallow slope of the floodplain on this stretch of the river spreads the flood across a large area suitable for rice cultivation, estimated to cover 15-20 percent of the territory under the jurisdiction of the village authorities of Songoré (Konaté and Tessougué, 1996). Sorghum, maize and, occasionally, cotton (a cash crop in the Sourou valley in colonial times) are grown on the non-flooded areas of clay soil, with millet, niébé, wanzou, and groundnut grown on the lighter sandy clay-sand soils.

Songoré is considered part of the historical Tiondougou entity (map 4), and despite strong links with the Pana village of Goéré, was never part of the Panadougou. Oral history gives two conflicting accounts of the founding of Songoré. Neither story can be accurately dated, however it is agreed that the village predates the Dina system which began in 1820 under Sekou Amadou. The first story, favoured by the lineage of the *Massa*, who lives in the Donkina *quartier*, (Konaté and Tessougué, 1996) states that Songore was founded by a family of Samogo originally from the village of Konga in Burkina Faso who had settled in Goéré. This family came across a mysterious spring of water during a hunting party and decided this was a good site for a new village. Since the dominant wild game in the area was “*Son*” in the local vernacular, the village was named Songore (*Son goéré*). The second version, promoted by the head of the Forokina *quartier*, claims that his ancestors, the Mossi clan Forori, came from the north, near Pissa, to found Songoré on land disputed between two existing villages. In this version, the name Songoré derives from *Son* (= to give) and *Gole*= (difficult): "difficult gift". This account holds that the later settlers from Goéré usurped the role of Massa by concealing one of their number in a hole in the ground and tricking the Forori into believing that they could hear the spirits of the earth answering the settlers from Goéré. This led the Forori to concede their rights as first settlers to control of the land. This version would explain why the spiritual leadership or *Zora* remains with an entirely different lineage to the *Massa* in a different quarter of the village, the ancestors of the *Zora* being the very first inhabitants who buried the first sacrifices to the land in a place known only to themselves.

The population of Songoré is now Dafing (see section 3.2.1), the majority being of Samogo origin (Aly Bacha Konaté 1995 unpubl res notes). Since 1976, however, Dogon farmers coming from the Seno and the Plateau areas to the north have established 11 hameaux within the territory of Songore, five of them in the last five years. There has been little integration of these immigrants in terms of marriage with the Dafing of Songoré. Census data (table 6.1) suggests that increasing population recorded for Songoré is primarily due to this immigration.

Table 6.1 Population census in different years: Songore and Oula villages

census year	1933	1948	1976	1987	1996	present study (main village only)- 1996
Songare	708	913	1155	1301	1408	730
Oula	824	984	732	953	910	943

A census carried out for voter registration in February 1996 by the Administration put the population of Songore and neighbouring hameaux at 1408 compared to 1301 in 1986 (DNSI, 1990). In contrast, the field census in this study (also in February 1996) counted a total of 88 households within the village of Songore itself (a household defined as those eating from a communal pot and producing from a “*foroba*”). With an average household size of 8.3 (sample N=19), this gives a total village population of just 730. This suggests almost 50% of the total population are permanent migrants living in hameaux. Given the rapid recent increase in the number of *hameaux*, the 1996 census figures seem likely to be an underestimate, with many migrants continuing to be registered in their villages of origin (or not registered at all). Indeed, a recent report by SOS Sahel (Konaté and Tessougué, 1996) states that the population of just one *hameau*, Wera, is greater than that of Songore. The relatively static level of population recorded for Songoré village over the past 50 years is most readily explained by high rates of emigration, estimated at 20-25 percent among the youth of the village (cf 6.3.2).

The people of Songore have customary rights to the land within the village territory which lies entirely on the west bank of the Sourou, but not to the water itself. (Rights to the water remain with their neighbours, Baye and Goere). The village “*Massake*” or *Chef de Terre* plays an important role in resolving disputes over land within Songore, and between Songore and neighbouring villages he will act as a representative together with the administrative *Chef de Village*. The *Massake* also decides, together with the *Chef de Village*, on the installation of hamlets on the territory of Songore.

Although Songoré is to all intents and purposes an autonomous village, the historic origin of the present *Massake*’s lineage in Goéré means that the customary rights of Goéré take precedence over those of Songoré. From this perspective the territory of Goéré recognises no boundary with that of Songoré, but only with that of Diallaye, further to the west. The current Massa in Songoré has close links with Goéré, however, and there are no current land disputes between the two villages. Until 1991, Songore cultivated land on the east bank of the Sourou, but this land has now been “reclaimed” by Baye. There are continuing land disputes between Baye and Songore on the west bank (see section 7.1.2).

Oula

The village of Oula is situated to the very south of the *arrondissement* of Baye, 50 km south of Baye itself and with poor road access. The village is isolated from the rest of the *arrondissement* and most commercial ties are with markets of Burkina Faso, whose frontier marks the southern limit of Oula’s territory. Situated on the east bank of the Sourou, Oula is bordered by the village of Kande to the north west, Sogue to the north, Yora to the north east, Boro to the east, Republique de Burkina Faso to the south and Souhé on the opposite (west) bank of the Sourou river (map 3). At this point in the Sourou valley, the area inundated by the annual flood is relatively narrow on the east bank, but very extensive on the west bank. As in Songoré, rice is grown on

the seasonally flooded area, with sorghum and maize on the non-flooded area of clay soil, and millet, niébé, wanzou, and groundnut on lighter, sandier, soils.

As in Songore, it is difficult to estimate the age of Oula. Oral history accounts recalled by the present *Massa* tells of five *Massa* before the advent of the colonialists in 1883. It would therefore predate the Dina of Sékou Amadou. Two principal clans are identified in the accounts of the founding of the village: the *Zoraden*, original founders who ceded control of land and water to the conquering *Massaden*. The *Zoraden* did not relinquish their spritual role as the first to clear and cultivate land and to offer sacrifice to the spirits of land and water. This spritual role continues in the institution of the *Zora* who is the oldest of the *Zoraden*. Similarly the present *Massa*, with responsibility for allocation of rights to use both land and water, is the oldest member of the *Massaden* lineage.

The name Oula derives from the word “*Woura*” which means “to unload here”, and is said to originate from the decision of the warriors to unload their baggage and remain at Oula. Under the *Massaden* Oula was largely able to resist the attacks of invaders from east and west, and subjugated the surrounding villages, many of whose people took refuge in the relative security of Oula, establishing new *quartiers* in the village. With the defeat of the rival village of Sogué, from which Oula wrested control of certain stretches of the Sourou waters, Oula presided over a degree of peace and security in the area. It would appear that this contributed to the establishment of Oula as the centre of the Ouladougou historical entity in the Samori (section 3.2 and map 4), which also claims the villages of Niassari and Donon in Burkina Faso.

Census data (table 6.1) indicate Oula’s population has changed little in the past half century, reflecting relatively low rates so far of immigration into the southern Samori. This has been reinforced by a decision of the Oula village authorities not to install any *hameaux de culture* on the village territory. With the advent of rice cultivation, some *quartiers* of Oula have begun to reoccupy the sites of villages (eg Bigué) abandoned by their ancestors. This has been accompanied by the installation of a number of migrant families at Guiningan on a semi-permanent basis to take the place of those moving to Bigué. In Oula, Guiningan, 14 km distant, is considered a *quartier* of Oula directly managed by members of the village, as opposed to a *hameau* which would routinely have a *chef de hameau*. However, the fact that ten migrant households have been installed on a semi-permanent basis has justified defining Guiningan as a *hameau* for this study (see also section 7.1.1). Our study counted a total of 112 households in Oula and Guiningan, with an average household size of 8.42 (N=24), giving an estimate of the total population of 943. The static population in Oula indicates high rates of emigration (see section 6.2.3) but may also indicate high mortality rates resulting from the remoteness of the village and the poor level of health care available.

As with Songore, the majority of the population describe themselves as Dafing, although they are also sometimes referred to as Pana.

Due to its status as the founding village of the Ouladougou, the *Massa* of Oula traditionally holds all responsibility for natural resources within the territory of Oula and in theory all of Ouladougou, all other *Massa* in the area being subordinate to the *Massa* of Oula. The introduction of colonial administration and the post of *chef de village* considerably weakened the autonomy of the *Massa* in Oula, but the village retains a role as arbitration authority in disputes between villages of the Ouladougou. Oula has customary rights over the east bank of the Sourou and the waters of a stretch

of the Sourou. In the past it also laid claim to part of the west bank, through the establishment of a settlement at Karé. This has involved the Oula authorities in a complex and unresolved land dispute between the villages of Karé and Kawéré, discussed in more detail in section 7.1.2.

Control of a stretch of the river includes fishing rights. Contrary to the decision to discourage agricultural immigrants, fishing rights have been allowed to two families of Bozo installed in semi-permanent settlements on the banks of the river.

Baye

Baye is the Administrative centre of the Arrondissement, and base for both administrative and technical services (including the offices of the Chef d'Arrondissement, Eaux et Forêt, Elevage, Projet de Gestion des Ressources Naturelles (PGRN)). The village is situated close to the head of the Sourou on the east bank and is bordered to the north by Pissa, to the north east by Libbe, to the east by the international frontier with Burkina Faso, to the south east by Zereme, to the south by Minta and Goere and to the west by Songoré and Lossagou (map 3). The 1996 census of Baye counted a total population of 2696 (including the 8 hameaux installed on its territory), compared with 1708 in 1986. The village houses a maternity hospital, pharmacy and dispensary; a primary school; and since 1993 a water storage tank fed from a borehole by a solar powered pump, in addition to numerous bore holes situated around the village.

The Massake of Baye has traditional rights over both the land and the water of the Sourou running through their territory. He retains considerable influence within the village, including initiating rituals over land and water and resolving land disputes.

Historically the village was not associated with Panadougou, being founded by a Dogon lineage, originally from Mande, who were installed in Kani Bonzon in the Plateau region (PGRN 1993). ("*Baye*" in the Dogon vernacular means "I am satisfied"). Baye became very unpopular among the other villages of the Arrondissement during the colonial period when it was head of the Canton de Pana and as such was responsible for recruitment into the army during the two world wars and into forced labour "*corvee*" at other times to undertake heavy manual work for the French Administration. This antipathy remains to this day and discourages people from other villages using the health centre and school to the full. The village is involved in a number of land disputes with Songore.

The village territory includes an extensive area of floodplain and the village has benefited considerably from the rising water levels and the advent of rice cultivation. The principle crops grown outside the flood plain are sorghum, millet and maize, with secondary crops of "fonio", ground nuts and cotton (PGRN 1993).

6.2 ACCESS TO RICE LAND AND SECURITY OF TENURE

6.2.1 Distribution of village rice fields

As indicated in section 3.2.2, although the *Massa* has overall authority governing land use within the village jurisdiction, in practice it is the lineage heads (often synonymous with *chefs de quartier*) who control access to cultivated land while the *Massa* has direct control over land as yet unclaimed by lineages within the village - an increasingly rare

resource. This is particularly true of land susceptible to flooding and hence suitable for growing rice.

"Je cultivais du sorgho, et du maïs dans ce champ. C'est un ancien champ que j'ai hérité de mes parents. Avec la riziculture, mes frères et moi, nous nous sommes partagés toutes les jachères de mes ancêtres qui sont au bord du Sourou" - a lineage head at Oula.

" Sur la terre de mes ancêtres le chef de lignage m'a donné un champ de riz. Mais il ne reste plus de partie non cultivée en riz dans la zone inondable que nous avons héritée de nos ancêtres. Même s'il en restait ce n'est pas à moi de donner aux étrangers, mais c'est à mon oncle le petit frère de mon père de le faire" - a 30-year old head of household at Oula

Those whose lineage does not command enough land to provide such "inherited" rights to a ricefield must "borrow" from those who have land to spare - until such time as the "proprietors" have a need for it. New *quartiers* may have been established by later immigrants to the village, but the *quartiers* housing the founding lineages would normally hold right to most of the land, particularly close to the village. One might therefore expect to see inequality in access to land across *quartiers*. However, in the case of rice land, which until 10 years ago was not particularly valued for crops, this would not necessarily favour the oldest and most influential *quartiers*.

"Je suis né ici à Songoré, mais mes ancêtres sont venus s'installer ici à Songoré. Nous n'avons pas de terre, nous demandons avec les autres unités de production qui sont des autochtones de Songoré. Ils nous donnent des champs que nous pouvons exploiter continuellement, jusqu'à ce qu'ils nous disent qu'ils ont eu la possibilité d'occuper les parcelles que nous cultivons. En ce moment nous leurs cédons la parcelle après les avoir remercié, et nous partons consulter une autre bonne volonté qui peut nous attribuer un autre lopin de terre" - a 50-year old head of household at Songoré.

" J'ai demandé avec le grand-frère de ma mère c'est-à-dire mon oncle maternel, un petit champ de riz que je cultive. La récolte m'appartient. Je ne pouvais pas faire ça à côté du champ de mon père car l'espace est trop petit sur la propriété terrienne de mon père" - a youth of 20 years old.

"La parcelle que nous avons héritée a été distribuée à tous les chefs d'unité de production descendants de notre ancêtre. J'en ai tout juste eu un lopin, mais comme c'est insuffisant pour moi, j'ai été contraint de voir l'ami de mon père dans le quartier voisin qui m'a cédé un champ dans les terres inondées de sa famille qu'il gère", - a young man in Oula.

The results of the field census described in section 4 (tables 4.1 and 4.2) show that in both villages all households have at least one rice field, but not necessarily one that is inherited. Inherited land within the flood plain is more evenly distributed between households in Songoré than in Oula. Thus, of all the fields cultivated by villagers from the study village, only 57% were inherited at Oula compared to 84% in Songoré (Table 6.2). Further, table 4.2 shows that 31 percent of households in Oula were entirely dependent upon borrowing land for *foroba* crops, compared to only 9 percent in Songoré. Of the 136 fields which were borrowed at Oula, 19% (25) were in the territory of another village, Souhe. Of the 58 fields borrowed in Songoré, only 5% (2) were outside the village territory, in Baye. The much higher proportion of households in Oula without inherited rights to land within the flood plain indicates more widespread vulnerability to losing access to rice fields if proprietors³ want their fields back.

³ the word proprietor here refers to the lender: in Mali the only true "owner" of land is the State

Table 6.2 Summary of tenure status of rice plots cultivated by villagers of Songoré and Oula (excludes plots farmed by seasonal and permanent migrants)

	Songoré			Oula		
	No. of plots	% of total	% of category	No. of plots	% of total	% of category
total rice plots cultivated by village residents	357	100		317	100	
inherited plots	299	84		181	57	
cultivated as:						
household <i>foroba</i> plots	146		84	109		57
individual <i>djonforo</i> plots	57		88	46		64
women's plots	96		81	26		47
total borrowed plots	58	16		136	43	
borrowed:						
within the village	56	15		111	35	
from other villages	2	<1		25	8	

Women's access to land, whether in the flooded or dryland zone, is generally through their husband or male relatives. A woman's plots classified as "inherited" are situated on her husband's land. Even if her brother has inherited a large area from her father, a woman can only use her father's land in the form of a loan from her brother.

"Mon mari n'a pas assez de terre dans la zone inondée. C'est pour celà que je suis obligée d'aller prêter une portion de terre avec mon grand-frère dans le quartier voisin" - young wife

The results of the field census can also be used to compare access to rice fields across different quartiers (table 6.3) within each village. In both villages a Chi-squared test showed a significant difference in the number of fields borrowed or inherited across the village quartiers: in Oula, two quartiers, Sankina and Yorgokina, borrowed more fields than expected and the quartiers Kimbasso and Penke borrowed fewer ($P=0.000$, 4 df); in Songore, Zourakina quartier borrowed more than expected and Donkina borrowed less ($P=0.000$, 3 df). In Oula, Kimbasso is the quartier of the Massa, while Penke is a very small quartier in terms of population with less pressure on land. In Songore, Zourakina houses the lineage of the Chef de Village and the Zora, while Donkina is the quartier with the Massake according to the second historical profile (p 9).

Table 6.3 Distribution of all fields by Quartier

Village	Quartier	No of hh	No of fields inherited		No of fields borrowed		No of fields lent to others	
			total	per hh	total	per hh	total	per hh
Songore	Donkina	28	103	3.7	9	0.3	86	3.1
	Forokina	8	32	4	3	0.4	39	4.9
	Lolonso	26	100	3.8	18	0.7	26	1.0
	Zourakina	26	68	2.6	28	1.1	29	1.1
	Total	88	303	3.4	58	0.7	180	2.0
Oula	Kimbasso	24	43	1.8	16	0.7	6	0.3
	Kindiasso	17	37	2.2	30	1.8	76	4.4
	Penke	30	69	2.3	29	1.0	16	0.5
	Sankina	22	27	1.2	27	1.2	1	0.05
	Yorgokina	9	2	0.2	21	2.3	0	0
	Total	102	178	1.7	123	1.2	99	1.0

Finally, the field census confirms the difference between the two villages in terms of the number of migrants, and particularly permanent immigrants living in *hameaux de culture*, cultivating rice. This is a consequence of the greater availability of floodplain land in Songoré, and of the greater isolation, and lower migration pressure, in Oula. It is reflected in the distribution of loaned plots for rice farming (table 6.4). In Oula 71 percent of all loaned plots were being cultivated by households from within the village. In contrast, in Songoré two thirds of loans of rice fields were to outsiders: to Dogon immigrants living in hamlets, or to seasonal cultivators from villages in the Samori (Tionou, Diallaye, and Ganida).

Table 6.4 Allocation of loaned plots for rice cultivation

	Songoré	Oula
Total loaned rice plots	171	191
within village:		
<i>foroba</i>	16%	81%
<i>djonforo</i>	5%	26%
women's fields	13%	29%
outsiders:		
permanent migrants (hamlets)	30%	5%
seasonal cultivators (Samori)	20%	23%
seasonal cultivators (Seno)	16%	-

6.2.2 Holding size

All the data above are concerned with the *number* of fields as opposed to area. With the limited time and resources available it was not possible to measure the fields and yields. In many cases individuals were unable to give an estimate in terms of hectares and even where these estimates were provided it is difficult to be confident in the accuracy of the data. Two methods were used to overcome these problems: for each field the number of days and method used to plough the fields were recorded as well as the estimated area where known; and a small number of fields (4) were measured. It was initially hoped to measure more fields, but given the natural fears of the population that our study was interested in reallocating land, it was felt that to approach individuals and ask to measure their fields might act to destroy the trust that the villagers had in the survey team.

In the four measured fields, an average of 0.17 ha were ploughed per day (in each case using an ox drawn plough). This agrees well with Clayton (1995) who found oxen would plough on average 5 ha in 30 days, or 0.17 ha per day. Where an estimate of surface area was given in the questionnaire survey, a comparison of the number of hectares ploughed by ox drawn plough per day between the two villages showed no significant difference ($t=1.98$, $P=0.06$, 29 df, unequal variances). The data was therefore pooled and a correlation analysis (around the origin) showed a significant relationship between the number of days and the number of hectares ploughed ($F=288.74$, $P=0.0000$, $r^2=0.83$), giving a result of 0.188 ha ploughed by oxen per day. A similar analysis of data from hand tilled fields (using a hoe) showed no significant correlation, but on average 0.06ha were cultivated per day. Finally, donkey drawn ploughs cultivated on average 0.17ha per day ($r^2 = 0.38$, $F=11.03$, $P=0.004$).

Given the high correlation coefficient from the regression analysis, the figure of 0.188ha/day was used to calculate the hectareage of fields prepared by ox plough, where not estimated by the respondents in the questionnaire, from data on the number of days spent ploughing and the number of ploughs used. The low correlation coefficients and lack of clear relationship between number of days and area for fields ploughed using donkeys and hand tilled respectively prevents area estimates being made for these two groups, or for fields ploughed using more than one type of tillage. In these latter cases, only those cases where an estimate of area was provided by the respondent were included in the analysis of area and production per hectare.

Average total holding size (total area of all plots) per respondent was slightly bigger in Oula (2.09ha) than in Songore (1.69ha), but not significantly so. However, there were significant differences in holding size across the different categories, summarised for each village below in Table 6.5

In both cases household holdings were largest followed by those of permanent migrants, seasonal migrants, individual men and individual women. In Oula, the household holdings were significantly larger than both individual categories and seasonal migrant fields, but not the permanent migrants' areas ($F=12.69$, $P=0.0000$, 52df), while in Songore, the household holdings were significantly larger than all other types of field ($f=24.87$, $P=0.0000$, $df = 62$). (Cases where the area was not estimated and could not be calculated were omitted.)

Table 6.5 Size of holdings for different categories of rice cultivator

Category	Songore			Oula		
	No of cases	Mean total holding size (ha)	s.e.	No of cases	Mean total holding size (ha)	s.e.
Household	14	3.98	0.48	20	3.63	0.42
Individual men	11	0.53	0.07	13	0.76	0.13
Individual women	11	0.52	0.09	9	0.63	0.15
Permanent migrant	10	1.47	0.22	3	2.58	0.22
Seasonal migrant	17	1.44	0.22	8	1.84	0.52
Total	63	1.69	0.21	53	2.09	0.25

In table 6.6 data from the field census (table 4.1) and estimates of holding size (table 6.5) have been combined to give a summary of the distribution of rice land between the five categories of cultivator. This shows that in both villages over half the area was cultivated for household (*foroba*) crops, and a further 15 percent as crops controlled by individual men and women. seasonal migrants accounted for 15-16 of the rice area in each village, but the much larger area farmed by permanent migrants (mainly Dogon in *hameaux de culture*) in Songoré meant that, overall, outsiders cultivated 29 percent of the rice area in Songoré compared to only 19 percent in Oula.

Table 6.6 Summary of distribution of rice plots and area between different types of cultivator in Songore and Oula

	No of rice fields (%)		mean area (ha) per field		Total area of rice fields (%)	
	Songore	Oula	Songore	Oula	Songore	Oula
Total	483	372			629 ha	568 ha
cultivated by:	%	%			%	%
households	36	51	2.02	1.95	55	65
individual men	13	19	0.53	0.76	5	10
married women	25	15	0.52	0.63	10	6
immigrants (hamlets)	11	3	1.47	2.58	13	4
seasonal cultivators	15	12	1.44	1.84	16	15

Holding size and household size.

Household size was measured in terms of Adult Unit equivalents, whereby children under the age of 7 are equivalent to 0.25 adults, children between the age of 7 and 15 and adults over the age of 60 are counted as equivalent to 0.67 adults and adults from 15 years to 60 years are counted as 1 (Little 1994).

A positive linear correlation was found between total area cultivated and total adult units overall when data from the two villages were combined ($P = 0.001$, $r^2 = 0.09$). However, closer analysis of the two villages separately showed that the correlation is significant only at Oula ($P = 0.000$, $r^2 = 0.34$) and not at Songore ($P = 0.21$) due to the high degree of scatter in the data.

6.2.3 Terms of land loans

“It is better to travel to a distant field to grow a good harvest, than to a distant market to buy your food” [Dogon proverb]

Borrowed fields are part of the fabric of customary land tenure, but the terms by which these borrowed fields are initially accessed and subsequently retained by the borrower, be he/she a villager or migrant, is a sensitive issue. Between members of the same village land loans do not require a long procedure. The lineage head from whom land is being sought consults younger members of his lineage about the purpose of the loan, and its duration. Later, the head of the lineage communicates their decision to the borrower. Nobody outside the two families involved in the loan is informed of the transaction, but it becomes an open secret in the village as observant villagers notice somebody cultivating on an old fallow belonging to a lineage not their own. The sensitivity of this issue is indicated by our finding that in Oula less than half the plots borrowed were identified by the lenders. In Songoré the matter seems more open for public discussion.

In the questionnaire, people borrowing land were asked whether they “offered” anything in return for the land they borrowed and whether there was any contract established at the start. Respondents either denied giving anything or gave details discussed below. None refused outright to answer, but it is difficult to know whether any of the respondents who claimed they did not pay did so out of fear of losing their fields (based on the assumption that “paying” someone for use of a field was somehow wrong). Unfortunately, not all respondents were asked how they were related to the individual loaning them the field.

There was no evidence of contracts being agreed upon between lender and borrower at the start of the season in any of the study villages. The word “donation” is therefore used here to avoid any assumptions that might be associated with the word “payment”, all donations being expressly stated as gifts instituted by the borrower and not demanded by the lender. This is undoubtedly an oversimplification of the issue: with little or no security of tenure and increasing demands for rice growing land, borrowers will obviously want to please their lender and the size of gift would be highly likely to influence any future decision by the proprietor as to who he should lend his land to. However, this is not to say that people were answering untruthfully when they said that there was no pre-established contract. Such a “contract” may not be explicit, even between the parties concerned, if it is thought of as culturally inappropriate while to all intents and purposes it exists as a set of informal expectations.

For each village the results are summarised in Tables 6.7, 6.8, 6.9 for three groups: members of the study villages; permanent migrants; and seasonal migrants respectively. The results are summarised by field rather than by household since one household may borrow more than one field from different people and under different arrangements.

Table 6.7 Access and payment for borrowed fields - members of study village

Village	Type of access to borrowed fields	Total no of fields borrowed (% by village)	No fields where donation was given (% by group)
Songore	Relative ⁴	5 (56%)	0
	Friend	2 (22%)	1 (50%)
	Unknown	2 (22%)	0
	Songore sub-total	9 (100%)	1 (11%)
Oula	Relative	4 (17%)	1 (25%)
	Friend	4 (17%)	1 (25%)
	Griot	2 (8%)	0
	Unknown	14 (58%)	5 (36%)
	Oula Sub-total	24 (100%)	7 (29%)
Overall	Relative	9 (27%)	1 (11%)
	Friend	6 (18%)	2 (33%)
	Griot	2 (6%)	0
	Unknown	16 (44%)	5 (31%)
	Total	33 (100%)	8 (24%)

Table 6.8 Access and payment for borrowed fields - permanent migrants

Village	Access to borrowed fields	Total no of fields borrowed	No fields where donation was given (%)
Songore	Chef de hameau	15	7 (47%)
Oula	Unknown	4	1 (25%)
Overall		19	8 (42%)

⁴A relative includes affines and may be quite distant.

Donations were given in three forms: a days labour (12 cases), rice (15 cases) and in one case cash. In two cases (one a friend and one a relative), the proprietor refused to take the donation offered.

Overall, a higher proportion of permanent migrants made donations to the proprietor (42%), followed by seasonal migrants (33%) and finally villagers (24%). However, this does not take into account the significant variation between the different villages. Donations were given by more seasonal migrants and villagers and fewer permanent migrants in Oula than in Songore. This reflects, perhaps, the specific interests of villagers at Guiningan (Oula) in encouraging settlement by immigrants (see box 7.3).

Table 6.9 Access and payment for borrowed fields - seasonal migrants

Village	Access to borrowed fields	Total no fields borrowed	No fields where donation was given (%)
Songore	Relative	15 (70%)	2 (13%)
	Friend	2 (10%)	1 (50%)
	Chef de Village/ Imam	2 (10%)	0
	Unknown	2 (10%)	0
	Songore sub-total	21 (100%)	3 (14%)
Oula	Relative	3 (38%)	2 (67%)
	Unknown	5 (62%)	4 (80%)
	Oula sub-total	8 (100%)	6 (75%)
Bankass	Relative	2 (29%)	0
	Friend	4 (57%)	3 (75%)
	Unknown	1 (14%)	0
	Bankass sub-total	7 (100%)	3 (43%)
Overall	Relative	20 (56%)	4 (25%)
	Friend	6 (17%)	4 (67%)
	Chef de Village/ Imam	2 (6%)	0
	Unknown	8 (21%)	4 (50%)
	Total	36 (100%)	12 (33%)

Of those that specified their relationship with the proprietor, a far greater proportion of borrowers who were not related to the lender gave a donation (42%) compared to those borrowing through relatives (17%). The overall majority of borrowed fields are negotiated individually, that is not through the *chef de village* or *chef de terre* (*Massa*), and were found through relatives, both within the village and between villagers and seasonal migrants (29/43).

" Les gens de Souhé sont mes oncles maternels, ils ont beaucoup de surfaces inondées. Moi même j'ai eu avec eux un champ de riz pour mon unité de production, pour ma femme, et même pour une dizaine d'unité de production de Oula. Ce n'est que par les liens de parente seulement que j'ai eu tous ces champs" rice farmer in Oula.

Widespread recognition of the productivity of rice cultivation in the Sourou valley has prompted villages without direct access to the floodplain to seek to strengthen and multiply their ties with friends and family living in the villages of the valley. At Ganida, for example, rice cultivators identified a total of 65 rice plots they cultivated in the floodplain, on land belonging to the villages of Songoré (26 plots), Woro (20), Souhé (11), Goéré (4), Kawéré (3), and Karé (1). This is particularly the case for villages of the Samori, such as Ganida, Tionou, Diallaye, Minta, Sogué, Saalo, and Ira, who identify themselves as ethnically close to the riverside villages.

"Il n'y a aucune différence entre Songoré et nous. Nous sommes tous Dafing, nous sommes tous de l'entité du Tiondou. Il existe des liens de mariage entre nous. Nos relations sociales et parentales étaient bien tissées avant l'avènement de la riziculture. Et dès que la vallée du Sourou a été inondée, chacun dans le village est parti voir un parent à Songoré pour prêter un champ de riz", - *chef de village* of Ganida.

"Quand la riziculture a commencé, nos parents qui sont à Songoré, nous ont fait le message en nous invitant à venir faire des champs de riz chez eux. Mais nous avons considéré ça comme une activité non rentable si bien qu'on ne voulait pas du tout partir. Au cours de ces deux dernières années lorsqu'on est parti le voir, ils avaient déjà tout labouré et donné certaines parties aux Dogon installés dans les hameaux ou venus du Seno" head of household and rice farmer from Diallaye.

It is striking that, even for seasonal cultivators resident in the town of Bankass, the access to rice land is described in non-market terms of kinship or friendship between cultivator and proprietor. This may be due, in part, to the evolution of new forms of reciprocity generated by the growth of Bankass as an administrative and commercial centre and of the Samori as a producer of agricultural surplus. Villagers from the Samori visiting Bankass need secure lodgings, and their hosts in Bankass gladly accept in return the loan of small plots of flooded land on which to grow rice. Such arrangements are unlikely to be readily broken by either side. During our enquiries in Bankass the only cultivator we met who claimed rice land through family was Ampleman Guindo, of Taganaboie (a *quartier* of Bankass), who said he obtained his rice plot in Baye through his father, who was a hunter who spent most of his time in the Samori.

Permanent migrants settled in *hameaux* tend to be from further away, usually Dogon from the plateau or Seno, and family ties with villagers in the Samori are rare. This group appeared particularly vulnerable to having their land reclaimed by the lender (table 6.10), although many of the respondents expressed a fear of losing their fields this way and 24 percent of women in Oula had also had loaned fields withdrawn. Unfortunately, the relationship between lender and borrower was not known in these cases.

Table 6.10 Percentage of respondents who had lost fields reclaimed by proprietor

Village	Category	% respondents who had lost fields
Songore	Household	16% (3/19)
	Indiv. man	8% (1/13)
	Indiv. woman	17% (4/24)
	Permanent migrant	40% (4/10)
	Seasonal migrant	24% (4/17)
Oula	Household	0% (0/21)
	Indiv. man	7% (1/14)
	Indiv. woman	20% (2/10)
	Permanent migrant	0% (0/3)
	Seasonal migrant	0% (0/8)
Bankass	Seasonal migrant	29% (2/7)

These observations raise questions about the relative advantage of stronger family ties among the local villages in finding rice fields compared with strangers coming from further away. As pressure on land becomes more acute, payment may play a more important part in the decision of whom to lend land to in future as may the ease with which land loaned to others can be taken back. It may be easier to accept payment and to take land back from a non-relative. Tensions about this type of development appeared central to opposition to this research in the village of Baye, and is discussed further in section 7.

6.3 ACCESS TO LABOUR AND AGRICULTURAL EQUIPMENT

6.3.1 Agricultural equipment and agricultural labour

There is little doubt that the adoption of animal draught has been a key factor in the spread of rice farming in the Sourou valley. In Songoré, 64.7 percent of the village households sampled had at least one pair of oxen and a plough and 18.5 percent had two or more ox-teams and ploughs. In addition, 5.9 percent of households had donkey-drawn ploughs. In Oula, a smaller proportion of village households had ox-teams and ploughs (52.4 percent), but a larger proportion (23.8 percent) had donkey-drawn ploughs. However, a significant number of households resident in Oula (19 percent) and Songoré (29 percent) did not have their own draught animals or ploughs. One field in Oula was recorded as being ploughed by tractor. This resulted from the initiative of a young man from Oula, living in Koutiala, in the CMDT (cotton-growing) zone, from where he had driven an old tractor back to Oula for the start of the ploughing season. He charged FCFA17 500 per hectare for ploughing, which was in itself considered too expensive for most cultivators, but the service was unreliable due to his tractor's frequent breakdowns.

The equipment owned by the different categories of cultivators (table 6.11) was very unequal, particularly with respect to women. No woman owned any traction animal, plough or cart in her own right, with the result that women must either plough by

hand-held hoe, pay workers bringing their own equipment, or wait and use family labour and the equipment belonging to the household head. The women would generally be last in line to use such equipment, after all the household fields and the individual men's fields had been ploughed. Late ploughing can seriously effect the success of the harvest, placing considerable pressure on women either to plough by hand or to use hired labour.

Table 6.11 Percentage of cultivators using agricultural equipment

Village	Category	% households (hh) with agricultural equipment				
		Cart	Plough	Oxen	Donkey	Horse
Oula	Household	57%	76%	57%	67%	14%
	Indiv. man	0%	0%	14%	7%	0%
	Indiv. woman	0%	0%	0%	0%	0%
	Permanent migrant	0%	33%	33%	0%	0%
	Seasonal migrant	50%	63%	50%	75%	0%
Songore	Household	74%	74%	68%	32%	5%
	Indiv. man	15%	23%	23%	8%	0%
	Indiv. woman	0%	0%	0%	0%	0%
	Permanent migrant	80%	100%	30%	100%	0%
	Seasonal migrant	82%	100%	82%	65%	24%
Bankass		71%	71%	71%	57%	29%

Rice has undoubtedly improved the access to agricultural equipment: 40 interviewees (27%) used the revenues from the last season to buy a cart, plough or ox.

Adoption of animal draught has considerably reduced the labour required for tillage and sowing. Often the household workforce splits into two, with one group using the draught animals to plough and sow the rice fields while the others plant the dryland fields of sorghum and millet by hand. At this moment of peak labour demand young boys of seven or eight years old have been found a productive role in driving the ox teams.

If mechanisation has saved labour at the beginning of the agricultural season, it has increased the labour required at harvest. Women, in particular, who do not generally plough or weed the rice in the *foroba* fields, undertake much of the cutting, stacking, and threshing of the rice and all of the winnowing. The harvest is often undertaken under some pressure, in order to clear the fields in time to avoid damage from herds of cattle moving into the Sourou valley during the dry season

Access to agricultural equipment can be instrumental in deciding whether or not to use hired labourers, particularly at the beginning of the season when labourers coming from mainly from the Seno to the north often bring their own equipment and oxen. This is not the only factor influencing use of paid labourers, however. For example, one might expect women who have limited use of household agricultural equipment to rely heavily on paid labour. However, in Oula, 67% of women used the household

plough while the remaining 33% tilled the land entirely by hand: none employed paid labourers. In Songore, 38% of women used the household plough, 33% tilled the land by hand, and the remaining 29% of women hired labourers with ox-drawn ploughs to prepare their land. Clearly there are other factors, such as availability of family and paid labour and availability of cash which play a part.

Access to labour and the source of labour varies considerably across the different groups interviewed and during the year. It has already been mentioned that women are usually last in line to use household equipment: they are generally last to access household labour as well. Similarly, young men who are cultivating their own fields (*djonforo*) are generally only free to work on their individual fields one day a week (Friday) and occasionally evenings, or in some cases only once work on the household fields (*foroba*) is completed. The above example has already highlighted the difference in levels of use of paid labourers by women between villages. The results are therefore analysed by category and by village for main rice growing activities.

6.3.2 Availability of family labour

The principal unit of labour organisation is the extended family unit (*unité de production*). This unit has varying forms with the succession of generations:

"Mon père est décédé, je suis le plus âgé de mes frères, donc la direction de la famille m'est revenue".

"Mon père est vivant, tous mes autres frères cultivent ensemble sous sa direction, mais moi il m'a séparé de lui, donc de mes frères. Je suis moi aussi avec ma femme et mes enfants une unité de productions à part".

"Notre père est décédé il y a environ 4 ans, mes frères et moi, nous avons cultivé durant 2 saisons pluvieuses, mais il manquait un climat d'entente, si bien que chacun de nous, nous nous sommes séparés et chacun est responsable de sa famille, de ses matériels agricoles, et de ses récoltes".

The (male) head of this unit negotiates with the lineage head over the division of lineage lands between his unit and that of his brothers and other members of the lineage. Within the area under his control he also determines which areas will be cleared and planted, and which used for *foroba* and *djonforo* fields. He also determines the work to be done during ploughing, planting and harvesting of the *foroba* crops by different members of the extended family unit. In particular he directs the work of the active male workforce: those between 15 and 60 years of age, comprising 30-33 percent, on average, of the members of the household unit in Songoré and Oula. These have the main responsibility for clearing fields for rice, often involving cutting trees and shrubs and burning them in windrows, and ploughing and planting the crop. By contrast, women play a larger role in the harvest.

The availability of family labour has long been subject to high levels of outmigration, particularly among the young. The mean age of absent members of households in Songoré and Oula was 21-23 years old for men and 16-18 years old for women. The survey indicated that for girls and women between 10 and 29 years old, and men between 19 and 39 years old, the proportion absent *en exode* was 20-25 percent. In Songoré 40 percent of those absent had not returned to the village in two years or more. In Oula the equivalent figure was 38 percent.

There was no significant difference between Songore and Oula in the number of active (between the ages of 15 and 60) men or women present per production unit. Labour availability and household size was also measured in terms of adult unit equivalents and again there was no significant difference between the two villages.

However, village households, permanent migrants and seasonal migrants had a significantly greater number of active adults in their charge and therefore available to work on their fields than were available to individual men or women. This difference can be demonstrated in terms of adult equivalent units, AU, the means for households, permanent migrants and seasonal migrants being respectively 6.28 AUs, 8.51 AUs, and 8.09 AUs, against values of 3.15 AUs and 2.83 AUs for individual men or women respectively. There was little difference between the two villages, with the exception of permanent migrants where the size of household differed drastically being 10.04AUs at Songore against 3.40AUs at Oula.

These data support the claim of many of the inhabitants of the rice growing areas that households were smaller than in the past. There was no consensus in the villages as to the cause of this decrease. Some claimed it had occurred since the advent of rice and was due to people wanting more control over the income. However, many claimed that the change started before the advent of rice.

It was a common assertion that the higher labour demands since the advent of rice cultivation coupled with higher returns had reduced the number of men leaving to find work in urban areas and that a number of entire families were now returning, after having previously moved permanently to urban areas. With no baseline data, it was difficult to test this assertion quantitatively. However, a comparison of the number of young men absent from the rice growing villages (i.e. Songore and Oula) at the time of the study with the number absent from the non-rice growing villages (i.e. villages of seasonal migrants such as Ganida and Sogue) was possible and the results seemed to support the assertion: The proportion of men between the age of 15 and 60 absent for at least 3 months was 15% in Oula and 10% in Songore. In contrast, in the seasonal migrants' villages the proportions were 25% from the families with fields at Oula and 31% from the families with fields at Songore.

However, the income used from the sale of rice may also be encouraging short term urban migration. A number of individuals interviewed claimed that the sale of rice provided the income necessary to pay for transport and fund small commercial enterprises during the dry season after the rice harvest, and a number of young men left during the course of the study with the income from their rice harvests. Urban migration remained the first or second most important source of income for 27% of men with individual fields interviewed at Oula and Songore and 23% used the income from the sale of rice in 1994/95 on transport or funding small commerce. The importance of the sale of rice in relation to other income generating activities is examined in more detail in section 6.5. Another reason to doubt that rice cultivation will reverse the long-term migration to urban areas was the common assertion that young women (35 and 50 percent of those absent in Oula and Songoré, respectively) increasingly preferred to marry men who lived in town - a strong disincentive for young men to live in the countryside.

6.3.3 Land preparation

Peak demands for labour in the production of rice are during land preparation and at the harvest. Land preparation occurs at the same time for rice as for other rain fed crops, and there tends to be fewer migrant labourers available during this time. The use of paid and unpaid labour by each group for land tillage is summarised for each village in figures 6.1 and 6.2.

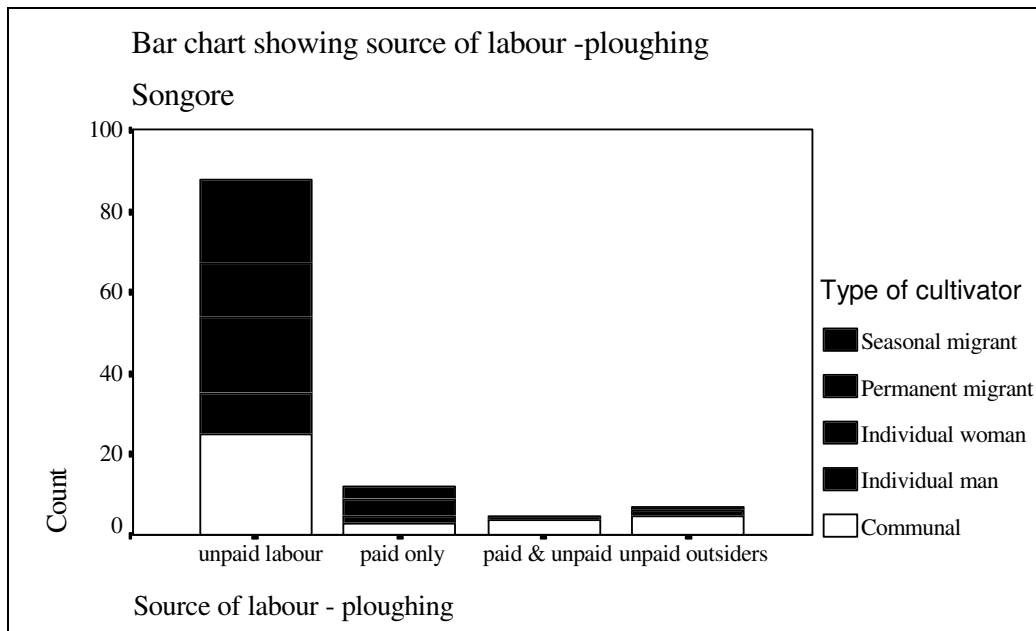


Figure 6.1

In both villages the majority of cultivators of all categories use unpaid family labour for ploughing. A Chi-squared test showed no significant difference between Songore and Oula in the proportion of fields ploughed using paid labour ($\chi^2 = 2.30$, $P=0.51$, 3 df). An average of 18.9% of all respondents at Songore and Oula used hired labour for ploughing their fields.

Payment for ploughing was mainly in cash (76%) with 10 exceptions: 5 paid for the labour in rice and 5 gave the labourer a small rice field in return for his work. Access to agricultural equipment plays an important role in determining who uses paid labourers: in general only those households without their own equipment would use hired labour.

The proportion of respondents using paid labour varied according to category across the two villages. This data is summarised in Table 6.12.

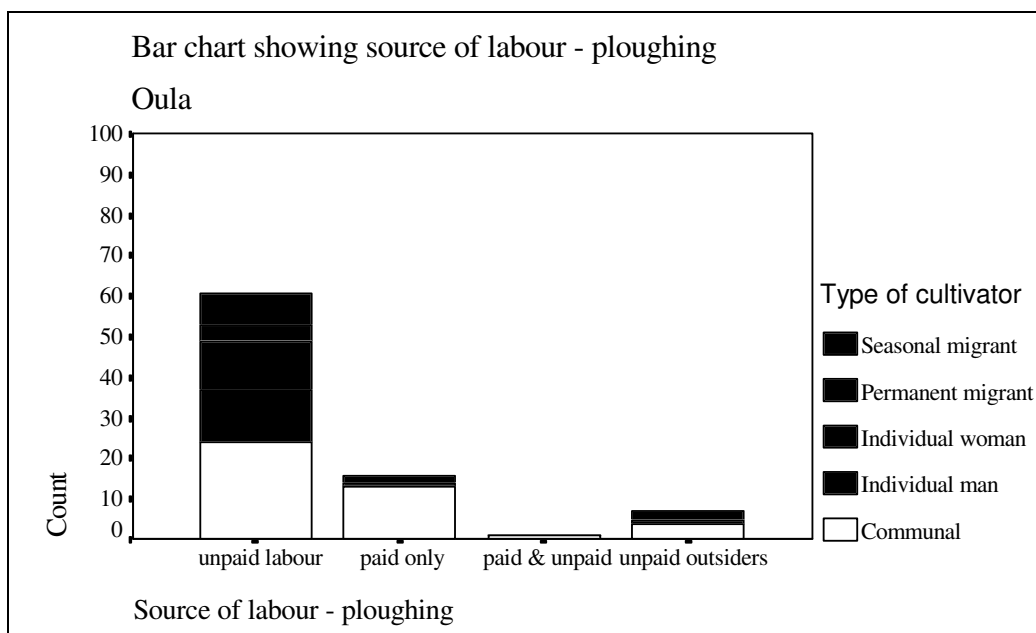


Figure 6.2

Table 6.12 Proportion of each category using paid labour to prepare land

Category	% of each category using paid labour			
	Songore	Oula	Bankass	Overall (Songore & Oula)
Household	22.5%	33.4%		28.1%
Individual men	21.4%	6.7%		13.8%
Individual women	34.5%	0%		24.4%
Permanent migrant	23.5%	0%		17.3%
Seasonal migrant	4.8%	20%	40%	9.7%
Overall	18.1%	20%	40%	18.9%

Paid labour was of greatest importance overall in household fields and women's fields. Across the two villages individual men and women and permanent migrants from Songore used more employed labour than their equivalents in Oula.

6.3.4 Rice harvest, preparation and transport.

In contrast to the ploughing season, there are few other demands on labour from January to March when the rice is harvested, threshed and winnowed. During this period, migrant workers from non-rice growing areas flock to the Sourou Valley in search of work, and paid labour is consequently more available and cheaper. Transport is generally by means of ox or donkey drawn cart and the rice is transported in sacks.

Harvest

Harvesting is highly labour intensive: the rice is cut using sickles and threshed using poles (around 2m long and 3cm in diameter). Payment for harvesting rice appeared to be uniform throughout the valley at one tenth of the total harvest: for every 10

bundles gathered, the labourer would keep one. In only 5 cases, all at Oula, were labourers paid with cash - in 4 out of the five cases the labourers were from Oula. Despite this high price, overall 56% of respondents used paid labour to harvest their rice crop in the 1995/6 season, although again this varied according to type of cultivator and across the two villages (figures 6.3 and 6.4). Unlike ploughing, which required cash, as long as there is a harvest anyone can pay.

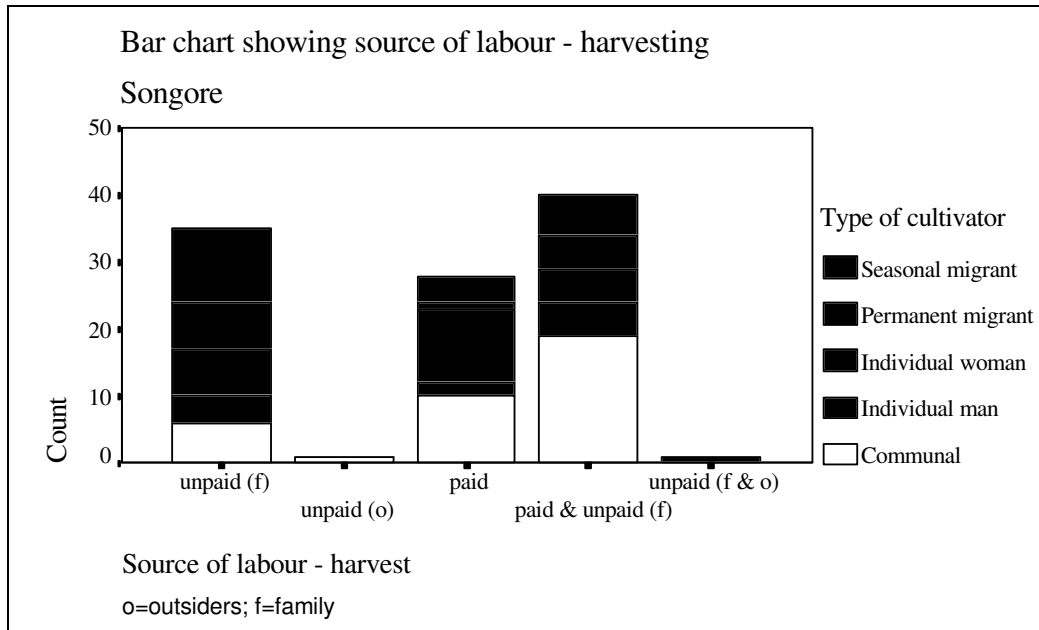


Figure 6.3

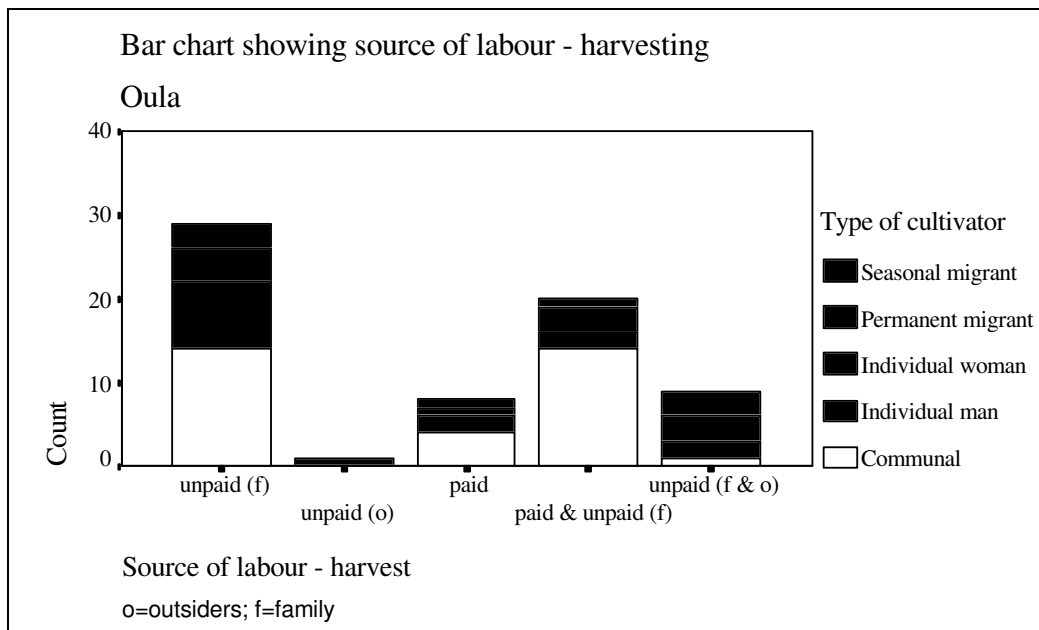


Figure 6.4

Across the two villages there was a significant difference in the proportion of respondents paying for labour ($\chi^2=17.18$, $P=0.002$, 4 df). In Songore, 65% of respondents used paid labour compared to 42 percent in Oula. There was again

considerable differences across the different categories and within each village summarised in Table 6.13 below.

Table 6.13 Proportion of each category using paid labour during harvest

Category	% of each category using paid labour		
	Songore	Oula	Overall
Household	80.6%	54.5%	68.1%
Individual men	63.7%	28.6%	44%
Individual women	69.5%	44.4%	62.5%
Permanent migrant	42.8%	0%	35.3%
Seasonal migrant	47.6%	25%	41.3%
Overall	64.8%	41.8%	55.8%

Overall, hired labour was again of greatest importance in household fields and women's fields in both villages. Also similar to ploughing, permanent migrants living in Oula did not use any paid labour, whereas in Songore 43% used paid labour.

The paid labourers for harvesting were principally Dogon although it was not always clear whether these Dogon were from the hameaux or from elsewhere. Again the source of labourers was different at Songore and at Oula, presumably due to the greater isolation of Oula: at Songoré 99% of all labourers (where cited) were Dogon, only 8% were said to be from hameaux; at Oula only 50% of all labourers were Dogon, 27% were Bella, 10% were from Oula and 10% from neighbouring villages (Yira, Saalo and Sogue).

Threshing

Threshing is also highly labour intensive, using simple sticks and tends to involve groups of young men who are paid by the day, on average 6.6 bowls (the local measure known as *bol*) of rice (approx. 2.47kg per day per person). Given the lower cost and high labour demands of threshing, the proportion of people using hired labour is likely to be highly dependant on labour availability. The proportion of each category using paid and unpaid labour in Songore and Oula is summarised in figures 6.5 and 6.6.

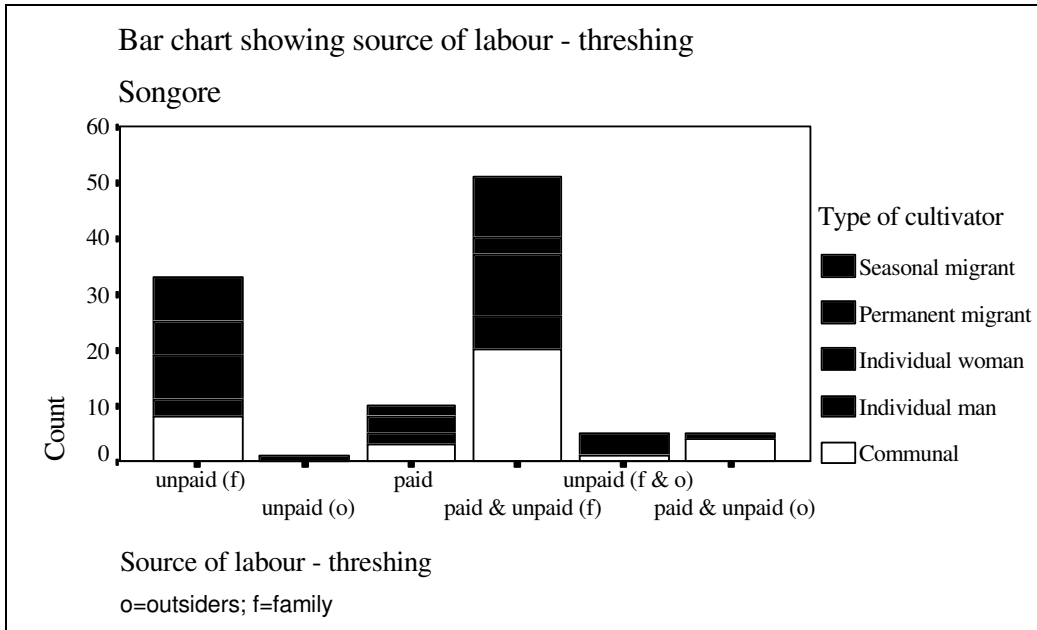


Figure 6.5

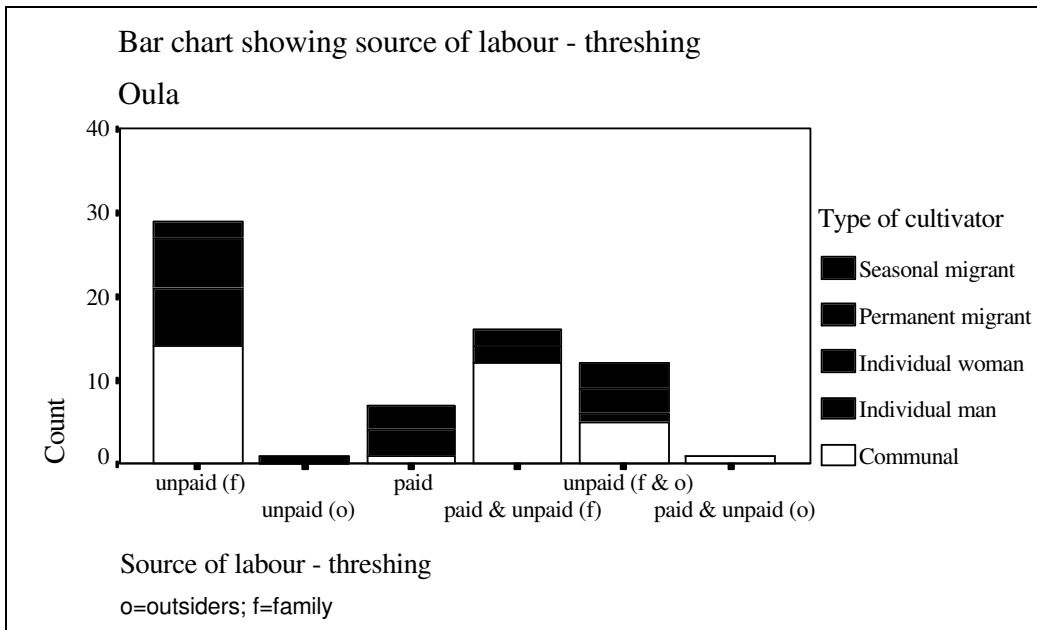


Figure 6.6

Again the proportion of respondents using paid labour is significantly higher in Songore (62.9%) than in Oula (36.3%). The difference between the two villages is probably due to the greater isolation of Oula and hence lower availability of seasonal labourers. Table 6.14 below shows that all groups, with the clear exception of permanent migrants at Oula use hired labour for threshing in both villages.

Table 6.14 Proportion of each category using paid labour for threshing

Category	% of each category using paid labour		
	Songore	Oula	Overall
Household	75%	42%	59.4%
Individual men	72.7%	38.5%	54.1%
Individual women	60.8%	33.3%	53.2%
Permanent migrant	28.5%	0%	23.5%
Seasonal migrant	61.9%	25%	51.7%
Overall	62.9%	36.3%	52.6%

Again, most paid labourers at Songore were Dogon from the north (97% in total were Dogon, 9% from hameaux). At Oula, 46% of paid labourers were Dogon, 31% were Bella, 8% were from Oula, 8% from Burkina Faso and 8% from neighbouring villages.

Winnowing

Winnowing is carried out by women, and it is difficult to quantify payment since many women are rewarded with the results of “*glannage*”: gleaning what they can in the second and even third round of winnowing. There was no significant difference between the two villages: only 17% of respondents used paid labour for winnowing (Figures 6.7 and 6.8).

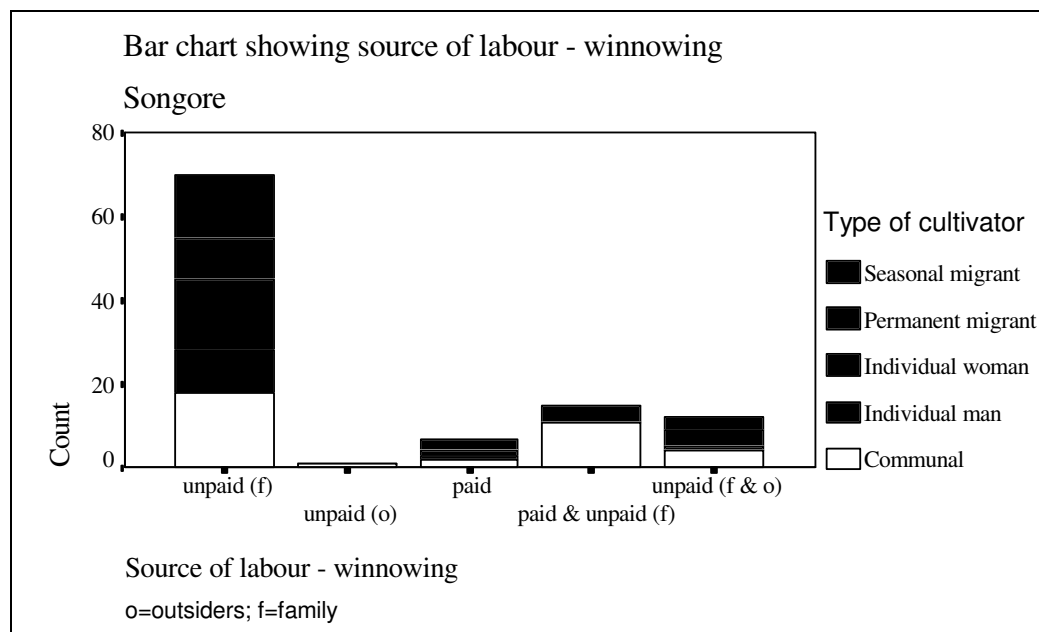


figure 6.7

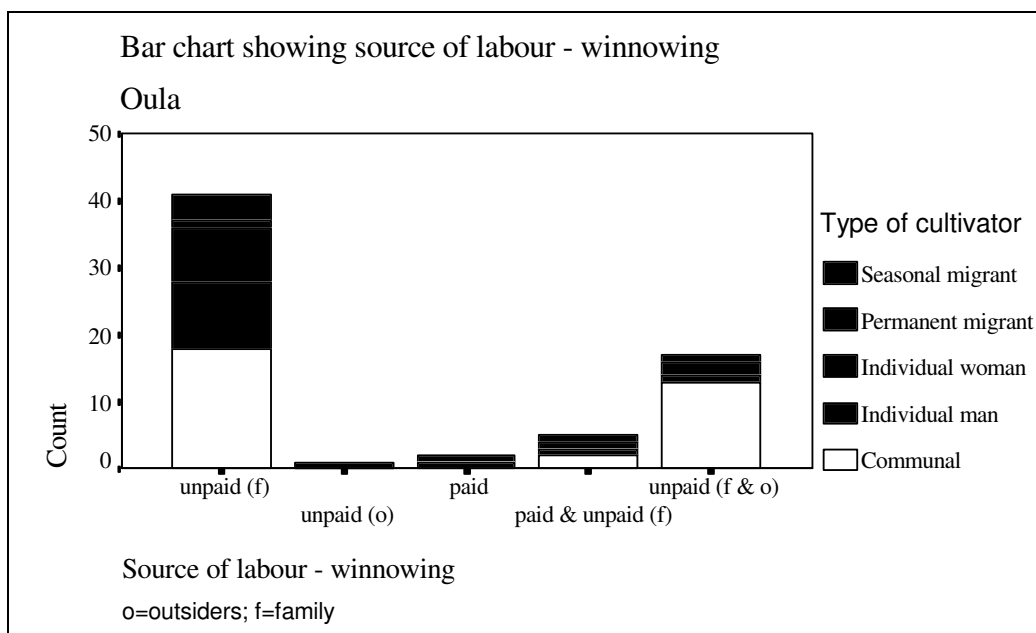


Figure 6.8

Differences in use of paid labour for winnowing across the different groups are shown in table 6.15 below. Once again, use of paid labour by permanent migrants in both villages is negligible and the use of paid labour is higher at Songore than at Oula.

Table 6.15 Proportion of each category using paid labour for winnowing

Category	% of each category using paid labour		
	Songore	Oula	Overall
Household	36.2%	6.1%	21.7%
Individual men	9.1%	15.4%	12.5%
Individual women	21.7%	11.1%	18.7%
Permanent migrant	0%	0%	0%
Seasonal migrant	14.3%	25%	17.2%
Overall	21%	10.6%	17%

All paid labourers winnowing were Dogon at Songore, while at Oula 50% were Bella, 38% were from neighbouring villages and 12% were from Burkina Faso.

The costs of labour is discussed later in the section discussing the control and management of the harvest.

Transport

The final stage in the harvest of the rice crop is transporting the rice from the field to the village. It is a measure of the greater levels of equipment that the sale of rice has engendered that only 16.5% of respondents used paid labour to transport their rice back to their fields. A further 16.2% use unpaid help from non-family, the remaining 67.3% use family carts and animals. The use of paid labour by each category is summarised below in Table 6.16.

Table 6.16 Proportion of each category using paid labour for transport

Category	% of each category using paid labour		
	Songore	Oula	Overall
Household	19.4%	6.3%	20.6%
Individual men	27.3%	0%	12.5%
Individual women	13%	11.1%	12.5%
Permanent migrant	0%	33.3%	5.9%
Seasonal migrant	10%	50%	21.4%
Overall	13.4%	12.3%	15.5%

79% of those paying for transport paid in rice paddy at a rate of 4 *bols* per sack transported, or 36kg per person paying for transport. The remaining 21% (5) were paid in cash, an average of 2,270 FCFA. Only 0.34% of the overall production costs is spent on transport.

6.4 PRODUCTIVITY OF RICE FARMING

Production was estimated from the total number of sacks harvested in the season 1995/96 (all respondents had finished harvesting by the time of the questionnaire interviews). One sack was estimated to weigh approx. 60kg rice. Where payment in rice paddy had been made to labourers in the course of the harvest, this was taken into account in the calculation of total production⁵. Two measures of production have been used: production per day and production per hectare (necessarily highly estimative). Finally overall production (kg per production unit, i.e. household, individual man etc.) for the season 1995/96 was compared across categories of users and villages.

6.4.1 Production per day

Production per day spent preparing the field is approximately the same for Oula and Songore at around 271kg/day and is significantly related to equipment used to plough the field (Figure 6.9) The yields per day for fields prepared by tractor are omitted from the figure since they were so much greater that they obscured any differences between yields from fields prepared by ox- or donkey- drawn plough and hoe).

⁵ The questionnaire asked the number of sacks harvested, the results are likely therefore to be an underestimate, since certain people, especially those with larger holdings, would be unlikely to want to tell of a very large harvest. The number of sacks given as “*Zakat*”, a form of charity associated with the Muslim faith under which 10% of production should be given to the needy, was a way of checking this, but clearly this was not perfect.

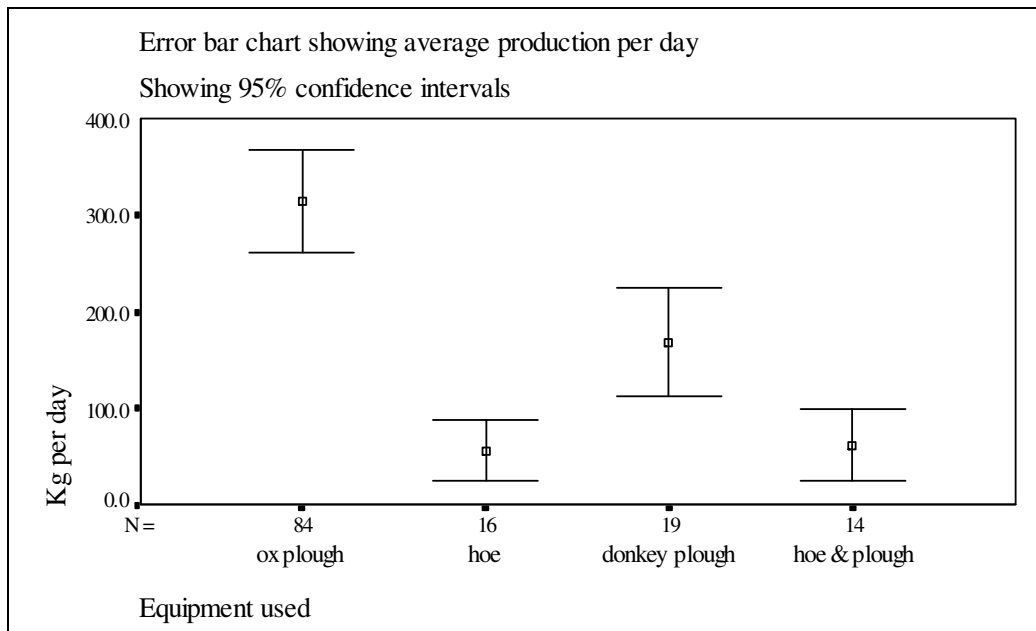


Figure 6.9

There is no significant difference in production per day between the different categories of producer.

6.4.2 Production per hectare

Production per hectare for Songore and Oula, using the original area estimates where available, and calculated estimates for other cases, was on average 1,318kg/ha (N=119). Rice cultivators from Bankass were not included in this analysis as all producers are by definition seasonal migrants and the fields they cultivated were in the territories of Baye and Goere. Production per hectare for rice cultivators from Bankass was slightly higher than average (1,722kg/ha), but not significantly so given the small sample size at Bankass.

These estimates are significantly higher than others made for uncontrolled swamp rice production in Mali. Moorehead (1991) and McIntire (1981) both found average production of traditional flooded rice production in the Niger Delta to be just 500kg/ha and Monke (1981, p.333) quotes maximum yields without inorganic fertilisers of 1,200kg/ha). However, production of Malo ba and Malo mensin have reached 2,500kg/ha without fertilisers in a research station (Gana, 1995) and the figures are comparative to estimates for swamp rice grown elsewhere in West Africa (e.g. Richards, 1986, studying traditional rice production in Sierra Leone found yields of 1,350kg/ha on average, and 2,500-3,000kg for swamp rice; and Monke, 1981, quotes average production of unimproved swamp rice in Liberia at 1,550kg/ha). The season under study was relatively good in terms of flooding. It is unlikely that people would overstate the number of sacks they harvested (the opposite is far more likely). It is, however, possible that people consistently underestimated the size of their fields.

Productivity per hectare was, perhaps unsurprisingly, highly dependent on the level of flooding. Respondents were asked whether the flooding of their field in the last season was good, bad, or average. The difference in levels of production per hectare was highly significant ($F= 7.94$, $P=0.0006$, 117 df) between fields with good and with poor flooding (mean productivity: 1,515kg/ha and 232kg/ha respectively), but there

was no statistically significant difference between fields with good and with average flooding (mean productivity: 1,170kg/ha).

Production per hectare was compared for: the two study villages (Songore and Oula); the method of tillage used; the type of seed sown; the different categories of cultivators; the type of access to field (inherited versus borrowed); and the type of labour used (paid and unpaid).

Comparing productivity between villages

Production per hectare was significantly higher at Songore (1689kg/ha, N=73) than at Oula (716kg/ha, N=45) ($t=5.51$, 2-tailed probability $P=0.000$)⁶ which can be explained in part by a significantly better likelihood of flooding at Songore ($\chi^2 = 9.06$, 2df, $P = 0.01$). Other factors such as soil fertility, were not measured.

Productivity and agricultural equipment

The productivity per *hectare* does *not* vary significantly overall with the instrument used. Thus, the payment for use of a tractor which significantly raises productivity per day, is only economically worthwhile if the cost can be made up during time saved - i.e. if the opportunity cost of more labour intensive methods is high (Figure 3.6). Taking only the data for ox-plough, hoe and donkey plough, however, reduces the variance and produces a significant difference in rice production between fields prepared using ox drawn plough (1,509kg/ha, N = 85) and those prepared using hand hoe (707 kg/ha, N = 17) ($P= 0.015$, $F = 4.36$, 106 df). Production levels in fields prepared by donkey drawn plough was also considerably lower (839 kg/ha), but not significantly so (probably due to the low value of N = 6)

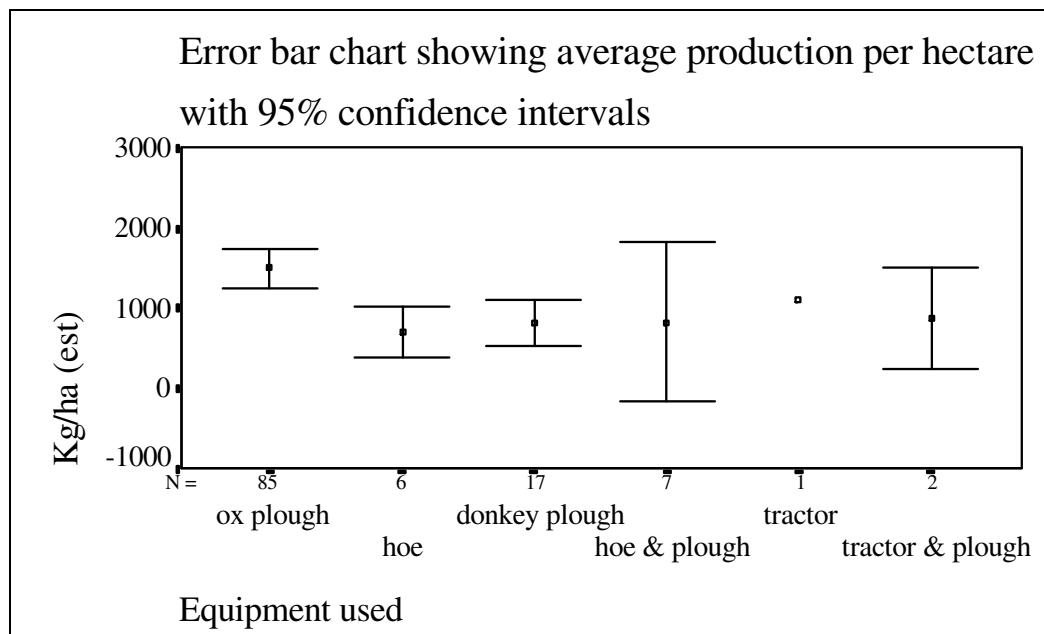


Figure 6.10

⁶The gap in productivity between the two villages is reduced if only those figures where field area was estimated by the respondent are used, bringing the overall average to 1167kg/ha (N=79). However, the mean yield of 1509kg/ha (N=35) in Songoré is still significantly higher than at Oula (896kg/ha, N=44).

The type of labour used varied significantly between the two villages, Oula having access to a tractor for hire, but using less bovine traction, while Songore used more oxen and fewer donkeys to draw ploughs. In all cases, women relied significantly more heavily on hoes to plough their fields than any other group.

Productivity and type of seed sown

Three types of seed were sown in varying combinations. Where a reason was given the type or combination of types of seed chosen depended on the likelihood of depth of flooding: Malo mensin was preferred where the flooding was not likely to exceed one metre; malo ba was preferred where the water level was expected to exceed 1m. No significant difference was found between the production levels per hectare and the type or types of seed used (F= 0.61, P = 0.65)

Productivity and the different types of cultivators

Production per hectare did not vary significantly between the different categories (Figure 6.11).

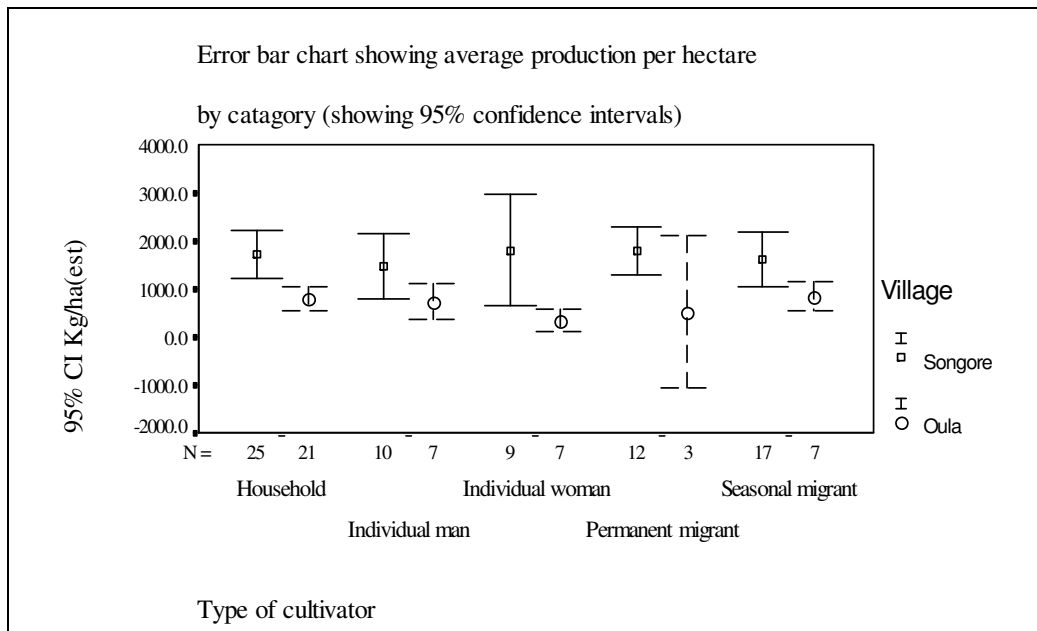


Figure 6.11

Comparing productivity and type of access

Production per hectare was slightly higher for borrowed fields (1,419kg/ha) than for inherited fields (1,214kg/ha), but not significantly so. Field size was slightly smaller for borrowed fields (1.25ha against 1.52ha), but again not significantly so.

Comparing productivity and source of labour

Production per hectare is slightly higher if own family labour is used, than paid labour, but not significantly so (Figure 6.12). Fields prepared by a combination of paid and unpaid family workers was most productive and by unpaid outsiders were the least productive. This could reflect the quality of land being worked on, as well as the quality of the labour itself.

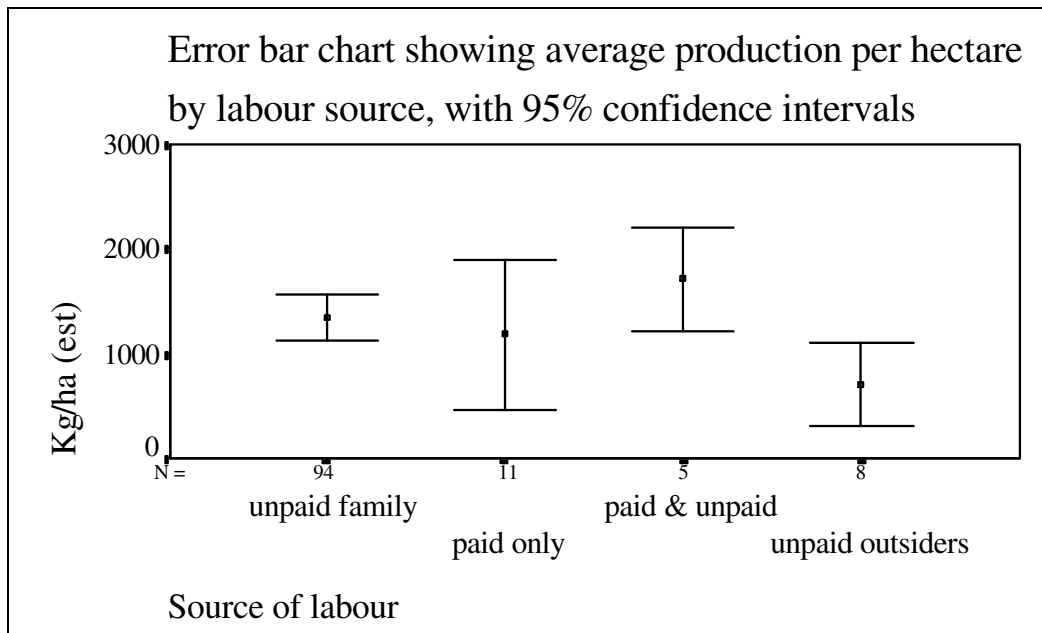


Figure 6.12

Comparing productivity and household size.

It has already been shown that members of the household are a vital source of labour. Production per hectare and total production by unit were regressed against the total adult units available for each unit in Songore and Oula. Total production showed a significant linear relationship, increasing with total adult units at both Songore ($P = 0.0019$, $r^2 = 0.12$) and Oula ($P = 0.0003$, $r^2 = 0.21$). However, production per hectare did not correlate with total adult units. The increase in total production, therefore, must relate to a positive correlation between the total area cultivated and adult units, despite this relationship being weak in the case of Songore.

6.4.3 Overall production levels across villages and categories

Mean production (kg per interviewee) is significantly lower in Oula (896kg, $N=56$) than in Songore (1,751kg, $N=83$, $t=2.60$, 2 tailed $P=0.010$, 137df). Differences in production by category are treated separately for each village and are summarised in Table 6.17. Again, Bankass has been excluded from the main analysis, however, results suggest a very high average production of 3,035kg per unit.

Overall 48% of respondents thought that the 1995/96 harvest was a good one, 29% though it was average and 22% thought it was bad. Fewer respondents than expected from Oula thought that the year was good and more thought it was bad, but the difference was not quite significant ($\chi^2 = 4.96$, $P = 0.084$, 2 df).

Table 6.17 Production (kg) per production unit by category for each village

Category	Songore		Oula	
	Mean production in kg (Mean production from fields within Songore only)	Total number of fields (within Songore)	Mean production in kg (Mean production from fields within Oula only)	Total number of fields (within Oula)
Household	5,494 (5,494)		3,067 (2,916)	
Individual men	714 (715)	65 (65)	384 (384)	72 (63)
Individual women	874 (874)	119 (119)	142 (122)	55 (49)
Permanent migrants	1,723 (1,723)	(55)	1,358 (1,358)	(10)
Seasonal migrants	1,761 (1,653)	(71)	1,100 (980)	(45)
Overall sum	10,567 (10,459)		6,051 (5,760)	

In both villages, production from the household fields is significantly higher than that from the other field types, followed by permanent migrants, seasonal migrants, individual men and individual women (i.e. following the pattern of field size shown in table 3.5). In Oula, production from the household fields is significantly greater than that from the individual men's and women's fields ($F=5.12$, $P=0.0015$, 55df), while in Songore, production from the household fields is significantly greater than that from all other field types ($F=18.75$, $P=0.0000$, 78df).

Total production within the territory of Oula and Songore may be calculated by multiplying the above figures for production from fields within each territory by the number of individual *fields* located within each territory for the individual men and women and the migrants, and by the number of *households* in the case of *foroba* production (from Table 4.1 and summarised above in Table 6.17) the results of which can be seen in Table 6.18 below.

Table 6.18 Total production for Songoré & Oula

Category	Songore		Oula	
	Total production (kg)	% of overall prodn	Total production (kg)	% of overall prodn
Household	483,472	57%	297,432	76%
Individual men	46,410	5%	27,648	7%
Individual women	104,006	12%	6,710	2%
Permanent migrants	94,765	11%	13,580	3%
Seasonal migrants	117,363	14%	44,100	11%
Overall sum	846,016	100%	389,470	100%

The results in this table show that Songore produces approximately 2.5 times more rice than Oula due to in part to the greater area of land cultivated under rice in Songore (approximately 816ha in Songoré against approximately 740ha in Oula) and in part to the lower productivity of land found in Oula. It is interesting to note, following on from this observation, that the proportion of production from communal fields is much greater for Oula than for Songore. This is further evidence for the greater emphasis placed initially on production from communal fields.

6.4.4 Rice productivity and wealth

The data presented above have shown that flood levels and method of tillage do have significant effects on rice productivity per hectare. Access to land, agricultural equipment and labour are all closely related to wealth, the importance of which was analysed using the results of a wealth ranking exercise (Grandin 1986) carried out in both villages. Three ranks were defined in Songore and five in Oula. In both villages, food security distinguished the poorest groups from the medium and wealthiest groups. The results for both villages are shown in Table 6.19 below.

Table 6.19 Results of a wealth ranking exercise at Songore and Oula

Village	Group	Definition	Proportion of households (Proportion of sample hh in each category)
Songore	1	Food self sufficiency; more than 5 heads of cattle	51% (58%)
	2	Food self sufficiency; 1-2 heads of cattle	32% (37%)
	3	Food deficit	17% (5%)
Oula	1	Food self sufficiency; lots of agricultural equipment, oxen & other livestock; recognised by all the village as well off	5% (5%)
	2	Food self sufficiency; some agricultural equipment, oxen & other livestock; access to labour and land.	11% (14%)
	3	Food self sufficiency; some agricultural equipment but lack of land.	22% (29%)
	4	High family demands and insufficient resources such as agricultural equipment.	24% (24%)
	5	Food deficit, no agricultural equipment	29% (29%)

While it would be preferable to compare the two villages separately the problems of small sample sizes made this difficult. The five ranks defined at Oula were therefore

combined to make just three ranks comparable to those at Songore. In this way, ranks 1 & 2 at Oula became rank 1, rank 3 at Oula became rank 2 and ranks 4 & 5 became rank 3. Wealth ranking was only carried out at the level of the household. All subsequent analysis, therefore, relates only to data for category 1, i.e. *foroba* fields.

Wealth rank and holding size

Comparing the mean total area of communal fields for each household across the three ranks (combining the two different villages) gave a significant difference between rank 1 (4.58ha) and rank 3 (2.80ha), but not between the two extreme ranks and the intermediate rank 2 (3.61ha) ($P = 0.05$, $F = 3.26$, 33df). The trend, however, between rank and holding size is clear.

Wealth rank and flood potential

A chi-squared test showed a considerable difference in probability of a good flood or poor flood according to wealth rank (the observed number of fields well flooded being higher than expected for members of wealth rank 1 and lower for wealth rank 3 and *vice versa* for fields poorly flooded) but not significantly so at the 95% level ($P = 0.075$).

Wealth rank and access to land

The results of a chi-squared test between rank and mode of access to land again showed a considerable difference in probability of land being inherited or borrowed according to wealth rank (the observed number of fields borrowed being higher than expected for members of wealth rank 3 and lower for wealth rank 1 and *vice versa* for fields inherited) but not significantly so at the 95% level ($P = 0.075$).

Wealth rank and method of tillage

The probability of preparing a field by hoe or donkey drawn plough was higher than expected for members of rank 3 and lower than expected for members of rank 1, while the opposite was true of fields prepared using ox-drawn plough ($\chi^2 = 20.0$, $P = 0.0005$, 4 df). Since the wealth ranks were partly based on access to agricultural equipment, this result basically supports the information provided by the resource people in the course of the wealth ranking exercise.

Wealth rank and productivity per hectare

Given the close associations between wealth rank and access to good land and agricultural equipment it is not surprising that the mean production per hectare increases with wealth (rank 1 producing 1,180kg/ha; rank 2 producing 1,026kg/ha and rank 3 producing 504kg/ha). However, the variance in all three ranks is high and the differences are not significant ($P = 0.16$). The main advantage, therefore, held by the wealthier groups remains the area of land cultivated, and there can be little doubt that this is related to access to equipment and labour.

6.4.5 Factors limiting the production of rice

The principle problem quoted as limiting rice production was unpredictable water levels (41% respondents). Farmers attempt to predict where the flood will be deep and of long duration and where it will be shallower and more short-lived, and plant varieties of rice accordingly (section 3.3.4). However the yearly fluctuation in flood level has proved unpredictable. In 1994-5 a deeper flood than expected left farmers

struggling to harvest earlier maturing varieties (*Malo mensin*) from canoes. The following year, in the hope of a repetition, those seeking rice fields (particularly migrants cultivating loaned land) were encouraged to clear land further from the river. In the event, the 1995-6 flood was weaker than the year before and many of the fields furthest from the river failed. The evidence from the survey is that wealthier households have a higher likelihood to have secured access to reliably flooded plots than poorer households.

Those interviewed mentioned as further problems weeds and fish and the quality of land preparation (including timing of ploughing and access to equipment and labour) (18% of respondents in each case); and damage by birds (5% of respondents). Other problems quoted included loss of harvest due to fire, bad seeds and hippos. Interestingly, damage caused by cattle herds was not mentioned as a cause of damage to rice fields.

The problem of the weed *diga* (*Oryza longistaminata*), is of particular concern as this is spreading, and is most severe on the older-established rice fields, threatening to make some of them unusable. It presents a new set of management problems to the rice cultivators, since the recommended methods of controlling involve more thorough tillage, involving more than one pass with a plough or following ploughing with harrowing, at the start of the dry season (ie just after harvest), to allow the roots of the perennial weed to dry out and die. Adoption of this practice would increase the cost of rice cultivation, and would also involve ploughing at a time of the year when many men are away from the village. It would also interfere with pastoralists' use of the rice fields for grazing during the dry season. Failure to find a way to reduce this weed may mean, however, that the current relatively high productivity of rice cultivation in the Sourou valley will not be maintained in future.

6.5 RICE IN THE ECONOMY OF THE SAMORI

6.5.1 The importance of rice in relation to other crops and income generating activities

Aerial photograph interpretation suggests that a total of 6088 ha has been cleared for cultivation in the Sourou floodplain between Baye and the Burkina Faso frontier. It is likely that some of this is under rain fed crops, but without ground truthing it would be impossible to determine how much. However, taking two thirds to be a conservative estimate and rice production at 1,300kg per hectare, these results suggest a total annual rice production from the Sourou Valley of 5,276 tonnes, with a value (at 7,000FCFA per 60kg sack) of approximately 615 million FCFA (approximately US\$1.23 million at the current exchange rate of approx. 500FCFA = 1\$US). This is a substantial addition to local production, and in an area of otherwise limited potential, the importance of rice production in the Sourou Valley is extreme.

Rice was ranked higher in importance than other crops by all residents of Oula and Songore, but among the permanent and the seasonal migrants, the rainfed staple crops, millet and sorghum, were more important (Table 3.15 below). Among the heads of households, 33% put sorghum as the most important crop, compared to 50% putting rice first. Among the individual men, 92.6% put rice as their most important crop. Among the women, 70.6% put rice as the most important crop and 23.5% put millet first. Among the permanent migrants, however, only 23.1% put rice first,

15.4% put sorghum first and 61.5% put millet first. Among the seasonal migrants, 9.4% put rice first compared with 46.9% putting both sorghum and millet first.

Only one respondent grew vegetables, despite the potential for vegetable growing provided by the higher water levels of the Sourou.

Despite the additional workload since the advent of rice, few respondents (14%) had abandoned growing any crop entirely through lack of time or labour. Those that had came from all groups and the main crops abandoned were sorghum and groundnuts. Only 12% had abandoned crops entirely due to flooding, in most cases maize. Prior to growing rice, the land was primarily fallow (in 63% of cases), although 27% were growing sorghum on the land, 5% sorghum and maize, and 5% maize. 22% had reduced the area of millet, sorghum or maize grown due to lack of agricultural equipment and/or time and labour. However 10% had increased the area under crops due to increased access to agricultural equipment.

Table 6.20 Importance of rice and other rainfed crops

Crop	% growing each crop/ Average rank for each crop by category									
	Household		Indiv. man		Indiv. woman		Perm migrant		Seas migrant	
	%	Rank	%	Rank	%	Rank	%	Rank	%	Rank
Rice	100	1.62	100	1.07	100	1.35	100	2.31	100	2.38
Millet	77.5	2.29	25.9	2.14	38.2	2.08	84.6	1.27	75	1.38
Sorghum	87.5	1.82	33.3	2.0	26.5	1.89	53.8	1.71	75	1.5
Maize	27.5	3.91	0		2.9	1	15.4	3.50	32.2	3.80
Groundnuts	5	4.00	3.7	3.00	43.1	3.00	30.8	3.75	37.5	4.12
Bambara nuts	15	4.33	0		50	3.18	23.1	4.00	37.5	4.58
Beans	7.5		0		5.9		15.4		25.0	
Fonio	0		0		0		0		14.3	
Sesame	0		0		0		0		14.3	

Rice and food security

“ When you have nothing to eat you can think of nothing else”

“An empty sack can’t be made to stand up”.

Many people interviewed in the villages of the Sourou have recent memories of food shortage, when households had empty granaries from June to October, and, lacking cash to buy millet, survived on meals of millet bran and whatever wild grains (*oseille de Guinée*) and leaves they could gather. Village elders in Songoré and Baye said that they haven’t seen any famine since the start of rice farming. Although much of the rice is retained for direct consumption (see next section), a significant proportion is sold, in part to enable the purchase of millet and sorghum, which are considered - weight for weight- to feed more people than rice.

Although widespread food insecurity is judged to have disappeared, there is a suggestion that the security of some has increased more than that of others. In the course of the wealth ranking exercise in both villages the elders selected to do the ranking commented on the high proportion of people in the wealthier groups with food security. Conversely, a food deficit was the important characteristic of households classified as poor. In Oula, for example “*auparavant, tout le monde*

cultivait à la main, donc il n'aurait pas de différence entre les familles" ("before [rice], everyone used a hoe to plough their land and there was no difference between the families").

The wealth ranking was done subsequent to the selection of the sample for the questionnaire survey. However, the proportion of households sampled within each rank is summarised in the table and are very close to the proportions for the whole population. While there is no data to quantify the change in wealth since the advent of rice cultivation, the comments on the results of the wealth ranking exercise supports the assertion that rice has considerably improved food security for the inhabitants.

The importance of rice in relation to other income generating activities

Rice was quoted as the major source of income by 65% of people questioned. A further 13% put rice second. Other sources of income quoted included small commerce (16% of respondents), urban migration (10% of respondents), artisan (7% of respondents) and sale of ground nuts (5%). Rice has undoubtedly provided an important additional source of income for the people living on the banks of the Sourou Valley. The cash from sale of rice is used to pay taxes, buy livestock for traction and as "savings", buy ploughs and carts and provide general day to day needs such as food and clothing. In particular, rice cultivation appears to have transformed the income opportunities for the young, by providing an alternative to migration as a source of cash income, although this may not be sufficient to halt the flow of youth to urban centres (section 6.3.2). This has quickly translated into expectations of higher levels of consumption:

La culture et la vente de riz, nous procurent de l'argent. L'habillement pour les fêtes (fin de Ramadan, ou Tabaski), ce n'est plus un souci. Le jour des grandes cérémonies, quand nous nous habillons on arrive plus à se reconnaître à distance, tellement que la parure nous fait un bon air" - a woman in Songoré.

"Le vélo ce n'est plus un problème, mon souci c'était au moins une mobylette, mais de plus en plus les mobylettes ne constituent plus un objet d'attraction dans notre village. Il faut maintenant s'acheter une moto grosse cylindrée marque YAMAHA, ou HONDA pour être bien vu comme un jeune dans le village. Quant aux radio-cassettes, les plus consommées aujourd'hui au village par un jeune en vue c'est surtout ceux qui fonctionnent avec 6 piles au minimum sans quoi même les femmes et les enfants ont chacun sa radio-cassette de 4 piles" - a youth in Songoré.

More generally, rice cultivation is sufficiently remunerative that it can support the wages of hired workers, attracting seasonal labourers from throughout the Samori and Seno. The proportion of total harvest paid to labourers is summarised for Songore and Oula in Table 6.21

Those bringing their own draught animals can expect to earn daily rates from FCFA3000 (for a donkey team) to FCFA5000 (for an pair of oxen) during the ploughing season. Similarly, harvest, those with animals and carts can expect to earn a sack of paddy for every cartload transported from the fields. Even for field labourers, the Sourou rice harvest presents an attractive alternative to long-established seasonal work in the Interior Delta:

"Nous qui venons du Seno, nous trouvons que c'est mieux de récolter ici le riz comme main d'oeuvre agricole au lieu de partir dans la zone inondée du delta central du fleuve Niger. Ici c'est plus proche et on a moins de problème pour le transport de nos sacs de riz au village" - seasonal worker in Songoré for the rice harvest.

However, with local households rapidly investing their income from rice in ploughs and oxen, the opportunities for migrants to offer ploughing and transport services are being reduced, with a consequent incentive for them to secure their income by seeking land on which to cultivate their own rice crop:

"Au départ lorsqu'on partait à Goéré avec nos charrues, on avait facilement du travail. Mais maintenant en 1996 presque toutes les familles ont une charrue, les demandes ne sont pas finies, mais elles sont peu. Puisqu'au départ bon nombre de parcelles défrichées demeuraient telles sans être labourées par manque d'équipement agricole" - seasonal migrant from Bankass farming a rice plot in Goéré.

The next section looks more quantitatively at the proportion of the harvest spent in wages and the use of the rest of the harvest returned to the homestead.

6.5.2 Control and management of the rice harvest

The proportion of harvest paid to labourers is difficult for the producer to estimate given that many workers are paid by the day in small local measures (e.g. *bols*, with approx. 160 bols to the sack, and *gongon*, approx. 1/6 sack) or in the case of harvesters take a proportion (one tenth) of the harvest before threshing or winnowing. The proportion paid to labourers has therefore been calculated where possible using the details given regarding use of paid labour in the season 1995/96. Use of the remaining net harvest was then compared across villages and categories of producer using the data from the 1994/95 harvest.

Proportion of harvest used to pay for labour

The proportion of gross harvest used to pay for labour (including land preparation, weeding, harvest, threshing and winnowing, including only those cases where labour was paid for in rice) was overall 6.6%. Given that the vast majority of paid labourers come from outside the Sourou Valley it can be concluded that most of this i.e. close to 6% of the total amount of rice produced goes to people from communities outside the Sourou Valley.

Table 6.21 Proportion of total production paid in wages to labourers.

Category	Songore	Oula	Overall
Household	11.4%	4.9%	8.5%
Individual man	9.0%	1.8%	6.0%
Individual woman	9.3%	1.1%	7.2%
Permanent migrant	2.4%	0%	2.0%
Seasonal migrant	4.9%	5.9%	5.2%
Overall	8.1%	3.7%	6.6%

The figure was significantly higher at Songore (8.1%) than at Oula (3.7%, $t=3.42$, $P=0.001$, 132df). Tables 3.7 - 3.10 have already shown that, overall, rice producers at Songore use more paid labour than those at Oula, possibly due in part to higher labour availability. At Songore, there was also a significant difference in payments made to labour by different categories of rice growers, with households paying a significantly higher proportion of their harvest to labourers than either seasonal or permanent

migrants ($F=4.57$, $P=0.002$, 87 df). There is no such significant difference between categories of producer and proportion given to labourers at Oula.

Distribution of net harvest

The results of the questionnaire survey does not support the assertion that rice is grown above all as a cash crop (Figure 6.13).

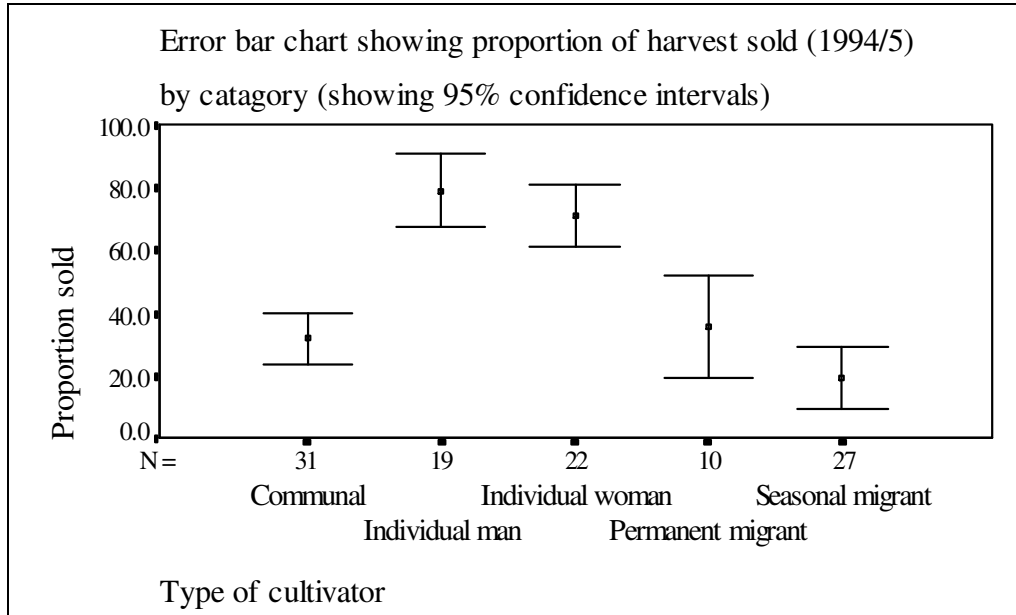


Figure 6.13

For individual men and women the vast proportion of the harvest is for sale (79% and 72% respectively (N=19 & 22)). However, the proportion of production sold from household fields, whether by families within the villages themselves or by migrants, is significantly lower: 32% for household fields (N=31), 36% for permanent migrants (N=10); and just 20% for seasonal migrants (N=27). Comparison across the three villages of the proportion of net harvest sold shows a very low figure for Bankass (just 14%) compared to Oula (42%) and Songore (51%).

The details of use of harvest by the five categories is summarised for all three study villages in table 6.22, which clearly shows that the proportion of rice kept for home consumption is significantly higher for seasonal migrants than for other groups. A considerable proportion of the harvest is retained for seed for the following season. It is also possible that the rice given to wives or in the form of charity as “Zakat” may be ultimately sold

Table 6.22 Destination of the net rice harvest, 1994/5

Category	% of total number of sacks harvested (excluding payments made to labourers in kind)					
	Sold	Seed	Given to wife / co-wife	Zakat	Other	Home consumption
Household	32%	15%	8%	7%	1%	37%
Indiv. man	79%	7%	4%	3%	0%	7%
Indiv. woman	72%	8%	0.1%	2%	0.4%	17.5%
Permanent migrant	36%	15%	3%	8%	1.3%	36.7%
Seasonal migrant	20%	12%	5%	5%	1.6%	56.4%
Average	48%	11%	4%	5%	1%	31%

From the above analyses using the data from the 1994/95 season in table 6.22 together with the proportion of the harvest paid to labourers and the average production from the 1995/96 season, a “rice budget” has been drawn up for each category for the three study villages, in table 6.23 below.

Table 6.23 Rice budget for each category of rice cultivators for Songore, Oula and Bankass

Village	Category	Average total production (kg)	Average paid to labourers (kg)	Average sold (kg)	Average used for seed (kg)	Average given to wife / co-wife (kg)	Average given as Zakat (kg)	Average other (kg)	Average consumed
Songore	Household	5494	604.3	2004.7	283.6	200.4	381.3	117.3	1902.0
	Individual men	715	64.3	527.	63.1	5.7	26.0	0	28.6
	Individual women	874	81.2	570.7	45.9	6.2	19.8	4.4	145.4
	Permanent migrant	1723	39.6	555.5	235.6	33.6	159.9	30.3	668.2
	Seasonal migrant	1761	86.2	418.6	184.2	26.7	125.6	1.5	917.8
	Songore overall	2113.4	171.1	990.5	167.0	34.9	114.5	18.6	616.4
Oula	Household	2916	142.8	721	526.8	277.3	174.7	0	1073.1
	Individual men	384	6.9	294.1	17.3	23.3	8.6	0	33.5
	Individual women	122	1.3	83.2	19.3	0	0	0	18.0
	Permanent migrant	1358	0	651.8	244.4	95.0	0	0	366.6
	Seasonal migrant	980	57.8	138.3	129.1	110.6	22.1	0	521.9
	Oula overall	1152	42.6	465.9	155.3	105.3	41.0	0	341.6
Bankass	Seasonal migrant	3035	264	388	200	100	108	205	1506

The overall distribution of rice produced in the villages of Songoré and Oula among the different parties engaged in growing the crop is summarised in table 6.24, based on tables 6.18 and 6.23.

Table 6.24 Overall Distribution of Rice Harvest

	Songore	Oula
Estimated total harvest (t)	846	389
Percentage harvested by: Household units	57	76
Individual men	5	7
married women	12	2
Immigrants in “hamlets”	11	3
seasonal cultivators	14	11
Percentage paid in kind to labourers	8	4

This shows that “outsiders” to the Sourou valley (seasonal cultivators and labourers) obtain 22 and 15 percent of the harvest in Songoré and Oula respectively, with immigrants taking 11 percent in Songoré but only 3 percent in Oula. Residents of the two villages take 74 and 85 percent of the harvest in Songoré and Oula respectively, but married women control a much higher proportion (12 %) of the rice crop (almost all of which is sold) in Songoré than in Oula.

7. LOCAL GOVERNANCE AND CHANGING RESOURCE USE

7.1 CUSTOMARY INSTITUTIONS AND THEIR RECENT EVOLUTION

7.1.1 Village land tenure

The oral tradition of customary tenure has accommodated considerable transformation. For example, before the introduction of Islam, customary authorities at their investiture would swear a vow of honesty to their people upon some sacred object (*fétiche*). Those breaking this vow could expect to soon die. Similarly, lineage leaders who rejected the ruling of the customary chief in land disputes could resort to a sacred entity which would indicate whose claim was true by killing the oldest members of the lineage making a false claim. Oral tradition has seen such practices abolished in favour of Islam and a recognition of the authority of the state in resolving conflict. Despite being open to reinterpretation customary law refers to precedent (“tradition”) until proved to the contrary. Under pressure of immigration the customary authorities in the Samori have proved favourable to providing access to outsiders through the establishment of new hamlets on dryland sites. However, this access to the flooded lands of the Sourou valley has come under tightening control by customary landholders since the advent of highly profitable rice cultivation.

This can be seen to take a number of forms. One aspect is the way that inheritance rights of families who are absent have been forgotten. This applies particularly to families in Baye and Songoré who in the past left to establish hamlets in sandy areas which offered better prospects for cultivating millet - in the Seno lands of Lossogou, Korossogou, Minta, and Hamdallaye. Where they are not simply forgotten in the allocation of rice land, they find themselves classified as outsiders with no customary land rights in the flooded area.

A second aspect is a reluctance of lineage heads to allocate rice-growing land to local villagers except close relatives. The dense web of marriage and extended family ties within and between villages gives rise to an evergrowing demand for rice fields from cousins, nephews and so on. While possession of rice-growing land thus confers great power, loans of plots to local people are considered to run the risk that the borrowers will after a few years claim hereditary rights to the plots, in conflict with the lender’s rights. The great value now attached to rice plots makes those who control them unwilling to risk future difficulties in reclaiming them from borrowers. As a result, the holders of customary rights over rice-growing land are more likely to loan it to outsiders than to members of their own village. This is illustrated by an exchange in Baye, while the research team was explaining the procedure for the field census. One villager straight away observed “Our relatives have forgotten the spirit of help to families who do not have hereditary land rights. They prefer to offer all the land to the Dogon who come from far away.” This brought an immediate response: “It’s my ancestors’ land, and I’ll only give it to those who can work for me and those who are useful to me”. A poignant example was provided by the case of one villager telling his brother, during a particularly

heated discussion, that he would never give him land to cultivate rice, preferring instead to give it to a stranger from whom he could get the land back whenever he so wished. Survey data in section 6 indicated that land loaned to outsiders accounted for 26 percent of rice plots in Songoré, more than double the number loaned to local villagers and 70 percent of all loaned rice plots in Songoré. By contrast, in Oula two thirds of loaned plots were cultivated by local families and only a third by outsiders. The principle difference between the two villages is the much higher immigration pressure in Songoré, manifest in the large number of hamlets which Dogon immigrants from the Seno have established under Songoré's jurisdiction.

The procedure for founding a new hamlet is complex but not insuperable to those driven by a vision of vast millet fields and plentiful fallow land. The family seeking to establish the new settlement must first approach the administrative chief of the village to inform him that they have found a site in the vicinity of his village. He in turn directs the settlers to the customary chief (Massakè), who consults the heads of the different lineages in the village to identify the lineage on whose land the site of the proposed hamlet lies. If the appropriate lineage head gives his consent to the new hamlet on his land, the Massakè tells the settlers what offerings are required for a ceremony performed by the Zora (in the animist tradition of renewing a covenant with the spirits of the area). Once the ceremony has been completed, the hamlet may be established. Once the village authorities have agreed to offer the settlers a site for the hamlet, the *chef d'arrondissement* must be informed. He notifies the settlers of the administrative formalities which they must complete. These include obtaining a permit from the forestry service to clear land for cultivation, and registration for tax purposes as a resident of the village whose customary authorities provided the land for the hamlet. Once established, the head of the founding family is recognised as chief of the hamlet, whose responsibility it is to inform both customary (village) and government (arrondissement) authorities of progress of the hamlet, including the arrival of other families.

The hamlet has a provisional autonomy over the land attached to it. The majority of hamlets recently established in the Samori are concerned mainly with the cultivation of dryland crops (millet, sorghum, groundnut, and *wandzou*). These present few problems, except where the "host" village reclaims land or where a neighbouring village complains its boundaries have been transgressed. This is not uncommon as hamlets are frequently established in boundary areas between existing villages.

Table 7.1 summary of plots loaned by Songoré landholders to Dogon immigrants

{PRI VAT E }No	Dogon hamlet	Number of rice plots	%	long-term loan	annual loan
1	Tiron ou Tollé	20*	38,5	x	
2	Wera	12	23,1		x
3	Léré	10	19,2	x	
4	Ganankanda	4	7,7		x
5	Wori	3	5,8		x
6	Passintonboni	2	3,8		x
7	Bougounifieni	1	1,9		x
TOTAL		52	100	2	5

*Number of rice plots are those declared in the field census at Songoré. They are much smaller than the numbers declared by the head of Tiron hamlet, who reported 50 extended household units with at least one rice plot each. Similar upward adjustment may be applicable to figures for other hamlets.

The access of Dogon hamlets to flooded land is much more restricted. Only those close to the river have much chance of rice fields. Only seven of the eleven hamlets in Songoré's territory, for example, were recorded as cultivating any rice land (table 7.1) and 80 percent of those plots were cultivated by just three hamlets (Tiron, Léré and Wera). The most common terms of access are an annual loan (*prêt annuel*), usually in return for ploughing the landholder's rice fields or gifts of rice at the end of harvest (see section 6.2.3).

The case of Tiron hamlet (box 7.1) illustrates how the formation of personal relationships between immigrants and local lineage heads have opened newcomers' access to rice fields. Indeed, the long term loans of land made by Anlè Doumèrè to the Dogon of Tiron and Léré account for half of all rice plots cultivated by the hamlets in Songoré (table 7.1). This is likely to be an underestimate because such long-term loans are made en bloc and subject to subdivision among households within the hamlet, whereas annual loans are more identified with individual households. Such long-term arrangements appear to be common in Oula (box 7.3), but in the upper part of the valley, where immigration pressure is strongest, they appear as isolated cases vulnerable to the mortality of the individuals on whom they depend. Here the annual loan is the rule, and the research undertaken in Baye (box 7.2), while failing to generate the quantitative data sought, provided an insight into the evolution of annual loans into a more formal land rental in the form of sharecropping.

Box 7.1 Immigrants' access to rice land in the hamlet of Tiron (Songoré)

The chief of the hamlet recounts: "I'm originally from Yabatalou. My parents resettled in Samani (Koporo-Na cercle) and I myself later moved to Kountogoro (Toroli cercle), where I was a trader in leather and skins. However, the business outlook was not good and I couldn't face being an ex-trader in Kountogoro, so I came to Songoré. After some diplomatic manoeuvres between the administrative chief of the village, the customary chief, and the head of the lineage on whose land my hamlet was to be, the village decided in my favour and I settled here in Tiron in 1988. We were only three families at the time. Later, my relatives in Yabatalou and Samani, who were short of good land, came to swell our numbers".

Although closer to the river than other hamlets under the jurisdiction of Songoré, the cultivation rights given by Songoré's authorities to the inhabitants of Tiron did not extend to clearing and planting rice fields in the Sourou floodplain. For this they had to obtain the authorisation of Anlè Doumèrè, the head of the lineage that controlled this part of the flood plain. "Old Anlè Doumèrè showed me a large area, which was his share of his family's land that he had divided in 1992 between him and his brother who lived in Goéré. I called all the heads of households in my hamlet and divided the land so that each family had at least one rice field. It wasn't possible, though, to allocate plots to individual men or women. Once he had given us the land Anlè left us to farm it". These and similar arrangements which Anlè Doumèrè established with another Dogon hamlet at Léré were confirmed during the field census by Anlè Doumèrè's son, who indicated that a large part of his father's rice land had been lent to people in the hamlets of Tiron and Léré.

This model of long-term understanding between local landholder and Dogon newcomers - motivated it is said by Anlè Doumèrè's acknowledgment of Dogon ancestry and the relatively small number of his own children - appears exceptional, however. Where the residents of Tiron borrowed rice fields from people in the villages of Goéré and Woro, they had to renegotiate access every year with the respective lineage heads.

In recognition of goodwill and the confidence in longer-term access to flooded fields which their understanding with Anlè Doumèrè provided, the cultivators from Tiron reciprocated in a number of ways. For example the chief of the hamlet, accompanied by at least one worker from each household in the hamlet, provided at least a day's ploughing and harvesting each year on Anlè Doumèrè's fields. At the end of the harvest, the chief of the hamlet would send several sacks of rice or millet to the Songoré village authorities and to Anlè Doumèrè. However, the mutual reciprocity of this arrangement did not mean that the residents of either Tiron or Léré would ever have more than temporary rights to cultivate their rice fields. Anlè Doumèrè died in February 1996, and the following July his brother in Goéré reclaimed the land loaned to the Dogon of Tiron and Léré.

Box 7.2 Immigrants' access to rice land in the hamlet of Yara (Baye)

There are eight hamlets of immigrant cultivators under the jurisdiction of the village authorities of Baye. Five of these were founded by families from Baye itself, who were later joined by families of Dogon immigrants: Korossogou and Foulangouère (both more than 50 years old), Dolebougou, Doulin, and Libeyara in the past seven years. Three more were founded by Dogon: Nematoulaye 11 years ago, and Yara and Boïla seven years ago. Nematoulaye is upstream of Baye in a dryland zone, but Yara, and its close neighbour Boïla one kilometer to the east, are downstream of Baye and have cultivated land that reaches to the east bank of the Sourou. Initially, the Dogon at Yara, like their hosts at Baye, cultivated only sorghum on the banks of the Sourou, and millet on the dryland areas. It is possible that, had rice farming on the Sourou flood not intervened, the cohabitation of Baye and Yara might have continued, but management of the flooded zone has become a source of discord between the two communities.

A household head in Yara recounted: "When we arrived in 1989, there were no rice fields. It was forest, with a few millet fields in clearings. We experimented with rice in 1990 and it was a success. The people from Baye came to direct where we should cultivate." Another added: "There's no more space for new clearings. At the start we were quite close to the river, but each time we cultivated a field for a year the people from Baye reclaimed it for themselves the following year and showed us a new area to clear. Now, after six seasons, our fields are situated in places where the flood hardly reaches." The unreasonable reclamation of rice fields from immigrants by local claimants of customary rights is alleged to include at times the eviction of cultivators at harvest, and seizure of the rice crop. Reporting of such incidents to the administration is said to be inhibited by immigrants' fear of being expelled from the hamlet by their "hosts".

Yara was founded in 1989 by a migrant from Diallassagou, named Arama, whose family originated in Simi (Ouo arrondissement). The hamlet is situated in the land of the Togokina ward of Baye. The administrative chief (*chef de village*) of Baye at the time had assisted Arama by introducing him to the customary chief (*massaké*) of Baye, who had ruled in favour of the creation of Yara hamlet. The Togokina lineage heads, when consulted at the time by the administrative and customary chiefs, had not objected to the allocation of the site to the Arama family. In the intervening years Yara has grown rapidly, from six families in 1989 to 72 families in 1996. Following the death of the administrative chief, the Togokina played an important role in securing the appointment of his successor and are now seeking the nomination of one of their number, the administrative chief's counsellor from the Togokina ward, as chief of Yara hamlet, in place of the head of the Arama family. In this way the Togokina lineage heads seek to avoid the loss of much of their land which would follow a change in Yara's status from "hamlet" to "village". In making such a change the administrative authorities would recognise the new village's authority over the land cultivated by its members. By bidding for the leadership of the new village the Togokina hope to secure control of the land.

The climate of insecurity has been exacerbated by rumours that certain politicians are supporting Yara's claims to recognition as an official village with full control over the dryland and flooded area cultivated by its members. Also, proposals for investment in improvement works (*aménagement*) in the flooded lands (see section 7.2.3) raise the spectre of loss of land rights for customary landholders.

In addition, certain landholders in Baye had become the target of criticism during the research project "Customary management of natural resources in the Samori" (Konaté and Tessougué, 1996) conducted by SOS Sahel the previous year. This occurred during a feedback (*restitution*)

session in which that project's researchers discussed their findings with villagers. The suggestion in public that certain forms of land loan being practised in the flooded area were outside customary law because they resembled sharecropping (*métayage*) - a blow to the heart for the Togokina landholders - provoked an outcry.

As a consequence, the arrival of the present researchers at Yara without previously visiting the village authorities at Baye was viewed with deep mistrust, and certain landholders from Baye attended the research-team's first meeting in Yara, unannounced. The meeting was conducted in Dogon, the language of Yara immigrants but poorly understood by those from Baye. Hearing the meeting discussing the rice-growing lands, and perceiving this as preliminary to an allocation of plots to the immigrants by a development project, the landholders felt themselves already expropriated. One then disrupted the meeting, claiming that he was the proprietor of the land and any discussions between the researchers and the Dogon immigrants were meaningless. After leaving Yara the research team sought to clarify matters in a meeting with the customary authorities in Baye at which were present the customary chief (Massaké), the administrative chief, and the counsellors representing each ward of the village. The meeting resulted in agreement that Baye would collaborate in the study, but, despite attending this meeting, the Togokina lineage head forbade members of his ward to answer researchers' questions. He also ensured that the village of Goéré similarly refused to collaborate in the study, alleging that the research had been banned by the commandant at Baye.

The lineage leaders in Baye justify their interpretation of customary land tenure on the flooded land with references to coffee and cocoa plantations in Côte d'Ivoire, where many of them had gone in their youth as migrants seeking work and found that plantation workers earned a third of the harvest for a season's work. Comparing their rice land with property for rent in urban areas, they asserted their right to offer access to the highest bidder. A senior member of the Togokina said "I see nothing wrong in claiming part of the harvest from those who come to borrow our land. They keep their paddy when they return to the Seno. Anybody who doesn't agree with the principle of sharing the harvest can stay at home. We didn't ask them to come here. As far as I'm concerned, I prefer my land to stay uncultivated and burned if necessary, rather than lend it to an outsider who gives me nothing after harvest." Another added: "the land stays where it is, for God and for us. Can you tell me that someone who rents a house in town shouldn't pay the rent? Here, if the Dogon want to cultivate rice and are happy with our conditions, they can have land, but if not they can stay at home. It's a favour we are doing them, because they keep their share of the harvest."

In Baye, therefore, the management of the flooded area is evolving along market lines, with the opportunity of sharecropping with outsiders to some extent supplanting criteria of solidarity and reciprocal assistance within the village. There is evidence of similar developments in Goéré, where customary authorities joined with the Togokina in Baye in refusing to collaborate with the study. According to anecdotal evidence, the son of the customary chief at Goéré loaned a large number of rice plots to Dogon from the Seno during the 1995-6 season, on a sharecropping basis. The proceeds reputedly financed his purchase of two powerful motor cycles some months after the end of the rice harvest.

Box 7.3 Access to rice land in the hamlet of Guinigan (Oula)

The village of Oula has permitted no hamlets of immigrants on its territory, but a number of families immigrants including Dogon from Koro and Bankass *cercles*, Mossi from Burkina Faso, and Bellah pastoralists have settled in the hamlet of Guinigan to grow rice on the floodplain. In one sense, Guinigan is almost a *quartier* of Oula, founded about 80 years ago by residents of the Kindiasso *quartier* of Oula. However this *quartier* had originated in precolonial times with the settlement in Oula of refugees from the ancient village of Bigué, which was near the site of present-day Guinigan, seeking security from local wars. In another sense, therefore, the founders of Guinigan, the Koné lineage, were returning to their ancestral lands. All immigrants living in Guinigan cultivate land loaned to them by the Koné lineage, who have a relatively small number of households for the large area over which they claim customary rights. Unsurprisingly, perhaps, the immigrants affirmed that their fields had not been subject to unreasonable pressure for return to the lender, and that they even had been allowed rights to fallow land. The head of the Koné lineage asserted: “lending land is normal and just, for nobody can have customary rights wherever they go. The immigrants need help to get land if they are to survive. However they must remember throughout future generations that they shall never be proprietors of the land they cultivate: no matter how long a log floats in the river, it will never become a cayman.”

This indicates that it while it is unproblematic to receive immigrants, it may prove more difficult to manage in future. There is some evidence for this in a *quartier* of Guinigan inhabited for over 50 years by a lineage from Sogué. The residents are registered (and pay taxes) in Sogué, although the land they cultivate is under the authority of Guinigan, and they see themselves as less subordinate to the original holders of customary rights over the land.

The great increase in value of floodplain land which has accompanied the advent of rice cultivation on the newly-flooded Sourou has therefore greatly enhanced the power of customary (lineage) landholders to appropriate a larger share of the output than previously. This trend has been met with a number of attempts to re-forge non-market relationships in access to floodplain land. As noted in section 6.2.3, these include attempts by those without direct access to the floodplain to strengthen and multiply family and friendship links with those that do. This may involve new forms of reciprocity, particularly for residents of Bankass, whose rapidly changing status from villagers to townspeople leaves them well placed to exchange urban services for access to rice land in the Sourou valley.

For those without such possibilities, and particularly the Dogon in hamlets such as Yara, maintaining access to rice plots is a continual battle of wits to retain the goodwill of the customary proprietor of the land, through offering several days work with the ox-team or several bags of rice after the harvest. Those who lose this game, through misjudgement or misfortune, risk losing their rice plot and being forced into the increasingly unrewarding work of clearing yet more woodland further from the river, and thus with diminishing likelihood of a flood adequate to grow rice. For these immigrants the hope for the future is outside intervention to develop (*aménager*) the Sourou valley. They hope that a state or commercial organisation which took over management of the flooded land would suspend customary proprietors’ rights and with them the threat of eviction from their plots.

This aspiration for large-scale transformation of existing tenure is in marked contrast to the increasingly individual scale on which land loans are arranged. It is striking that, with

few exceptions village-level authorities (the *Massakè*, and the administrative *chef de village*) have little direct involvement in individuals' access to rice fields. The exceptions are when access is sought by more organised groups. For example, the Panadougou Village Development Association (l'Association pour le Développement des Villages du Panadougou - ADVP), based at Saalo, sought land on the banks of the Sourou for an agricultural training centre for Ouladougou youths. The customary authorities at Oula granted a site for the centre after confirming the availability of land with the lineage leader at Bigué (Guinigan, cf box 7.3). Village-level authorities are involved in determining access by groups of outsiders, such as immigrants wishing to settle in the area (see above) and pastoralists seeking grazing and water (see below). They also are responsible for negotiations with neighbouring villages.

7.1.2 Inter-village relationships

Since the advent of rice cultivation, land rights have become an important issue between villages of the Samori. On occasion these serve to reinforce links between two villages. This is most apparent in the case of Souhé and Oula, which, although originating in different historical entities (Souhé in the Tiondougou and Oula in the Ouladougou) have through mutual lending of land which has generated a climate of mutual support between the two villages. This may extend across the international frontier, as in the case of the Burkinabé villages of Donon and Niasseri whose inhabitants cultivate a total of eight rice plots loaned by proprietors of land at Oula. More commonly, however, the advent of rice growing has provoked discord, as exemplified in the following cases.

Dispute between Para and Sogué.

The floodplain land now claimed by the authorities of Para originally belonged to the much older village of Sogué, which many years ago occupied the current site of Para. To improve villagers' health, the village of Sogué was moved to its present site away from the river. The customary authorities at Sogué originally established the villages of Woro and Para as its dependencies to assert its continuing claim to land on both sides of the river, and cultivators from Sogué retained fields on the river bank for maize and sorghum. Sogué also claimed control of the water in this stretch of the Sourou, which, until the rise in the level of the river in 1987, conferred the privilege of controlling the start of the fishing season and allowing members of the village a day's fishing before people from neighbouring villages (Para, Kandé, Woro) were allowed to fish.

From 1987 villagers from both Para and Sogué began clearing land to cultivate rice. The authorities at Sogué wished to reassert their historic rights in order to allocate rice plots to all the households of Sogué, but, recognising the more recent and continuous occupation of the area by Para, sought an agreement for joint management of the floodplain. This was refused by the authorities at Para who now assert exclusive control over this part of the floodplain. Excluded from customary rights, villagers from Sogué borrowed rice plots from neighbouring villages. In 1990-1 these totalled 47 plots on loan from individual proprietors in Oula (22), Kandé (6), Goéré (2), and Para itself (17). The growing tension between the two communities has resulted in the eviction of Sogué villagers from five of

these plots in Para, and growing resentment in Sogué: “People from Para don’t want us in the flooded zone. They take our plots away and hand them over to people from Minta, to the Peulh pastoralists... In Para they just don’t want to understand, they consider us a nuisance.” “We had our maize and sorghum fields there...we were on the banks of the Sourou well before Para. That’s why we had control over Para’s rights on the river.We know how profitable rice is and we are not prepared to let Para alone benefit from it. This problem could break out into the open any moment between Para and Sogué. God save us from that.” - administrative chief at Sogué.

This anxiety to avoid open conflict, and a judicial process conducted by government officials, despite the intense frustration felt by the authorities at Sogué, is due to the experience of an earlier dispute over control of the Sourou floodplain: between Karé and Kawéré.

The dispute between Karé and Kawéré

The village of Karé was founded in precolonial times by the authorities at Oula to assert their claim to territory on the west bank of the Sourou. However the colonial administration included Karé in the canton of Diallaye, not that of Pana to which Oula belonged. The separation of the two villages increased when a dispute between them in 1945-7 resulted in the colonial administration drawing the limits of Oula’s jurisdiction as the east bank of the Sourou. This ruling in effect gave Karé authority over a strip of the west bank and its floodplain extending southwards from Karé as far as the territory of Souhé. However, by 1948 Karé had authorised a settlement by Mossi at Kawéré, a little to the south of Karé itself. Curiously, this settlement on the west bank was considered part of the canton of Pana, on the east bank, and the authorities in Oula seized an opportunity to re-assert their claims to the west bank by installing one of their own lineages as chief of Kawéré. Kawéré was subsequently recognised as a village with full authority over land within its jurisdiction. Its territory, therefore was to the south of that of Karé.

With the advent of rice production, the village authorities at Karé, seeking to clear and cultivate land on the floodplain to the south found themselves hemmed in by land controlled by Kawéré. They sought to create an enclave to the south of Kawéré’s jurisdiction but found their right to do so contested by the authorities at Kawéré, who (it is said at the instigation of Oula’s authorities) now laid claim to all the floodplain southwards to Souhé. In the 1994-5 agricultural season, members of the two villages competed to cultivate the disputed area: some ploughing where others had cleared, some sowing where others had ploughed. Government officials, alerted to the growing tension, attempted to mark a boundary between the territories of the two villages. Since this exercise was guided by the customary authorities of Oula, it was inevitable that their old adversaries at Karé found the boundary unacceptable and destroyed the marker posts. At the time of harvest the contest between the two sets of villagers rapidly escalated into armed confrontation, at which point the administration in Bankass dispatched government security forces to the area, sequestered the disputed harvest, and prohibited any further cultivation on the disputed area pending a negotiated settlement of the conflict.

However, despite numerous attempts to bring the sides together, by the customary authorities of the historic Ouladougou entity, by the cercle administration at Bankass, and by the regional judicial authority at Mopti, the dispute remained unresolved in mid -1996. There have been instances of confusion about which government agency is responsible for making decisions about the dispute, such as the broadcast on a local radio station of contradictory statements by judicial and administrative officials involved in the case. In the meantime the economy of villages of Karé and Kawéré have been crippled by their exclusion from cultivating the floodplain, their most productive resource: “War exterminates the able-bodied, but legal processes are also costly” (Dogon proverb). This has had a salutary effect on the many disputes between villages engendered by the rapid transformation in land use in the Sourou floodplain. Few wish to suffer the fate of Karé and Kawéré and disputes tend to be promptly brought under control by village authorities and lineage heads.

The area of dispute between Songoré and Baye

Considerable tension exists between the villages of Songoré and Baye as a result of two disputed areas of flooded land. The first of these is on the east bank of the Sourou, in the vicinity of the hamlet of Yara. The authorities in Songoré allege that only members of their village were cultivating maize and sorghum in that area before the advent of rice cultivation, and that they were expelled by lineage leaders from Baye who claimed the land when the potential for rice cultivation was recognised. This allegation is supported by the inhabitants of Yara, though, given their own conflict with the Togokina of Baye, it is difficult to accept this as corroboration.

The second area of dispute concerns the Yerèkèrè, an eastward-flowing tributary whose confluence with the Sourou is just north of Songoré, along whose banks cultivators from both Songoré and Baye have cleared rice fields. Cultivators in Songoré allege that those from Baye have extended their fields beyond the zone to which they have rights - identified by tradition with a particular vegetation dominated by the tree *Acacia seyal* - and into Songoré's zone which they identify with a preponderance of a different tree (*Anogeissus leiocarpus*). People in Baye counter that it is their land which is encroached upon by cultivators from Songoré. While these competing claims have cooled relations between the two villages, those from Songoré are inhibited from pressing their case at the level of the government administration for fear of repeating the experience of Karé and Kawéré.

Relations between villages and pastoralists

“Before rice farming started, problems over land were rare. The tensions of recent years among the Dafing villages are above all due to the rice fields. In the past every village in the Samori had its place, and it was the two ancient villages Tionou and Oula who controlled the land. These villages (who now claim land) like Ganida, Karé, and Kawéré are only recent. We, the Peulh, if only we were more sedentary, we too could have had a village on the bank of the Sourou and would today be masters of a large domain in the floodplain.” - pastoralist from Nassari Peulh.

Before the rise of the level of the Sourou, cultivation of the floodplain was limited to scattered fields of maize and sorghum. It provided some dry season grazing and water for

herds from the Seno and from the Peulh settlements on the margins of the Samori (Libé, Nassari, and Minimankanda). These grazed in the large area of surrounding woodland in the Samori during most of the year, but some were watered during the dry season from wells dug in the dry Sourou river bed. The water and grazing which the Sourou offered for this “*petite transhumance*” was limited, however, and most herds made the “*grande transhumance*” to the more distant but richer bourgou pastures of the Inner Delta of the Niger.

The rise in the level of the Sourou greatly increased the quantity and quality of dry season water and grazing resources, and prompted increasing numbers of herders in the Samori to switch to the *petite transhumance*. However, pastoralists found their access to the river increasingly blocked by the strip of rice fields along both banks, and the areas of pasture increasingly encroached for rice cultivation. The period of greatest difficulty is between November and January, when the ponds on the Samori pastures begin to dry up and the rice harvest has not yet begun, and the pastoralists find themselves in increasing conflict with the village authorities who control the use of the floodplain.

“Nowadays it is the fields that are chasing the cattle. The cattle can stay where they are but the fields come after them. If as a herder you let your herd stray onto a rice field, no matter how poorly flooded or poorly germinated, they’ll say you have damaged a good harvest and the administration will fine you.”- herder from Libé.

There is evidence, however, that the growing problems confronting pastoralists are recognized by government officials in the *arrondissement* and *cercle* administration, and attempts have been made to guarantee access to the river for stock. These efforts have not met with much support from village authorities, however.

In the area controlled by Oula, where herders previously had three points at which to cross the river they are now confined to one. Although the authorities at Oula have agreed to preserve a corridor for pastoralists to reach this remaining crossing point, and access to a dry-season watering area on the Bouba tributary, they rejected attempts by the government livestock service to mark the corridor with posts in 1995. The corridor has nonetheless remained open to the pastoralists since.

In the territory of Baye is included a large dryland area known as Koroo, historically reserved for wet season pasture for the herds belonging to the Peulh at the neighbouring village of Libé. In 1993 the government livestock officer at Baye *arrondissement* attempted to persuade the customary authorities of Baye village to create a corridor to allow the herds on the Koroo to water at the Sourou during the dry season. The villagers accused him of bias in the pastoralists’ favour, and refused to grant pastoralists access. Similarly, Peulh from Minimankanda complained to the government administrators at Bankass *cercle* that encroachment of rice cultivation on their grazing lands known as Siri, Welou houki and Bakoma, which lie in the territory of the villages of Baye, Songoré and Lossogou, prevented their herds from reaching the river. The *cercle* administration upheld the pastoralists’ complaint by limiting any further establishment of hamlets for Dogon immigrants in the area. However, this has not prevented the expansion of rice

fields by local villagers from Songoré, Baye, and Lossogou, which continue to block pastoralists' access to the Sourou and its backwaters in the area.

The Peulh recognise the customary rights over land exercised by the authorities of the Dafing villages of the Sourou valley, but this has not prevented them from involvement in rice cultivation. The pastoralists gain access to a share of the rice output by loaning draught animals to those cultivating rice, or by financing the clearing, ploughing and harvest of rice on land obtained on loan from local landholders. As indicated in section 4.2.3, the survey of rice cultivation in Songoré and Oula revealed no fields cultivated by Peulh, and it is difficult to assess how important this is. At the very least, pastoralists' involvement in rice cultivation appears localised and dependent on the specific conditions of pastoralist-villager relations in each locality.

7.2 THE ROLE OF STATE AGENCIES

7.2.1 Local administration

In some respects the role of state agencies in managing changing resource use in the Sourou valley can be summed up by the observation that although the state is the nominal owner of the land in the Sourou valley, the state's representative, the *chef d'arrondissement* at Baye had to obtain his rice field as a loan from the customary authorities of the village. The account in the previous section supports the conclusion that the state has had no involvement in allocating land and played little role in decisions about changing resource use, such as the clearing of forest in the Sourou valley for rice cultivation.

Where the role of state agencies is more visible is in regulating relationships between different groups of resource users. Instances of this in the previous section included:

- Intervention to prevent armed confrontation between villagers of Karé and Kawéré over disputed land rights in the floodplain.
- Fines applied to pastoralists for encroachment of herds on rice fields
- Assistance to pastoralists seeking to maintain access to the river by holding negotiations with village authorities to define corridors for herds to move through zones occupied by rice fields.
- Action to restrain encroachment of cultivation on established grazing areas by refusing authorisation for new cultivators' hamlets.

What these instances also make clear is that the the role of the local administration is largely one of policing, with the aim of maintaining order, and ensuring that the rural population is fully registered for taxation purposes. Interventions to restrain one group of resource users from encroaching on another seem limited to these goals, and the role of state agencies is therefore largely reactive, with little evidence of engagement with the nature or purpose of changes in rural resource use. This is exemplified also in the involvement of government technical departments in the development of rice farming, discussed in the next section.

One respect in which government administrators have a profound influence on how land and other resources are allocated is through their role in establishing the formal status of settlements. This is because customary control of land is located in the village. There are two specific points at which the administrators' role is critical. One, exemplified in various ways in this study, is the requirement for the government administration to ratify proposals for the establishment of new hamlets under the jurisdiction of existing villages. The roles of different agencies in the promotion of these new settlements vary from case to case, settlers seeking alliances to press their case wherever seems most propitious. In certain instances, therefore, it is possible for government administrators to become perceived in the process not as arbitrators but as supporters of the settlers' case. The case of the hamlet of Yara seems to have elements of this. The Dogon immigrants of Yara have a document formally recording the founding of the hamlet in 1992, and identifying the founding families, signed by the *chef d'arrondissement* of the time at Baye. It is clear that this document is regarded by the residents of Yara as an important safeguard with which to counter threats, veiled or otherwise, of eviction by the customary landholders at Baye. Equally, it appears to landholding lineages, such as the Togokina, as evidence of state collusion in supporting the immigrants' ultimate aim of usurping customary rights to the land. In the climate of tension which pervades the relationship between the immigrants and their hosts, all intervention by agencies of the state and any outsider identified with them (as, to some extent were the present research team), is assessed primarily in terms of whether they are likely to strengthen immigrants' land rights. In this, the deep mistrust of written records as a means of undermining customary (oral) authority is evident, even in villages that collaborated in this study. Thus, in Songoré an early response to proposals to undertake a field census was: "You want us to make a census of our rice fields. But is this a good idea, when some have not inherited their fields in the flooded zone. In whose name will such fields be recorded? As far as I'm concerned, it would be wrong to record those fields in their names, because the fields are on loan to them. And you, with your white people, everything you put on paper today is difficult to deny tomorrow because the writing doesn't get lost like the spoken word." This type of concern meant that the field census was conducted in such a way that a clear distinction was drawn between *inherited* and *borrowed* land. The definition of the latter was necessarily comprehensive and explicit: "all plots which you have cleared or ploughed after consulting someone who is not of your lineage, and who does not manage your lineage's customary land rights. Plots, therefore, that you cannot leave to any of your descendents."

The second moment in which the action of government administrators is critical is that at which a "hamlet" becomes designated as an official village. This means that tax collection is now the responsibility of a (government-appointed) administrative chief (*chef de village*) within that new village (ex-hamlet) rather than the administrative chief of the host village on whose land the hamlet was established. More crucially, the status of "village" confirms autonomy of land rights and ends the right, in principal, of the lineage of the host village on which the "hamlet" was established, to intervene in the way that land is used. While many current disputes between villages in the Sourou valley set ex-hamlets against their original host- or parent-village, most of these "hamlets" had been

raised to status of villages in the colonial period. There are no examples of new villages being formed from hamlets in the Sourou valley in the past thirty years. It is not clear why this should be, but it might suggest less willingness of post-independence governments to intervene, or simply a certain stagnation in the formation of new settlements in the Samori in the 1960s and 70s. Despite this, the possibility of new hamlets becoming recognised as official villages looms large in the minds of both immigrants and customary landholders. With the great increase of value of land in the floodplain, this process technically places within the hands of government administrators the power to transfer very significant assets between different communities.

7.2.2 Technical services

Agricultural Research and Extension

Although officers of the government agricultural services work at *cercle* and *arrondissement* level, their roles are primarily administrative, in the collection and compilation of statistics. Where they undertake extension work on rice in Bankass cercle, it is on small-scale irrigated areas at the base of the Bandiagara escarpment. The several thousand hectares of rice cultivation in the Sourou valley is effectively excluded from the reach of agricultural extension services on the grounds that the flood makes them inaccessible from Bankass during most of the agricultural season.

The research and extension programmes of the Institut pour l'Economie Rurale (IER) are based at the regional capital, Mopti. These have had negligible impact upon the development of rice cultivation in the Sourou valley. Indeed, researchers at IER in Mopti indicated that funding was in future to focus on research on irrigated (inondation contrôlée) rice, because this was considered better capable of providing a return on research investment, than the floating rice grown under variable flood regimes, which predominates in the Inner Delta of the Niger and now in the Sourou valley. Even without such a change in focus, however, the rice research conducted by IER appears restricted to the testing of new rice varieties - often as part of international programmes. Two sites in the Sourou valley, at Baye and Goéré, had been included for rice experiments for the first time in the 1995 season. However, the seed sown in the experiment at Baye failed to germinate, while that at Goéré was damaged by fish, so that neither produced usable data. There is no research being undertaken in the Sourou valley on other aspects of rice cultivation nor on the impact of rice cultivation on the wider farming system of the area. As such the ten year's funding support by USAID for farming systems research in Mali (1985-95) has had little impact in the development of rice farming in the Sourou valley.

PGRN/Gerenat and Gestion de Terrior

The principal government initiative in relation to natural resource management at local level is the *Programme de Gestion de Ressources Naturelles* (PGRN) funded by the World Bank within the Ministry of Rural Development and the Environment. The programme's main actions are in implementing a methodology of village-level land management, widely known as the *Aménagement de Terrior/Gestion de Terrior* (AT/GT)

approach, or GT. An earlier programme in Mali, Gerenat funded by GTZ, used the same methodology and the two programmes were merged.

The GT approach originated in a series of consultations sponsored by CILSS in the mid-1980s in order to seek a consensus for a framework for rural development. It uses a model of decentralised management (*gestion*) and improvement (*aménagement*) of resources at the level of *terroir*: “a socially defined space, containing a bundle of resources and associate rights within which a community is assumed to satisfy most of its needs” (Toulmin, 1994:3). Key features of the approach were: it provided a way of linking local-level action with broader environmental policy goals; it sought to integrate sectorial aspects of resource use (water, forestry, agriculture and livestock); it sought the voluntary participation of local populations at all stages; it recognised a long-term planning time-frame; and it recognised security of land rights as a prerequisite for local investment in natural resource management (Evers, 1994:7). The different ways the GT approach has been formulated and implemented in the Sahel during the past ten years has been reviewed by Evers (1994). Here our concern is with its implementation by the PGRN programme in Bankass *cercle*, and its contribution to decentralised natural resource management.

The PGRN programme in Bankass started in 1993 and is based at the local offices (*cantonnement*) of the *Direction Nationale des Eaux et Forêts* (DNEF). The programme is implemented by a *cellule locale* made up of local (*cercle*) directors of government services for agriculture, livestock, and cooperatives, and chaired by the *cercle* director of DNEF. In addition to these government officials, the cellule is advised by a programme officer: the *Chargé d'Appui Technique* (CAT). The PGRN programme (identified as “GTZ”) pays the salary of the CAT, and also for motorcycles, fuel and expenses for 14 staff of the government livestock, agriculture, cooperatives, and health services in selected *arrondissements* (Baye, Ouenkoro, Ségué, and Bankass-central). The role of the *cellule locale* is to support the development of village-level resource-management plans: *terroir* is thus taken as equivalent to the jurisdiction of the customary village authorities. The methodology used (PGRN-Gerenat, 1993) is organised in four principal steps:

Préparation: identification of the villages in which the programme is to work; initial consultations with villagers, and creation of a committee of villagers *Comité Villageois de Gestion de Ressources Naturelles*; identification of a multidisciplinary team to work with the villagers.

Diagnostics: initially separated into parallel villagers’ and technical diagnostic activities to identify and map village resources and resource management priorities.

Elaboration de Plan de Gestion de Terroir: a series of planning steps involving mapping where particular actions are required (*Schema d'aménagement*), and a plan for implementing them (*Plan d'aménagement de terroir*) including supporting actions such as training and funding, and a plan for subsequent management (*Plan de Gestion de Terroir*).

Exécution: implementation of the planned actions, and monitoring and evaluation.

At the time of fieldwork, in early 1996, multidisciplinary teams composed of government staff from *cercle* and *arrondissement* levels had undertaken the first two steps (*Préparation* and *Diagnostics*) in six villages selected by the *cellule locale*. The *Schema d'aménagement* had also been completed for all six villages and work on the *Plan d'aménagement de terroir* was in progress for two of them. The progress of the programme was discussed with the chair of the *cellule locale*, in Bankass, and further information was gathered in Baye, which was one of the six villages selected.

The work undertaken in the Diagnostic stage, based on the francophone version of Participatory Rural Appraisal (Methode Accélérée de Recherche Participative- MARP), was supported by the provision of enlarged aerial photographs of the village lands. A written report of the MARP findings for Baye suggests that the methodology is effective in identifying the broad outline of resource use in the village, and priority problems, although the MARP report makes no mention of land tenure issues, or even of cultivation of land within the *terroir* by outsiders. Within these evident limitations, the aerial photographs and maps produced by the MARP activity, in April 1993, were an invaluable resource for discussions which the present research team conducted with the *Comité Villageois de Gestion de Ressources Naturelles* in Baye in January 1996. However, in moving from diagnostics to planning, the PGRN in Bankass confronts a number of problems.

The first difficulty concerns the interpretation of “participation” in the programme. The MARP in Baye involved an interdisciplinary team of six working with villagers for six days. While the development of the *schema d'aménagement* involves further consultation with villagers, there are signs that the process becomes more centralised - the documentation of the *schema d'aménagement* is sent to PGRN in Bamako for processing, as the Bankass team do not have the IT capability considered necessary - and more dominated by technical decisions. As a consequence, the workload for the *cellule locale* to produce the *Plan d'aménagement de terroir* (for a 15-year period) is high, and tends to be technically prescriptive. The *Plan d'aménagement* for Bankass-central, for example, specifies that to cultivate 55ha annually out of the 164ha of the *terroir*, villagers will need to construct 70 compost pits of 10m³ in order to meet the prescribed manuring rate of 10t/ha. The plan specifies a need for PGRN funding for animal-drawn carts to transport the compost. A second issue relating to the extent of “participation” concerns the composition of the *Comité Villageois de Gestion de Ressources Naturelles*. In Baye this committee was effectively the same as the customary authority of the village of Baye. In the light of the discussion above (section 7.1.1) this evidently excludes from representation the interests of many existing resource users, such as pastoralists, immigrant cultivators, and sharecroppers.

A second set of obstacles to progress in the PGRN in Bankass is the concentration of the planning workload on the *cercle*-level members of the *cellule locale*, all of whom have other responsibilities, and, more important, have dual lines of accountability: to the *cellule*, and to their regional departmental line managers in Mopti. The *cellule locale*

chair in Bankass noted that the multiplicity of demands to which staff at *cercle*-level are subjected by their regional offices showed how little co-ordination was being achieved by the *cellule regionale* of the PGRN - itself composed of the heads of those same regional offices.

Many of the observations of the implementation of the GT approach by PGRN in Bankass confirm experience elsewhere (Evers, 1994) which indicates a failure to deal adequately with differentiation within rural communities with consequent under-representation of those with secondary rights of access to resources, and entrenchment of local hierarchies on the *Comité Villageois de Gestion de Ressources Naturelles*. An important further limitation to the impact of PGRN in Mali is that the GT programme is not linked to the wider programme of decentralisation of government. Thus, while the GT programme focuses on decision-making at village level, this has no legal standing (except for the collection of taxes) within the framework for decentralised government, which has the *commune* as the smallest representative unit. This presents problems in that while the resource-management decisions of the *Comité Villageois de Gestion de Ressources Naturelles* remain outside the constitutional framework of decentralised government, it is unlikely that such decisions will be defended by the state as legally binding. This seriously weakens the credibility of GT as a means of improving local governance of natural resources in Mali.

7.3 PROSPECTS FOR REFORM

7.3.1 Decentralisation

Given that the government's programme of decentralisation was incomplete at the time this research was undertaken, it is not possible to say what impact this will have on natural resource management. In Bankass at the time of fieldwork the decentralisation process had completed the first phase of defining the new *communes* prior to holding elections for the members of the *commune* councils. Two members of the *cercle* administration had attended a decentralisation conference and training programme in Mopti, and, on their return, they had organised a workshop for all *chefs d'arrondissement* and *notables* (usually prominent customary authorities) from the *arrondissements* of Bankass *cercle*. This workshop established the boundary commission (*commission de découpage*) for the *cercle*, and also a team within each *arrondissement* to disseminate information and stimulate discussion at village level about decentralisation in general and the choice of adherence to a particular *commune* which each village was required to make. In practice, the existing *arrondissement* administrators - the *chefs d'arrondissement* - formed almost half of the boundary commission, and participation by non-government entities was minimal. Public discussion of decentralisation issues was limited, indicating some anxiety about the ramifications this might uncover. For example, in contrast to the practice in other parts of Mali, discussion of the subject was excluded from local language broadcasts by the local Bankass radio station.

Five of the existing seven *arrondissements* were proposed for simple conversion into *communes*. Of the other two, Diallassougou with a total of 76 villages was split into four

future *communes*, of which at least two (Tori, and Lessagou) effectively reconstituted the jurisdiction of colonial *cantons*. Kani-Bonzon was the other *arrondissement* which was not simply converted into a single commune, but was split into two. Interestingly, one of these, grouping 35 villages centred on the ancient village of Djimbal, reconstituted a precolonial entity concerned with tree and forest management, the Alamadiou (Konaté and Tessougué, 1996). This demonstrates the potential for the decentralisation process to go beyond a simple administrative reformulation and provide an opportunity for a more active assertion of local links and identities. Whether more time for discussion of these opportunities would have prompted more villages to reconfigure *commune* boundaries differently from those of the *arrondissements*, and whether this would have had a positive impact - on land disputes in the Sourou valley, for example - must remain an open question. Late in the process it was rumoured that the village of Songoré had joined with that of Pissa in a bid to form a new *commune* that would have reduced its administrative ties with its neighbour Baye. In the event, the *arrondissement* of Baye is to become a *commune* with no change of the existing boundaries. Among local administrative officials there is some scepticism about the impact of decentralisation. One said he felt the political culture in the Samori was “not mature”, contrasting local institutions to those in other parts of Mali, such as the CMDT zone, where he said the management of significant resources by the Associations Villageoise had fostered the development of a more democratic local culture. Others had reservations about the capacity of communes in relatively poor areas such as Bankass to generate sufficient tax revenue to support the services for which they would be responsible.

7.3.2 Aménagement: Investment and Development of the Sourou valley

When asked where they thought the water came from to change the level of the Sourou, people in the Sourou valley usually say that it came from Burkina Faso. At the lower end of the valley, at Oula, some informants said the water resulted from a dam in Burkina whose construction they attributed to the presidency of Thomas Sankara. Peulh pastoralists, who observed the rise in water level in the lower valley, at Souhé and Oula, two years before it occurred at Baye in the upper valley, also indicate Burkina Faso as the source of the water. One consequence of this is a sense of dependency on events in Burkina Faso for the continuation of the floods that allow rice cultivation in the upper valley. Beyond this, however, many in the Samori have observed the rapid clearance of the land covered by the present level of flooding, and recognise that future access to rice cultivation may depend on increasing further the area covered by the flood. This is of particular interest to those who live in villages in the Samori at some distance from the river, and some have begun publicly seeking support for infrastructure which would improve their access to the Sourou flood.

The villagers of Ganida, for example, are seeking funding from development agencies for works that would allow more water into a branch of the Sourou valley that reaches onto their village's land, and retain the water there for longer. They have sought alliances with other villages, notably Karé and Diallaye, to help press their case, although it is not clear that either of these would gain as much as Ganida itself from such a scheme.

Another “grassroots” initiative to modify the flood regime is the proposal by the *Association pour le Développement des villages du Panadoukou* to construct a small dam on the Bouba tributary, near Oula, to extend area of rice cultivation along the banks of the Bouba to the east of the main Sourou valley. The Association, based in the village of Saalo, represents a group of about ten villages in the eastern Samori and is involved in a number of initiatives to create schools, health centres, and agricultural training for youths. The proposal for a dam on the Bouba has been blocked by objections from Peulh herders from Nassari, who have been allocated the Bouba as a watering area and as a corridor for herds to reach the Sourou (see section 7.1.2 above). The competing claims on the Bouba are ultimately in the hands of the customary village authority at Oula, within whose jurisdiction the lower reaches of the Bouba fall.

These initiatives suggest villagers’ strategy for increasing their returns from rice growing are to find ways of intervening to extend the flooded area. Our analysis of productivity of rice cultivation in the Sourou valley (section 6.4) indicates that in the longer term, as opportunities for area expansion become scarcer, returns from rice are going to depend on improving the yield per unit area. Improved water control is critical to increased rice yields for two reasons. Firstly, the depth of flooding is one of the most important determinants of yield: poorly flooded fields produced on average only 15 percent of the harvest on well-flooded fields. Secondly, the growing problem of perennial weeds (especially *Oryza longistaminata*) associated with rice-growing areas will, if not controlled, take some fields out of production completely. Control of these weeds requires thorough tillage which is possible only if the land is drained for at least part of the year.

For all these reasons, the need for some form of water management in the Sourou valley will grow in the next few years, if the prosperity based on rice is to continue. International investment is available, in principle, in the form of a project to be funded by the *Fonds d’Equipment des Nations Unies* (FENU). This projected an expenditure of US\$9 million over 5 years in the *cercles* of Bankass and Koro (FENU, 1992), to begin in 1996. The project is to undertake a number of actions throughout the two *cercles*, mainly through support to improving village land management in about 80 villages, which will be sub-contracted to NGOs and other development agencies. In addition, the project will build a culverted causeway (*digue-ponceaux*) across the Sourou at Baye and construct a laterite road from Baye to Oula, thus opening up year-round road access to the Sourou valley in Mali. Finally, as part of land management improvement for villages in the valley, the project envisages the construction of small water management works.

FENU project documents are cautious about how much water management infrastructure will be built, stressing the need for further studies and consultation with the villages concerned. However, a number of possibilities are mentioned. These range from a system of sluices which incorporated into the causeway crossing at Baye. This would permit the rising flood to move upstream but then retained (and augmented by streams feeding the upper reaches of the Sourou) by closing the sluices. A potential storage of 3.8 million m³ is estimated to be feasible behind such a structure. This would allow longer and more extensive submersion of the upper end of the Sourou valley. The potential for smaller-

scale submersible dykes to regulate water levels in the many backwaters of the Sourou floodplain has also been noted in project documents. Interventions of this kind would clearly meet the needs of villagers seeking more rice land, such as those in Ganida. However, the case of the hamlet of Yara within the *terroir* of Baye discussed above (section 7.1.1) shows that even discussions of infrastructure for water control are likely to inflame the tensions which exist over land rights between immigrants and customary landholders.

The fears and expectations attached to *aménagement* are openly voiced by all sides in the Sourou valley. Holders of customary rights over land fear that outside investment to improve water management will be accompanied by the extinction of their control over the land and its transfer to a project management over whom their influence will be secondary to that exercised by outsiders from administrative or commercial centres, such as Bankass, Diallasagou, or even Mopti. This fear stems from their observation of the ODR (Office du Niger) system in the Niger Delta. The suppression of customary rights which most associate with *aménagement* is viewed equally with dismay by land-lenders and with hope by land borrowers. Of the latter those with most to gain are the immigrants, particularly Dogon but also Bellah and Peulh seeking income from rice, who have no kinship ties with local landholders to exploit, but who are locally resident and thus are perceived by landholders to threaten long-term claims over land which they cultivate on loan.

The climate of uncertainty and rumour has been fed by uncoordinated actions among different development agencies. The FENU proposals have been the subject of unofficial discussion for a matter of years, but had not been discussed with PGRN at the time this fieldwork was conducted. An early action of the FENU project will be to map the *terroir* of all 80 villages where it will be working, using geographical positioning system and SPOT satellite images, but there are no plans to share this with other agencies. As discussed earlier, the present study team were viewed with deep mistrust in Baye from the start, particularly by individuals who felt they had been the object of criticism by SOS Sahel researchers in the past. In addition, a research team from the UNDP (the United Nations Development Programme) were in the process of a 6-day intensive study on poverty in Baye, and the Projet National de la Vulgarisation d'Agriculture had carried out a census of rice fields independently of our study in Yara two weeks previously. Not surprisingly it was very difficult for the local population to distinguish between all the various "research teams", and a certain amount of scepticism was evident. As one village leader in Songoré put it, "When we were hungry and needed help, no-one was interested in coming here. Now that we have some prosperity, don't come here and measure us up to tell us how much of our land we need to feed our families."

[The experiences described above provide a clear example of how the activities of external organisations and the study team itself can affect the results of a study such as this one and how these effects are of considerable importance in interpreting the findings. There is little doubt that their previous exposure to SOS Sahel as well as the presence of other research bodies influenced the decision of Baye not to join in the study. Equally, it is probable that the acceptance of the study in Songore and Oula was more sign of good

faith in SOS Sahel than in our explanation of the objectives of the study: given the relationship SOS Sahel has developed with the villages, it may be felt SOS Sahel would be unlikely to take people's land from them and the study may even be able to assist them in their rice production]

7.3.3 NGO-led initiatives.

Since the mid-1980's a number of internationally funded non-government organisations have been active in funding and implementing development initiatives in the Seno and Samori. The three principal agencies are SOS Sahel, in the *cercle* of Bankass, and CARE International and the Near East Foundation (NEF) in the neighbouring *cercles* of Koro and Doenza, respectively. All have been engaged in activities across a broad sectoral range, including health, literacy, and water supply, but with their main focus on improving and conserving the natural resource base through soil conservation, tree planting, and support for local woodland management institutions. The programme of decentralisation begun by the new government in 1993, has provided the three NGOs with further scope for developing their support for local resource management, and they have formed a regional network through which to share experience and develop policy. An important element of this joint effort has been a series of workshops to explore a conceptual framework for developing local institutions for resource management. In 1993 and 1994 these workshops sought to develop an approach for local application based on Institutional Analysis and Design, an analytical framework based on institutional economics which has already been employed in the Sahel, notably by Associates for Rural Development undertaking research for USAID (ARD, 1992; Thompson and Coulibaly 1994). The 1994 workshop identified some important themes in this approach and its relationship to the Malian government's decentralisation programme. The following draws on the written proceedings of that workshop (CARE/Mali, 1994).

Firstly, the approach seeks legal recognition for rural local resource-management organisations. These may be village-level or supra-village entities, such as the customary tree and woodland management authorities, the Alamodiou, the Ogakana, and the Waldé Kelka. Recognition of these organisations would include allowing them to set rules of access (eg to woodland), and to apprehend and apply sanctions for infractions. Possible routes to legal recognition under existing legislation include the constitution of these organisations as cooperatives (1988 legislation) or as private associations (1959 legislation). Either way, however, the right to fine or otherwise punish transgressors is likely to be seen as problematic: a form of "private justice" to which state authorities would be opposed.

A second theme to emerge from the 1994 workshop is that the definition of decentralised collective entities (*la délimitation des collectivités dites "décentralisés"*) should be "adapted to the local socio-economic conditions". This means that, where appropriate, the *village* should be legally recognised as a *collectivité*. In this way the NGO approach addresses the problem exposed by the GT experience (section 7.2.2), that the customary

(village) authorities who control natural resource use have no formal legal recognition within the decentralised system of government by *communes*.

A third theme, essential to support the proposal of recognition of villages as *collectivités*, addresses issues of power within the village. It is argued that, while hierarchical, villages consist of many institutions which each exercise some power. Effectively, therefore, the village is perceived as a pluralist entity, with no one group or individual controlling all the the power and the role of the village chief being one of coordination and arbitration. This, it is argued provides a structure which can control the abuse of power and provide alternative pathways by which individuals can seek recourse against what they see as injustice within the village.

The conceptualisation of the village as a pluralist entity offers scope for NGOs concerned with equity to engage in partnership with social groups for whom rights are fundamentally hierarchical, rather than universal. While acknowledging that village institutions currently do not adequately represent the interests of certain groups (women, pastoralists), it allows for the possibility that pluralist village power structure will permit innovation that enables its institutions to become both more effective and more inclusive in managing natural resources.

The main tasks to emerge from this approach for NGOs are to mediate between government and rural organisations in order to secure legal recognition for the latter, and to encourage the evolution of village organisation towards the pluralist model. Some progress has been made already towards the former, with the signature of local natural resource management “subcontracts” between the local officials of DNEF and local woodland management groups. In each case, an NGO (CARE/Mali in Koro, and SOS-Sahel in Bankass) has been a third signatory to the agreement, effectively offering some guarantees to the government side.

It is too early to say how successful this approach will be, but it is perhaps significant that the main focus of discussions have tree and woodland resources, and a particular concern with the regulation of clearing of woodland in the Samori for agricultural expansion. The relevance of the approach to the issues identified in the case study of rice cultivation in the Sourou valley may be limited by the fact that the flooded areas for rice-growing are of much more limited extent and much more easily subject to individual control than woodland resources.

8. RICE CULTIVATION IN THE SOUROU VALLEY: ISSUES IN LOCAL GOVERNANCE

From 1990 onwards cultivators in the Sourou valley have cleared about 6000ha, mostly to grow rice. Based on a sample of 20 percent of fields in two villages, this study produced an estimate of average paddy yield of 1.3 t/ha, giving an overall production conservatively assessed at 5276 tons or US\$1.2 million. This increase in cereal production has been achieved without reducing dryland production of the staple millet crop in the area, and thus represents a net gain to cereal production in the Samori. The study found that the development of rice farming has had a major positive impact on food security in the villages of the Sourou valley, and on income opportunities, particularly among young men. The development of rice farming has attracted many seasonal migrants to the Sourou from the Seno and Samori, and provides an additional attraction to permanent immigrants in new settlements (*hameaux de culture*), particularly in the northern part of the Samori. In the village of Songoré, at the upper end of the valley, seasonal farmers and hired labourers were estimated to have harvested or received in payment 22 percent of the rice crop, with immigrant settlers taking another 11 percent. In Oula, at the lower end of the valley, the “outsiders” share was lower, with seasonal cultivators and hired labour taking 15 percent and immigrants only 3 percent. The development of rice cultivation has been undertaken at the initiative of local villagers and immigrants to the Sourou valley, and decisions about access and use of the floodplain land have been controlled by customary authorities at village level: the Massaké (*chef de terres*), and the leaders of lineages with hereditary customary rights to land. Neither government technical services nor NGOs have had significant input to the development of rice production to date.

However, the study identifies a number of underlying problems which those cultivating the floodplain will have to address in the near future, and which raise questions about the nature of future intervention by government and non-government agencies. These problems may be grouped under two main headings. Firstly, the need for investment to introduce some form of water management to increase the reliability of rice yields, maximise the area available for rice cultivation, and allow the growing threat of perennial weeds to be contained. Secondly, the need to resolve the mounting tensions which land allocation under customary tenure has begun to create, in relation to land distribution within village jurisdictions and also between villages and between villages and pastoralists.

In relation to this latter set of problems the study examined the operation of customary tenure in relation to the floodplain land, and found that the rights and obligations of those with hereditary rights over land were subject to different and contested interpretations. This suggests a need to look more carefully at what is meant by “customary tenure”. The brief review of Malian land legislation undertaken here (section 2.4.2) suggests customary tenure incorporates a legacy of precedent that includes rules imposed by past states (such as the Dina imposed by the Macina state), but interpreted in response to current economic and social constraints and opportunities. In the case of the Sourou valley, the historical precedent of the past 300 years is one in which settlements were

relatively isolated both locally, because of the Samori woodland, and regionally, because of their location at the periphery of the states based at Segou or Macina. The Tiondougou and Ouladougou entities of the Samori concentrated authority at the level of the village. Yet present-day village communities in the Sourou have been, for the past half-century at least, closely linked through migration to urban centres in Mali and throughout West Africa. This has an impact on village society socially, economically, and culturally. This is manifest to some extent in the testimony of villagers' aspirations as consumers (section 6.5), but also in the interpretations of "customary" hereditary rights as the landlord's right to charge rents - an interpretation which is justified by explicit reference to commercial practice in towns and plantations (section 7.1). The opportunity to charge rent is provided by the fact that the floodplain land itself is quite limited in extent but has become very productive, and the hereditary rights are rather narrowly distributed by comparison with the number of resource users. In one of the two villages studied in detail, Songoré, only 9 percent of households had no hereditary rights to land in the floodplain, but the large number of immigrants and seasonal cultivators in this part of the Samori - who have no hereditary rights - cultivated 36 percent of the village's floodplain land in 1995 (section 4.2). To the south, in the village of Oula there are fewer immigrants, but 31 percent of village households have no hereditary rights on the floodplain. The study produced some evidence that, most notably in the village of Baye (section 7.1.1), holders of customary land rights are inclined to substitute "obligations" to loan land to kin or fellow villagers by more market-oriented sharecropping arrangements with outsiders from the Seno, or beyond. More generally, the loaning of land on an annual, rather than an indefinite basis, was considered to be exploitative by many borrowers. This was particularly felt to be the case where the borrower had to clear woodland to create a new rice field - a considerable investment - but was then only allowed to cultivate it for one or two years. The terms of land transactions described by this study suggest that even indefinite loans involved substantial "considerations" being offered by the borrower to the lender of the land, in the form of labour or part of the harvest. What the annual loan introduced was not the principle of payment but the insecurity of competition, the possibility of needing to find a new plot for next year, which pushes the level of payments upwards.

The study showed that the Dogon immigrants living in hamlets were more vulnerable to having loaned plots withdrawn from them, but that there was some concern that the practice could spread to loans between members of the same village. If this were to take place it could accentuate further the differentiation evident in this study. In particular, the survey of rice cultivation, when coupled with a wealth ranking of households within the two villages studied, indicated that the wealthiest households cultivated an average of 4.58ha of rice while the poorest cultivated 2.8ha. This difference appeared due mostly to the ownership of draught oxen by wealthy households. Other trends suggested by the survey, though not statistically significant (due to incomplete data), are that wealthy households appeared more likely to have well-flooded land and, on average, rice yields twice as high as poorer households (section 6.4.4).

It is too early to judge whether these trends will raise serious issues of wealth differentiation within the villages of the Sourou floodplain. What is evident from the

study is that the system of customary authority confronts growing tensions over floodplain land both within and between village jurisdictions. Any intervention by government or non-government agencies must therefore examine the options for land tenure reform. Discussion of reform is commonly conducted in terms of a dichotomy between “modern” (written) and “customary” (oral) which effectively calls into question the legitimacy of both. The existence of “customary” tenure emphasises the external and imposed colonial (and by implication post-independence) government, whereas the existence of “modern” (private) tenure suggests an unfinished process of transformation of “customary” tenure. This dichotomy can be perceived to persist in the government’s current decentralisation plans, which leave ambiguous the relationship between elected government and hereditary authority.

The years from 1991 to the present have marked an interregnum between the withdrawal of active policing of natural resource management by the (central) government’s forestry service and the devolution to *communes rurales*, to be governed by an elected council with considerable autonomy for managing natural resources under its jurisdiction. On the eve of the formation of the *communes* this study found that the main powers of local government (*cercle* and *arrondissement*) administrators to control natural resource use lay in their ratification or rejection of proposals for new settlements, and the associated cultivation rights for the settlers. Over this period the standing of village authorities has been enhanced by the emphasis of their role by the *Gestion de Terroir* approach of the government’s natural resource management programme (PGRN), and by the many NGO actions in the Samori and Seno focussed on village-level organisation.

However, the current decentralisation programme in Mali does not define how the *commune* council will relate to village authorities. The only legally-recognised village authority is the administrative chief (*chef de village*), whose appointment will continue to be negotiated between the customary village authority and the local delegate of the *central* government (section 2.3.3). The decentralisation programme excludes from legal recognition the principal authorities governing natural resource use: the *Massaké* and lineage leaders who hold customary hereditary land rights. Conversely, although the *commune* is to have authority over resources (notably forest) within its “domain”, it is unclear whether this includes land claimed by customary village authorities. What, then, are the roles in natural resource management of representative (*commune*) and hereditary (village) authority?

NGOs have sought to act as mediators between village and government, and have advocated the designation of villages as the most local form of *collectivité décentralisée*. This designation carries with it, however, expectations of equality of representation of different interests within the *collectivité*, that may not be reconcilable with customary patterns of hereditary and hierarchical authority. NGOs have sought to reduce any democratic deficit by conceptualising villages as pluralist entities in which different groups control different sets of resources, and, as a result, power is distributed among different interests. This study suggests that where the governance of floodplain resources are concerned, this approach faces considerable obstacles. In particular the village *terroir* may contain large numbers of immigrant cultivators, possibly now constituting a majority

of the population within the jurisdiction of some villages of the Sourou valley. These, together with pastoralists whose grazing lands are claimed by village authorities, are essentially unrepresented within the customary authority of the village and have rights that are subordinate to those of lineages with hereditary customary rights. Moreover, one of the most valuable resources, the floodplain land used for rice cultivation, is held by a minority who, in some villages, show an inclination to allocate it according to market criteria rather than those of community solidarity.

For the “pluralist” model of village governance to work requires either full representation within the village councils of the interests of those, such as immigrants and pastoralists, who are currently excluded, or their constitution as separate *collectivités* with autonomy to manage their own land. The conflicts described in section sections 7.1.1 and 7.1.2 show that this is an extremely sensitive area, and one in which existing government structures have proved ineffective in resolving (as opposed to containing) disputes or in providing assistance to negotiated reform. It appears inescapable that future intervention, whether by the future *communes* or by NGOs, must deal with the need for reform of land tenure. This is most urgent on the rice-growing lands where a climate of mistrust constitutes a barrier to any reform of hereditary rights in favour of cultivator’s rights.

It is possible that the linkage of tenure reform to investment in improved water control, such as that envisaged by FENU, might be a means of transforming it into a “win-win” prospect in which hereditary landholders give up certain rights in return for improved productivity and opportunities for diversification which investment in water control could bring. This may be optimistic, however, as the experience of imposed tenure reform under state development schemes (ODRs) elsewhere in Mali has left all sides with the view that *aménagement* is a zero-sum game in which those with hereditary rights will be the losers and those without such rights - notably the immigrants and seasonal cultivators from elsewhere in the Samori and Seno - will be the winners. Failure to achieve a negotiated reform threatens the legitimacy of the outcome and its future subversion by a continuing “deeper” legitimacy of “customary” rights.

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Appendix: Maps

Map 1: Rivers and Principal Towns in Mali

Map 2: Location of the study area

Map 3: The Sourou Valley

Map 4: Approximate boundaries of historical socio-entities and colonial cantons, *cercle de Bankass*

Map 5: Sketch map of the location of the Lery Dam

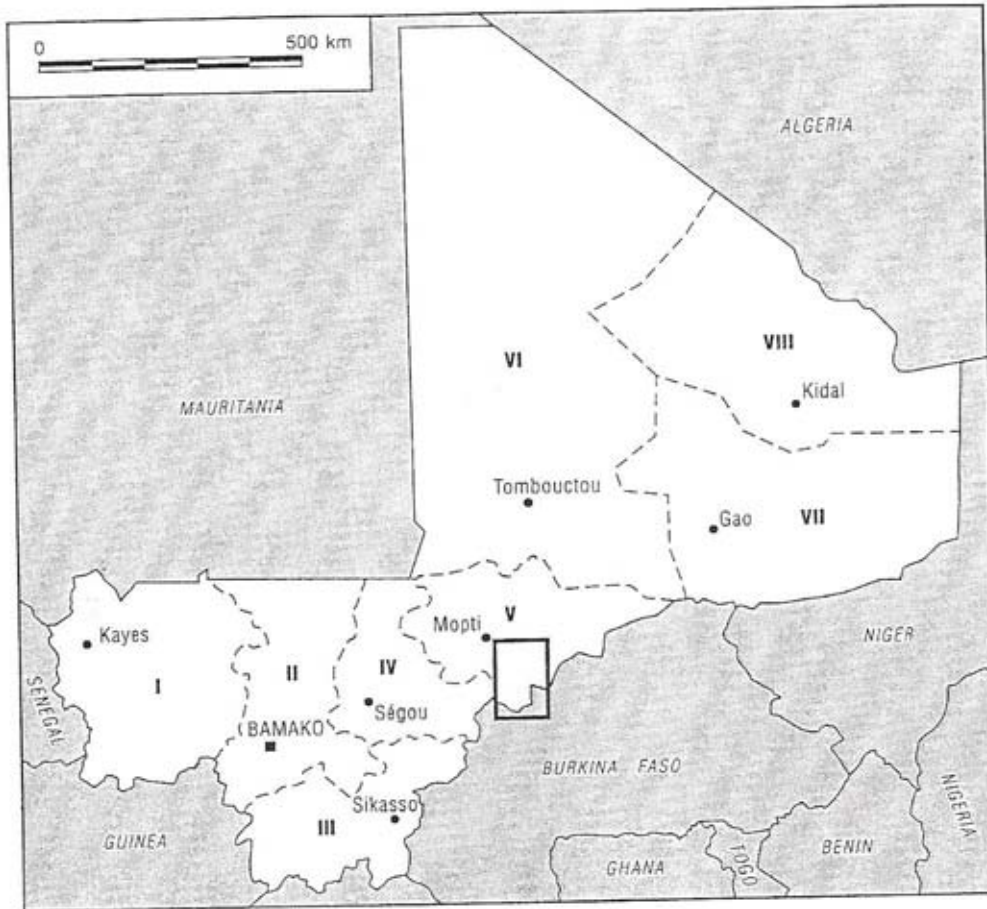
Map 6: Limits of areas within aerial photograph interpretation

Map 6a: Limits of areas within aerial photograph interpretation (continued).

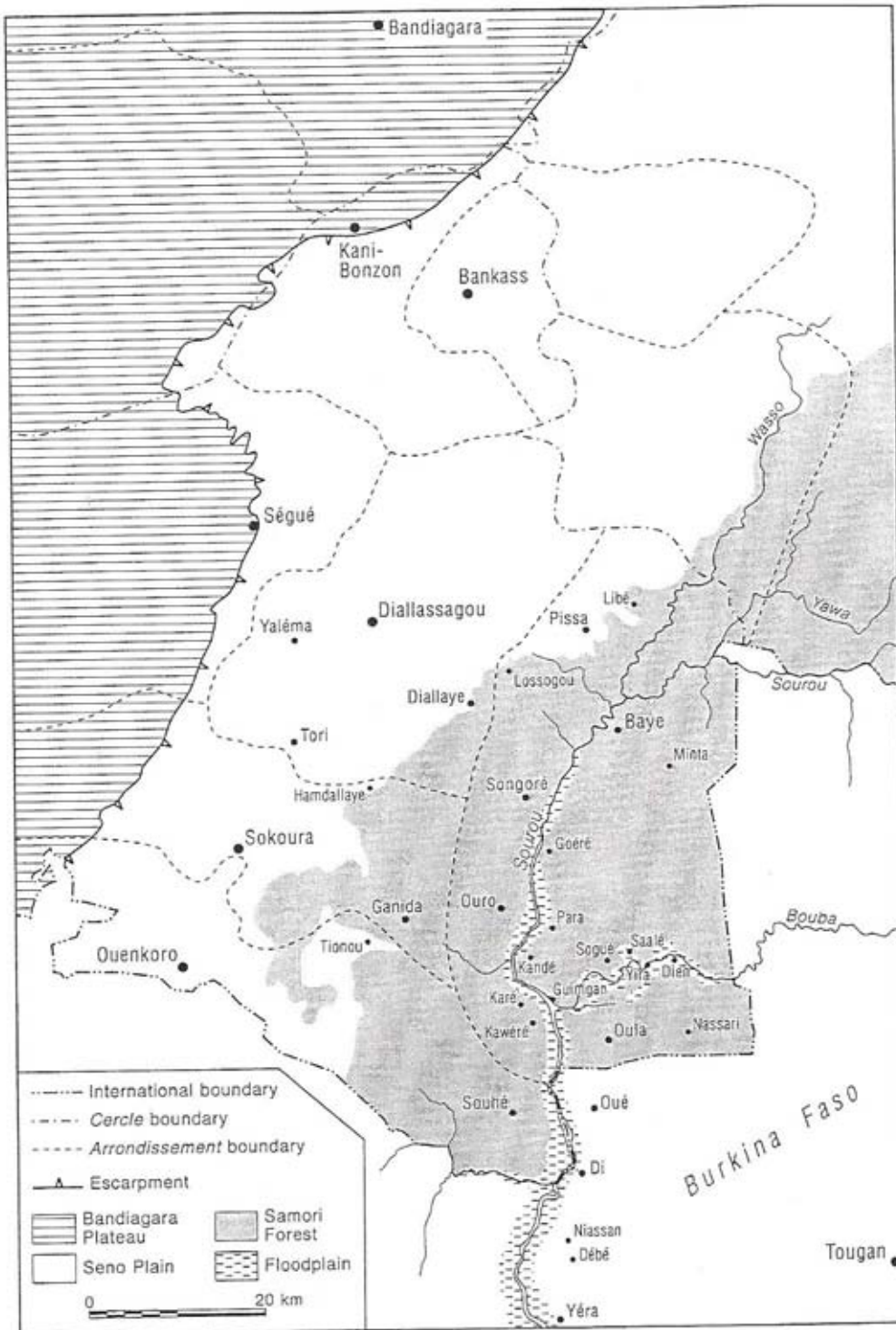
Map 1 : Rivers and Principal Towns in Mali



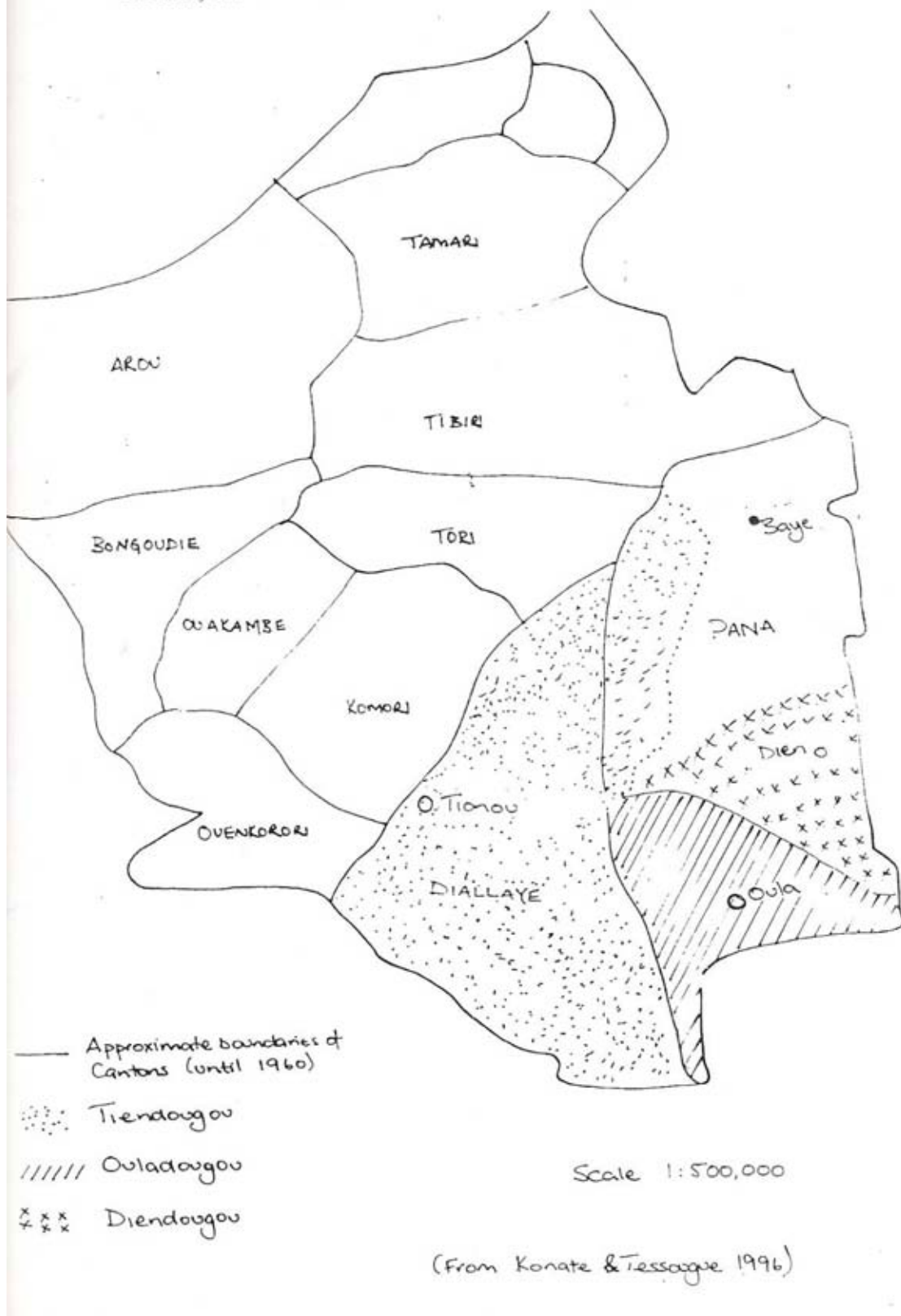
Map 2: Location of the study area



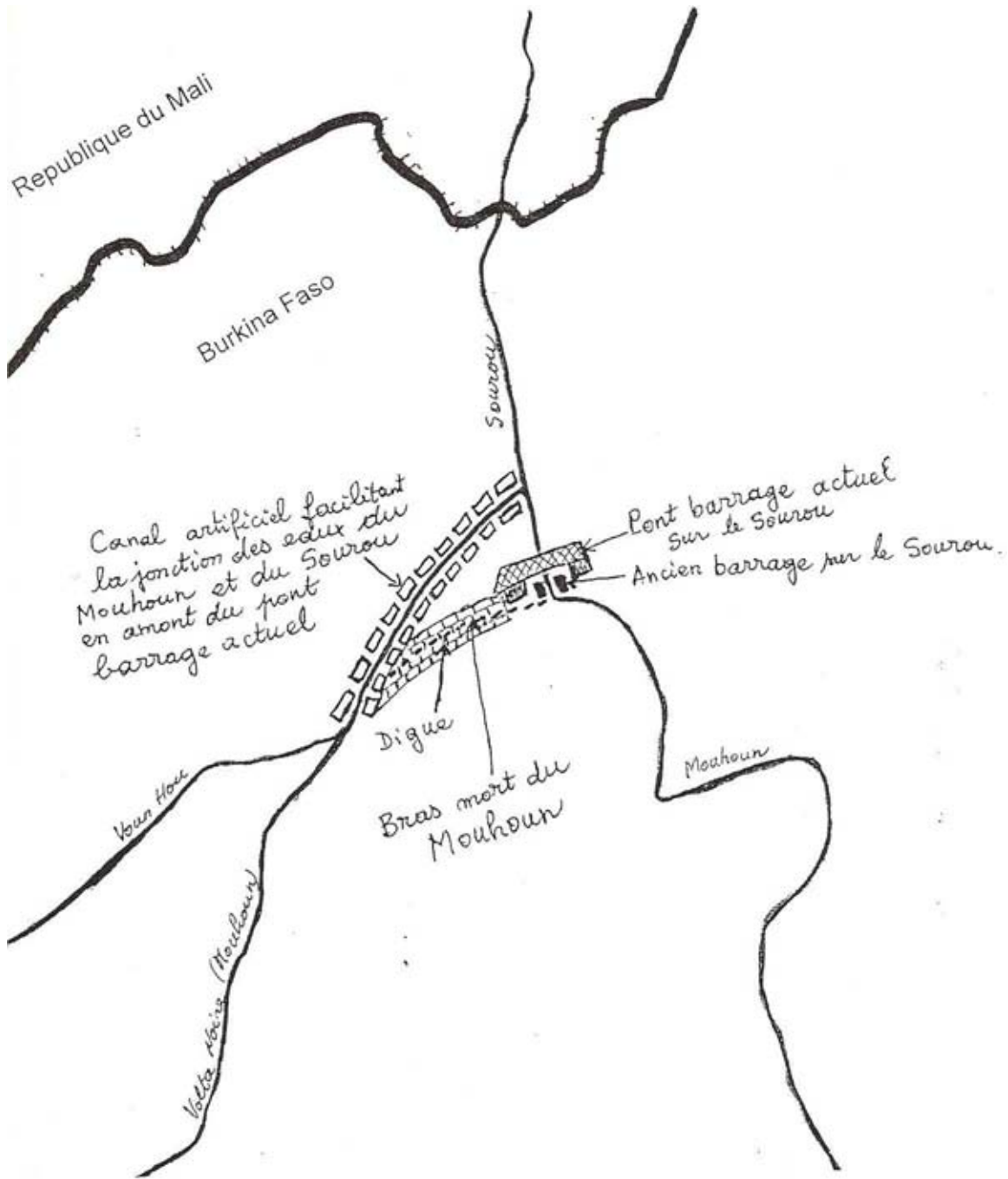
Map 3: The Sourou Valley



Map 4: Approximate boundaries of historical socio-entities and colonial cantons, cercle de Bankass

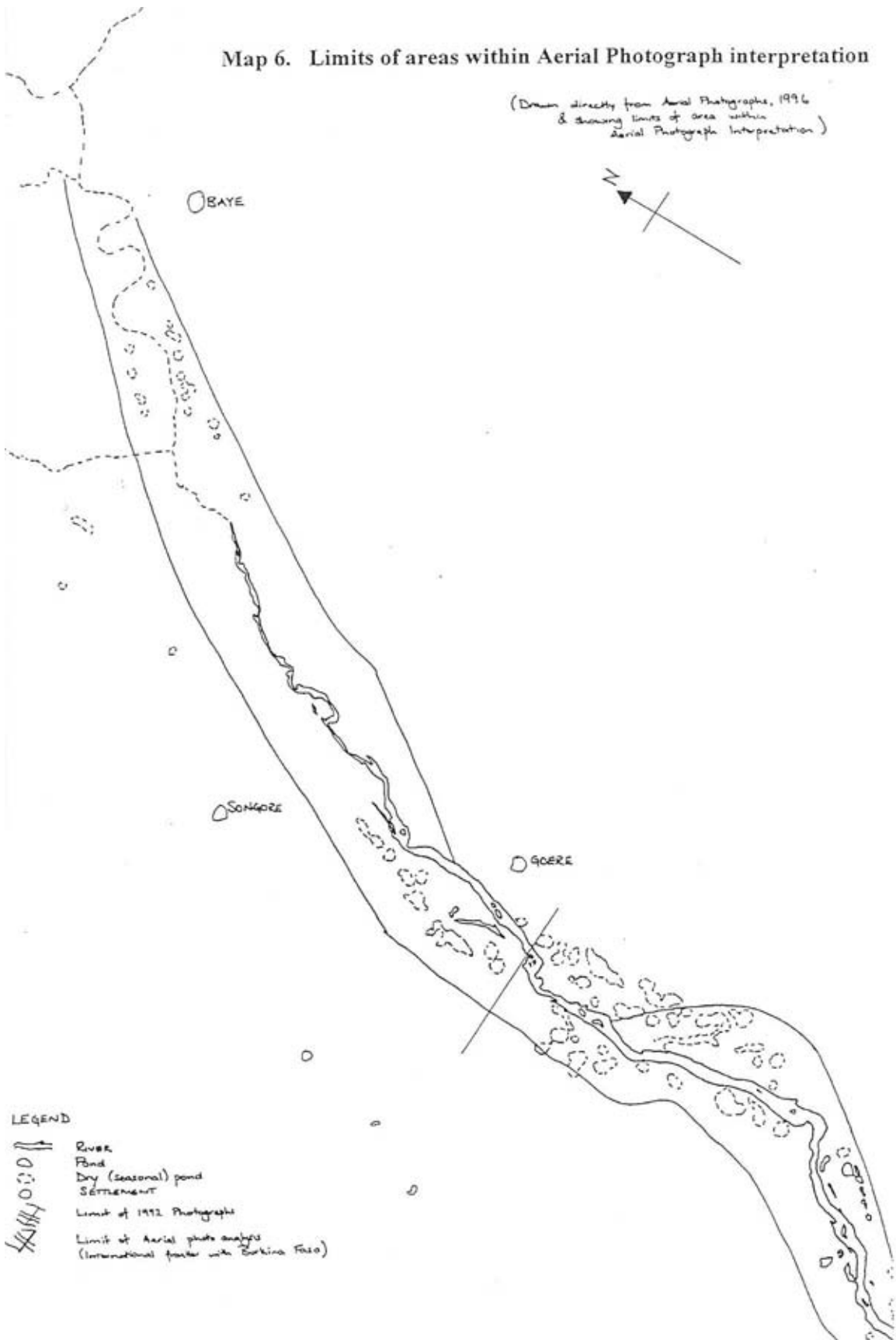


Map 5: Sketch map of the location of the Lery Dam



Map 6. Limits of areas within Aerial Photograph interpretation

(Drawn directly from Aerial Photographs, 1996
& showing limits of area within
Aerial Photograph Interpretation)



THE SOUROU VALLEY (II)

Map 6 (continued)

