

# Settlement and Development in the River Blindness Control Zone

## Case Study Burkina Faso

Della E. McMillan, Jean-Baptiste Nana,  
and Kimseyinga Savadogo





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## Foreword

This volume is a case study of land settlement in Burkina Faso prepared as part of the Land Settlement Review (LSR), a regional study of land settlement in West Africa. The objective of the LSR was to examine the phenomenon of land settlement resulting from the successful control of onchocerciasis (riverblindness) by the Onchocerciasis Control Programme (OCP). The LSR analyzes the process of land settlement, both spontaneous and government sponsored, and recommends operational policy guidelines for promoting viable and sustainable settlement-related activities in the areas where onchocerciasis has been controlled.

OCP is widely acknowledged as the most successful on-going disease control program in Africa. Started in 1974 by a group of 7 West African countries and 9 donors, including the World Bank, the program has expanded to 11 countries, includes 22 donors and protects 30 million people. In most of the original program area the disease has been virtually eliminated and lasting control of the disease throughout the extended program area is expected to be secured around the year 2000. The health impact of the program has been significant. Nine million children born since the beginning of the program are free of any risk of contracting the disease. Over 1.5 million people who were once seriously infected are now disease free and the program will have prevented an esti-

mated 300,000 cases of the disease by the end of this decade.

In addition to its substantial health benefits, one of the primary justifications of the program has been the substantial development potential of sparsely populated onchocerciasis endemic river valleys. It is estimated that 25 million hectares of tillable land is being opened up by onchocerciasis control and rapid migration to these river valleys is already occurring. OCP is not directly involved in the socio-economic development of these areas, but the Committee of Sponsoring Agencies (UNDP, FAO, WHO, the World Bank), the statutory body that oversees OCP, has encouraged development in the OCP area by executing two regional studies: the first, Socio-economic Development Studies in the Onchocerciasis Control Programme Area, looked at the development potential of the onchocerciasis freed areas and the second, the LSR, examined the extent and impact of new settlement in the OCP river valleys.

The LSR, prepared by the Institute for Development Anthropology, Binghamton, New York, consists of in-depth case studies of Burkina Faso, Ghana, Mali and Togo, as well as shorter reviews of settlement activities in the other OCP countries (Benin, Cote d'Ivoire, Guinea, Guinea-Bissau, Niger, Sierra Leone, and Senegal). The Burkina Faso case study is being published as part of the riverblindness

technical paper series because Burkina Faso has experienced more settlement in the onchocerciasis-controlled areas than any other country. The government of Burkina Faso has been active in promoting settlement over an 18 year period and this study provides important insights into the possibilities for and limits to government action in support of land settle-

ment. Other volumes in the series are the Final Report from the LSR and an overview of the structure and history of OCP.

Katherine Marshall  
Director  
Sahelian Department  
Africa Region



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## Preface

The socio-anthropological study by Della McMillan, Jean-Baptist Nana and Kimseyinga Savadogo on settlement strategies in Burkina Faso, published in the present volume, is one of the basic, in-depth country case studies of the Land Settlement Review carried out in 11 countries in West Africa in the Onchocerciasis Control Program area. The overall report of the Land Settlement Review was published in a separate report in the present publication series.<sup>1</sup>

The extraordinary achievement of reducing and virtually eradicating river blindness in vast areas of West Africa, where for decades people have suffered terribly from this disease, has reopened these territories to expanding human settlements. The Land Settlement Review, carried out by a research team of the Institute for Development Anthropology (Binghamton, NY), with support from several sponsoring agencies including UNDP and World Bank, has explored the potential for such settlements and has formulated recommendations to interested *governments* and agencies as to the need and approach for assisted settlement strategies.

The country study presented in this volume by Della McMillan and her associates enables the reader to examine, for one country, the wealth of empirical material on which the analysis and recommendations of the settlement review are based, and the field research methodology through which it was gathered and processed.

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<sup>1</sup> See Settlement and Development in the River Blindness Control Zone, by Della McMillan, Thomas Painter and Thayer Scudder, 1992, Washington, DC, The World Bank.

The Burkina Faso case study was selected for publication because this is the country where new settlement has progressed most during the first 18 years of onchocerciasis control. The study is also distinguished by the fact that it benefitted from previous baseline data (Murphy and Sprey, 1980; McMillan 1983) that could be restudied<sup>2</sup>; it includes a rare longitudinal case study of settlers who immigrated to the Volta river planned settlements between 1974 and 1979.<sup>3</sup>

The significance of this research extends beyond the topic itself. Today many of the oncho control areas are being reoccupied by adjacent populations as well as by immigrants from outside the immediate basin region. Unassisted and unguided, spontaneous or anarchic settlement, many result in the development of local systems for agricultural production that have negative long term consequences for people and natural resources, ranging from declining productivity and real income levels to outright environmental deterioration and the eventual abandonment of once-productive lands. The land settlement review and its country studies strive to identify approaches and strategies that will result in production systems that are sustainable and that contribute to the viable socioeconomic development of the surrounding region. The dedicated field researchers of the Burkina Faso case study have not only reconstructed a convincing image of the web of complex social processes going on in the areas they studied, but have also made a

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<sup>2</sup> See Murphy, Josette and Sprey, Leenert 1980.

<sup>3</sup> McMillan, Della, 1983, 1986, 1987a, 1987b.

AVV-UDs. The UD chiefs of Mogtedo, Bombore, Rapadama, and Linoghin assisted us with the development of longitudinal data sets on production and settlement patterns in their own groups of planned settlements.

This research could not have been conducted without the active support of the OCP and various national and regional agencies that have offered their assistance. In the Solenzo region we are indebted to the Director of the CRPA du Mouhoun for giving us access to many of their data sources as well as occasionally extending help with data collection. We are especially appreciative of the efforts of Adama Traore, who also heads the PNGT (Programme National de Gestion des Terroirs Villageois) pilot projects for the Solenzo region. The *Préfet* of Solenzo is to be thanked for the administrative assistance he provided.

Our work in Niangoloko would not have been possible without the unfailing support we received from the *Préfet*. We also wish to extend our thanks to the staff of the Comoe CRPA and the multiple forest use project at the Classified Forest at Toumousseni.

Our research at Kompienga was conducted with strong support from the dam construction authority (*Direction Générale de la Maîtrise d'Œuvre de la Kompienga* [DGMOK]) as well as SONABEL (*Société Nationale d'Electricité du Burkina*), the national electricity authority. We are especially indebted to Pascal Zagre, former General Director of the Kompienga Project; Guira Antoine, the DGMOK sociologist, now with the Ministry of Education; and Jean Ouedraogo, DGMOK supplies chief, now attached to the new Bagre project.

M. Emmanuel Nikiema, Director-General of the AVV, has been extremely supportive of our work throughout the country. We are especially indebted to him and his staff for the excellent overview they gave us of development in the different zones. Mme. Celestine Bere, Director of the AVV *Suivi-Evaluation* Department, has served courageously as Burkina's representative on the national onchocerciasis committee for many years. We appreciate the detailed comments we received from Mme. Bere and we are also very grateful to the logistical support provided by the last two directors of the AVV *Direction des Etudes, Programmation et Contrôle* (DEPC). On the ground we were aided tremendously by the strong support we received from the Director of the AVV-UP1 office at Zorgho, and his staff. Our research in the AVV planned settlements would not have

been possible without the help of the UD chiefs at Mogtedo, Mogtedo-Bombore, Linoghin, and Rapadama. The *Préfet* at Mogtedo and the Mogtedo CR (Revolutionary Committee) extended their support and collaboration to the longitudinal research we conducted on the Mogtedo market. At a personal level we would like to thank Arthur-Felix Yanogo, Benjamin Tabsoba, and the hard-working farmers of Mogtedo V3 who have made it possible for us to continue the longitudinal case study these ten long years.

The Burkina case study and the Land Settlement Review (LSR) have benefited immensely from the strong support we received from Dr. Ebrahim Samba, Director of the OCP, and his staff. For more than a year we found encouragement and logistical support from our many OCP colleagues, and a home away from home in the OCP Economic Unit, under the direction of Mr. Jean-Baptiste Zongo. Mr. Michel Pare, Mr. Patrick Chopin, and Mr. Ayina are thanked for their assistance with the myriad administrative and logistical details we faced in doing the research. Mme. Kabore, the OCP librarian, worked to track down much of the bibliography cited here; her efforts are invaluable. Without technical assistance on microcomputers from Mr. Soumbe, in the OCP Biostatistics and Information Systems Unit, we would never have been able to analyze the massive amounts of data collected. Mr. Saidou Gadjaga, of the Biostatistics and Information Systems Unit, helped with the analysis of certain data sets; Mr. Daribi and Mme. Simporé, with data entry.

Jeanne Cornell and Elizabeth Albert, graduate students at the University of Kentucky, provided research and production assistance on the earlier version of the Burkina report as well as translation and typing on other country reports. Jeanne Harlow played a major role in the initial structural editing of the first draft of the Burkina report, and is the primary person responsible for the design and reproduction of maps and other graphics for this report and the Final Report. Melanie Brandt drew some of the maps. Debbie Anderson, computer systems analyst, did an excellent job of carefully verifying the base data and running some of the important data sets—including land measurements and input use at Solenzo, the Kompienga census data, the FulBe economic studies, and the expenditure and revenue survey. For final editing of this monograph we are indebted to Vivian Carlip at IDA, for the



initial draft, and Carol Lauriault at the Center for African Studies, University of Florida, for this monograph. At IDA, Vivian Carlip received assistance from Sylvia Horowitz, Curt Grimm, Kim Munson, and Dianne Anson.

We would like to extend thanks to Michael Cernea and Scott Guggenheim of the World Bank and to Nicole Glineur, Tijan Sallah, and Beth Skinner of the World Bank Oncho Unit. We would also like to thank Mr. Claude R. Delapierre, the Resident Representative of the Burkina World Bank Mission, and his staff including Celestin

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We are grateful to Bruce Benton and John Elder of the World Bank Oncho Unit who encouraged us to revise the initial report for publication.

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## Acronyms

ALE	Adult labor equivalent
AVV	Autorité des Aménagements des Vallées des Volta (Volta Valley Authority)
CEARD	Cabinet d'Etudes d'Appui et de Recherches pour le Développement
CILSS	Comité Permanent Inter-états de Lutte contre la Sécheresse dans le Sahel
CMRPN	Comité Militaire de Redressement pour le Progrès National
CNR	Conseil National de la Révolution
CR	Revolutionary Committee (Comité Révolutionnaire)
CRPA	Centre Régional de Promotion Agropastorale
CSA	Committee of Sponsoring Agencies
CSFA	Conseil Supérieur des Forces Armées
CSP	Conseil de Salut du Peuple
DAF	Direction Administrative et Financière
DEPC	Direction des Etudes, Programmation et Contrôle
DGMOK	Direction Générale de la Maîtrise d'Ouvrage de la Kompienga
DMR	Département du Monde Rural
FAO	Food and Agriculture Organization of the United Nations
GNP	Gross national product
GRN	Gouvernement Renouveau National
GTV	Gestion des Terroirs Villageois
GTZ	Gesellschaft für Technische Zusammenarbeit (German Development Agency)
ICRISAT	International Crop Research Institute for the Semi-Arid Tropics
IDA	Institute for Development Anthropology
IMF	International Monetary Fund
INERA	Institut d'Etudes et des Recherches Agricoles
INSD	Institut National de la Statistique et de la Démographie
LSR	Land Settlement Review
NGO	Nongovernmental organization
NPK	Nitrogen-phosphorus-potassium (fertilizer)
OCP	Onchocerciasis Control Programme
OFNACER	Office National des Céréales
ONAT	Office d'Aménagement des Terroirs
ORD	Organisme Régional de Développement
PATECORE	Projet Aménagement des Terroirs et Conservation des Ressources dans le Plateau Central



PNGT	Programme National de Gestion des Terroirs
PNGTV	Programme National de Gestion des Terroirs Villageois
RDA	Rassemblement Démocratique Africain
SOFITEX	Société des Fibres Textiles
SONABEL	Société Nationale d'Electricité du Burkina
UD	Unité de Développement (Development Unit)
UNDP	United Nations Development Programme
UP	Unité de Planification (Planning Unit)
USAID	United States Agency for International Development
WHO	World Health Organization

*Note:* The exchange rate in July 1989 was approximately \$1 US = 315 CFA francs.



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## Abstract

The Onchocerciasis (River Blindness) Control Programme (OCP) was initiated in 1974 to control river blindness in a seven country area in West Africa (Benin, Burkina Faso, Côte d'Ivoire, Ghana, Mali, Niger, and Togo). Later, the program was expanded to include Guinea, Guinea-Bissau, Senegal, and Sierra Leone. Today, 18 years after the inception of control, the OCP is widely regarded as one of the most effective, regional health programs ever launched. River blindness is no longer cited as a public health threat in the original control zone and many of the river basins are undergoing active resettlement.

Eighty percent of the territory of Burkina Faso, or 235,000 km<sup>2</sup>, falls within the area covered by the OCP. Of this total area, 41,000 km<sup>2</sup> was classified as uninhabited and uncultivated in 1975. In an effort to control the projected immigration to these new lands and the underpopulated river basins, the Burkina government created a special national agency, the Volta Valley Authority or AVV, and gave the agency complete control of 30,000 km<sup>2</sup> of underpopulated river basins. In theory this mandate was to supersede all pre-existing claims to land.

The pace of spontaneous settlement quickly outgrew the ability of the AVV to finance and create a sufficient number of sponsored settlements. In addition, there were sizeable intra and inter-regional differences in the rate of new lands settlement. Within any subregion, the villages that attracted the most immigration were those near

major roads and/or dynamic markets and administrative centers.

Strong similarities in the settlers' social and economic adjustment were observed at all study sites. These responses, and the associated conflicts over the allocation of land, grazing, water and forest resources, followed a predictable pattern. This report examines a wide range of factors in the micro and macro policy environment that affect settler responses to different problems at each settlement stage and their effect on sound natural resource management.

Especially important in this study were the national policies relating to crop subsidies, marketing boards, transportation infrastructure and agronomic research. The study shows how national policies which targeted investment in river basin development exacerbated pre-existing, inter-regional inequities and led to rapid, uncontrolled spontaneous immigration from the less well endowed plateau areas. Heavy investment in the development of an appropriate cotton package for the high potential south increased the attractiveness of settlement, while there is no equivalent technical package for rainfed agriculture in the less favored center and north.

It is clear from the research here that government efforts to promote sustainable land use practices by official mandates are unlikely to succeed. More likely to be successful are interventions similar to the new *Programme National de Gestion des Terroirs (PNGT)*, a program for village land management which reinforces the capacity



of local inhabitants to regulate access to land and other resources.

Farmers' perceptions of their long-term opportunities for developing diversified non-crop sources of employment were key factors in determining settlers' long-term investment strategies and their willingness to invest in more labor intensive crop production practices. These research results have implications for the future design of river basin planning which heretofore has focused almost exclusively on intensifying crop production.

New land settlement and the growth of regional markets and administrative centers are clearly intertwined. Early attempts by the AVV to reinforce the development of market centers were often misplaced. For this reason it is recommended that aid for infrastructure development to reinforce new market and administrative centers be phased over a longer (10-15 year) period.

The complex interweaving or synergism between settlers and the hosts who provided them access to land and between livestock owners and herders needs to be well understood. Government policies which favor one group over the other can

inhibit the development of positive relationships. The PNGT model combines zoning (to delineate land most appropriate for rainfed crop cultivation from land to be used for livestock, or managed and natural forests) with a strong base of local village land management committees.

The volume and complexity of the tasks involved in this type of integrated development planning have led many governments throughout the world to advocate autonomous management structures like Burkina's AVV. The history of the AVV highlights the fact that such agencies may allow the government to organize a complex assistance package much more quickly and to attract high levels of donor funding. However, autonomous agencies tend to suffer from high costs and administrative inflexibility.

The Burkina case study provides ample evidence for success in areas where new land settlement has been assisted and the high environmental, social and economic costs of unassisted, spontaneous settlement at higher population densities. This is a rich history that deserves to be thoroughly analyzed before embarking on a new generation of follow-up planning.

# 1

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## Introduction

The Onchocerciasis (river blindness) Control Programme (OCP) is one of the most successful health programs ever launched in Sub-Saharan Africa (Figure 1.1). Today, eighteen years after control began in 1974, the disease is no longer cited as a public health threat in the original control zone and many of the river basins are undergoing active resettlement (OCP 1985, 1986; Remme and Zongo 1989; Younger and Zongo 1989).

In the wake of this success, however, there is increasing concern about the environmental sustainability of crop, livestock and forestry practices in the newly settled areas. A ten year assessment of settlement trends revealed that most immigration is spontaneous or unassisted, with little or no settler access to basic infrastructure, and economic or social services (Hervouet *et al.* 1984; OCP 1986). By far the major criticism of spontaneous settlement is that settlers tend to farm the largest area possible, with little attention to sound management of soil, forest or water resources.<sup>1</sup>

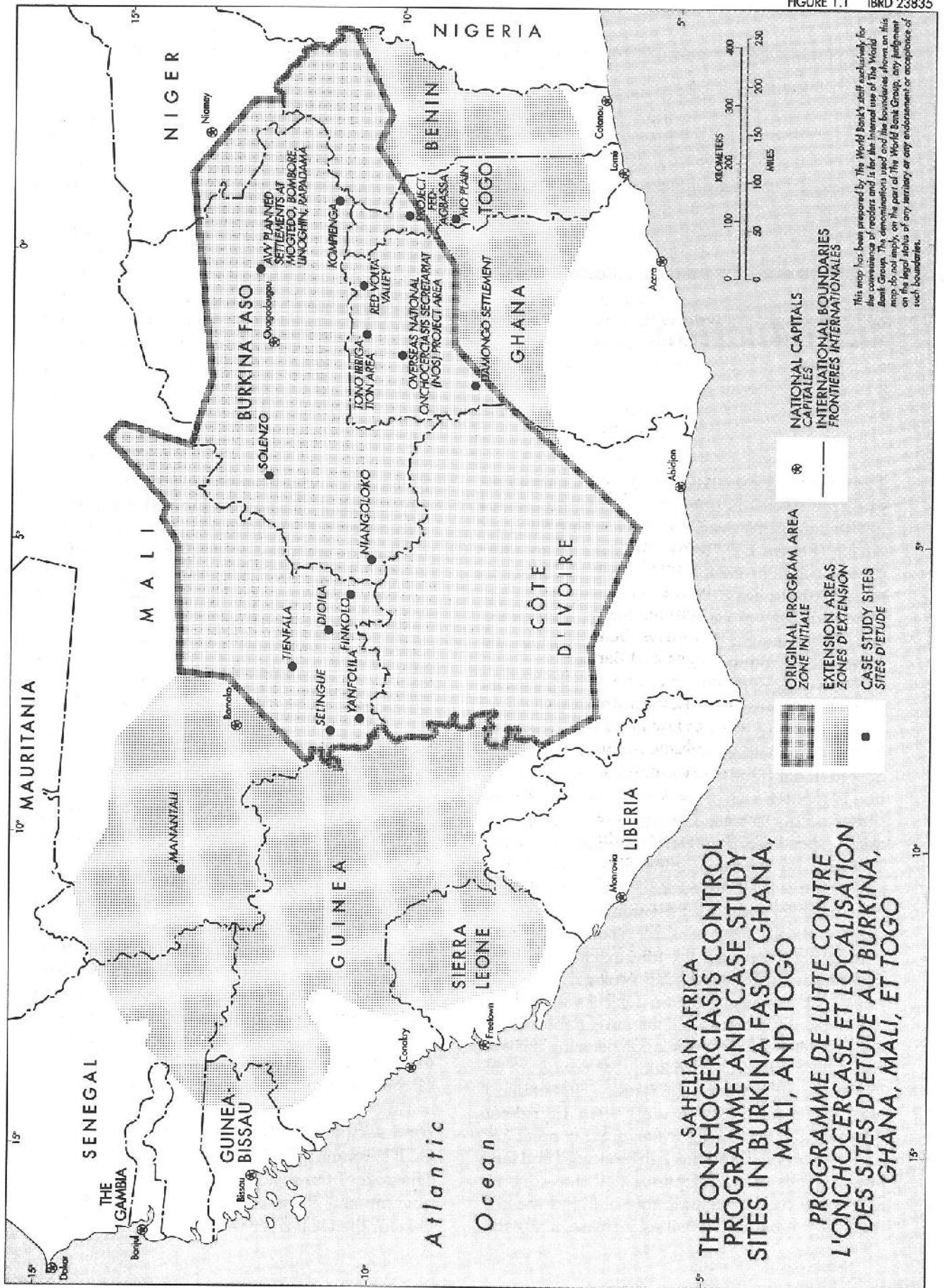
If immigration rates are low, extensive cultivation and livestock practices are ecologically and socially sustainable; population densities are low and reserve lands remain available. Invariably, however, problems arise as population densities increase and it becomes difficult to allow for periods of fallow sufficient to restore soil fertility. Higher densities are associated as well with increased competition for potable water, grazing areas and fuelwood. If new land that can be cleared and farm land remains easy to acquire, *and* if the economic and social costs of abandoning old land are low, then, as population densities increase, a sizeable

portion of the original settlers—or their offspring—may relocate at this point in the settlement cycle.

To develop more intensive crop and livestock production practices, settlers require assistance (Scudder 1981, 1984, 1985, 1991; Scudder and Colson 1981; McMillan, Painter and Scudder 1990). This assistance includes public and private investment in roads and bridges, along with the provision of crop and livestock research and extension services. One of the key questions that face policy planners today is: what form should this assistance assume?

This report describes the experience of Burkina Faso with new lands settlement and follow-up planning in its underpopulated river basins affected by onchocerciasis control. The study is of special interest because Burkina Faso is the only one of the 11 countries covered by control where the national government has shown a sustained interest in area specific planning for the underpopulated valleys. In addition, new lands settlement has been most extensive in Burkina Faso. This planning includes a number of experimental village land management, agropastoral and forestry projects. The analysis of this experience provides valuable insights for future planning in the entire 11 country control zone.

This research was conducted as part of the second socioeconomic study coordinated by the OCP's Committee of Sponsoring Agencies (CSA). The goal of the socioeconomic studies is to help governments develop appropriate planning models for the OCP river valleys.



This map has been prepared by the World Bank's staff exclusively for the convenience of readers and is for the internal use of The World Bank Group. The demarcations used and the boundaries shown on this map do not imply, on the part of The World Bank Group, any judgment on the legal status of any territory or any endorsement or acceptance of such boundaries.

SAHELIAN AFRICA  
 THE ONCHOCERCIASIS CONTROL  
 PROGRAMME AND CASE STUDY  
 SITES IN BURKINA FASO, GHANA,  
 MALI, AND TOGO

PROGRAMME DE LUTTE CONTRE  
 L'ONCHOCERCASE ET LOCALISATION  
 DES SITES D'ETUDE AU BURKINA,  
 GHANA, MALI, ET TOGO



The first study, which is referred to as the Preparatory Phase Study,<sup>2</sup> provides an inventory of existing physical and socioeconomic data for the OCP areas in the eleven countries currently covered by control. The final report includes development proposals for OCP zones in each of the seven initial OCP countries and makes recommendations for further in-depth studies as part of the development planning process (Hunting Technical Services 1988a,b,c,d).

The second study, which is referred to as the Land Settlement Review, was designed to provide the national governments with recommendations and guidelines on how best to facilitate development in areas of new lands settlement based on an analysis of settlement experiences to date and, where relevant, selected experiences elsewhere.

As part of the Land settlement Review, in-depth case studies of land settlement were conducted at sixteen sites in Burkina Faso, Ghana, Mali, and Togo (Figure 1.1; Table 1.1). A less intensive review of settlement, based on interviews and analysis of existing data, was conducted in Côte d'Ivoire and Guinea. A third level of the Land Settlement Review, which entailed critical analysis of existing documentation, was conducted for the remaining OCP countries: Senegal, Guinea-Bissau, Sierra Leone, Niger, and Benin. The major conclusions and recommendations of the comparative Land Settlement Review are described in the Land Settlement Review Final Report which appears as a separate volume in this series.

The Burkina case study is based on a mixture of quantitative and qualitative research at four study sites and a series of complementary special studies on market systems, gold mining, the agropastoralist zone at Gadeghin, settler turnover in the government sponsored settlements, and local and national institutions (see Annex 1 for a detailed discussion of the research methods used at each site). The four case study sites include representative examples of the different settlement "types" found in the wider control area. These settlement types — sponsored, assisted spontaneous, and unassisted spontaneous—reflect different levels of government and other agency intervention in the settlement process.

In sponsored settlement, a government agency is involved in almost every phase of the development program including surveying and preparing the land, constructing basic infrastructure, creating new community organizations and designing and administering agricultural extension.

In assisted settlement, one or more governmental or nongovernmental organizations (NGOs) provide basic services and infrastructure for spontaneous settlers who have moved or will move to a site on their own. Areas where migration is occurring (or has occurred) with little infrastructure and few economic and social services are classified as "unassisted" or spontaneous.

The first case study includes three groups of planned settlements (Linoghin, Mogtedo, and Mogtedo-Bombore) created by the *Autorité des Aménagements des Vallées des Volta* (Volta Valley Authority or AVV) in the Nakambe (ex-White Volta) river basins east of Ouagadougou (Figure 1.1). A less intensive study to examine the early results of an experimental program to incorporate spontaneous settlers into village land management groups and into coverage by the extension services based in the neighboring planned settlement at Rapadama was also included. In addition, we also conducted a small number of interviews among pastoralists recently settled in the new AVV agropastoral zone at Gadeghin, immediately adjacent to the Rapadama planned settlements.

Solenzo, the second study site, is located in the southwest Mouhoun River Basin (ex-Black Volta). Like the AVV-UP1, Solenzo is located in an area that was highly endemic for onchocerciasis before 1974. Solenzo has higher rainfall and better soil fertility, however. In addition, the Mouhoun Basin and Solenzo region were already experiencing an increase in agricultural in-migration in the late 1960s due to a successful regional program to promote intensive cotton production.

The third and fourth case study sites—KOMPIENGA and NIANGOLOKO—are located in the extreme southwest and southeast of Burkina. Both areas were highly endemic for onchocerciasis prior to 1974. Despite the highest rainfall in the country, both areas have experienced far less new lands settlement since 1974 than the more northern river basins. Immigration to the KOMPIENGA basin has increased since 1983, due to the creation of the country's first hydroelectric dam.

The present report is divided into 12 chapters and 5 annexes. Chapter 2 provides a brief overview of the river basins including their natural resource potential and settlement patterns—past, present, and projected. Their important role as livestock pasture and passageways are also described.

Descriptive information on the sites is presented in Chapter 3, where the point is made that we

**Table 1.1 The Land Settlement Review Case Studies**

<i>Country; name of site; nature of sample;</i>	<i>Settlement type; approx. date of settlement onset</i>	<i>Location in country</i>
<b>BURKINA FASO</b>		
1. Solenzo (3v:36hh+19v)	Spontaneous (1960s)	Kossi province
2. Niangoloko (22v)	Spontaneous (1982)	Comoe province
3. KOMPIENGA (1v:35hh)	Dam-related planned resettlement and spontaneous (1983)	Gourma province
4. Volta Valley Authority (AVV-UP1)		
a. Survey Restudy		
Linoghin (6v:20hh)	Planned (1973)	Oubritenga province
Mogtedo-Bombore (7v:20hh)	Planned (1979)	Ganzourgou province
Mogtedo (6v:40hh)	Planned (1974)	Ganzourgou province
b. Case Study Restudy		
Mogtedo V3 (1v:20hh)	Planned (1975)	Ganzourgou province
c. Rapadama (+7)		
	Assisted (1987)	Ganzourgou province
<b>GHANA</b>		
1. Red Volta Valley and Plateau (2v:30hh)	Cyclical, spont. (late 19th cent.)	Upper East Region
2. Fumbisi-Yagoba-SooMankarigu ("Overseas") (4v:30hh)	Assisted (1985)	Upper West, Upper East, and Northern Region
3. Damongo Settlements (3v:30hh)	Planned (1950s)	Northern Region
4. Tono Irrigation Scheme (2v:30hh)	Planned (1980s)	Upper East Region
<b>MALI</b>		
1. Yanfolila (5v:30hh)	Spontaneous;(1970s) Assisted (1985)	Third Region (Sikasso)
2. Selingue (3v:29hh)	Dam-related planned and spontaneous (late 1970s)	Third Region (Sikasso)
3. Dioila (4v:30hh)	Spontaneous (1960s)	Second Region (Koulikoro)
4. Finkolo (3v:30hh)	Wage workers in workers' villages at tea plantation (late 1960s)	Third Region (Sikasso)
5. Tienfala (3v:9hh)	Spontaneous, by railway workers (from early 1900s; continuing)	Second Region (Koulikoro)
6. Manantali (14v:70hh)	Dam-related planned First Region (1986/87)	(Kayes)
<b>TOGO</b>		
1. FED-Agbassa (3v:30hh)	Planned (1972)	Kara Region
2. Mo Plain (3v:30hh+6v)	Spontaneous (1970s)	Central Region

*Note:* Numbers in parentheses that follow site names denote the number of villages at each site where household interviews were conducted, followed by the number of households in the site sample. Numbers preceded by a plus sign denote the number of additional villages at the site where leaders and other community members were interviewed. Information on Manantali was drawn from earlier research dealing with that project (Horowitz, Koenig, Grimm and Konate forthcoming)

observed strong similarities in terms of settler response patterns at all four sites. Moreover, these similarities seemed to be equally true in areas of planned and assisted spontaneous settlement. These responses were predictable and reflect the manner and results of settlers' adjustments in their new social, ecological, and economic settings.

The chapters that follow (4-12) look at a wide range of factors in the micro and macro policy environment that affected settler responses to different problems at each settlement stage. These factors include:

- national price and subsidy policies that determine the prices settlers and hosts receive for their crops and livestock (Chapter 4);
- settlers' and hosts' perceptions of their local land tenure rights (Chapter 5);
- local perceptions of long-term opportunities for developing more diversified, non-crop sources of employment (Chapter 6);
- the profitability and risk associated with new opportunities for commercial food and export crop production (Chapter 7);
- settlers' proximity to and/or degree of social and economic integration with area markets (Chapter 8);

- settlers' social and economic integration with indigenous inhabitants and area pastoralists (Chapter 9);

- the long-term environmental sustainability of the settlers' local production systems (Chapter 10); and

- the effectiveness of local and national management structures (Chapters 11 and 12).

Annex 1 provides a brief overview of the research methodology in Burkina. Annex 2 gives an overview of Burkina's political history. Annexes 3-5 group supplementary tables.

## Notes

1 See McMillan, Painter and Scudder 1990; OCP 1986; Hunting Technical Services 1988a, 1988b, 1988c, 1988d; Van Raay and Hilhorst 1981; Weitz, Pelley and Applebaum 1978; Angel 1985; Remy 1973; Becker 1985; Bharin 1981; Couty, Marchal, Pelissier, Poussi, Savonnet and Schwartz 1979; Dollfus 1981; Raison 1979, 1981, 1985; Nicolai and Laserre 1981; Remy 1968, 1973, 1975, 1981.

2. The Preparatory Phase Study was conducted by Hunting Technical Services, Ltd. (U.K.), in collaboration with *Organisation et Environnement* (France).

# 2

## Overview of the OCP River Basins

### Location and Natural Resource Potential

Eighty percent of the territory of Burkina Faso, or 235,000 km<sup>2</sup>, falls within the area of the Onchocerciasis Control Programme (Figure 1.1) (Hervouet et al. 1984:1). Of this total area, 41,000 km<sup>2</sup> (17 percent) of river basin land was considered uninhabited and uncultivated before the OCP started in 1975 (ibid.) (Table 2.1; Map 23841).<sup>1</sup>

The river basins straddle two broad climatic zones: a northern sudanian region with an average annual rainfall of 600-800 mm, and a southern sudanian region with an average annual rainfall of 800-1,200 mm (Map 23842). Both agroclimatic zones are

characterized by a single rainy season and a dry season that can last from six to eight months.

The river basins are generally considered to have greater potential for rainfed agriculture than the adjacent plateau areas. Moreover, the river basins include almost all of the land deemed to have potential for large scale irrigated farming. The water resources and vegetation of the valleys have long been important to West Africa's livestock industry—both for grazing and for transportation from the landlocked cattle producing areas of Niger, Mali, and Burkina to the coast (Map 23843).

These basins have also been a vital source of fuelwood and construction materials for Burkina's

**Table 2.1 Burkina's Major River Basins and Area Estimated to be Directly Affected by the Onchocerciasis Control Programme**

<i>River Basin</i>	<i>Area (km<sup>2</sup>)</i>
Valleys of the Nakambe (ex-White Volta) and Nouhao	8,250
Valleys of the Nazinon (ex-Red Volta)	3,900
Middle Valley of the Mouhoun (ex-Black Volta)/and Valley of the Bougouriba	6,100
Poni	2,150
Sourou	1,000
Valley of Komienga	4,000
Valley of the Sissili	3,000
Valleys of the inferior and superior effluents of the Mouhoun	<u>19,000</u>
Total	<u>47,400</u>

Source: AVV 1985d:6.



growing cities. As for other resources, only a fraction of the basins' potential for fishing and hydroelectric power has been tapped. One large hydroelectric dam with plans for limited irrigation has been constructed at Kompienga. Construction of another, with greater potential for irrigation, is beginning at Bagre. A third large dam is planned for the future at Noubel along the Ghana frontier. The recent discovery of gold at several small sites in the Nakambe and a large commercial gold site at Fara-Poura in the province of Sissili have created interest in the area's potential for mining.

In the 1950s, the basins' sparse population densities made it possible to designate vast areas as classified forests and wildlife reserves. Today, the highest concentration of Burkina's protected wildlife and forest areas are found in the river valleys (Map 23844).

### Historic Settlement Patterns

In the past, the poverty of Burkina's central plateau region has contributed to high rates of out-migration.<sup>2</sup> The best known of these emigration patterns in the mid-1970s was that of young men leaving to work as labor migrants in the more developed coastal countries like Côte d'Ivoire.<sup>3</sup> A second population movement, which took on momentum after the 1968-1973 drought, was that of Mossi settlers moving off the central plateau to the less-populated fertile non-Mossi regions of the west (Map 23845).<sup>4</sup>

Despite low population densities and higher rainfall in the deserted river valleys of the Nakambe and Nazinon, and substantial population pressure in the neighboring plateau, almost none of this earlier emigration was directed toward those valleys prior to 1975. Settlers did occupy lands in the vicinity of the Mouhoun, but not in the more infected areas immediately adjacent to the river.

While onchocerciasis is considered to be an important factor in the lack of settlement in Burkina's river basins, it is by no means the only factor. Certain regions are characterized by a Precambrian basement complex, known for its poor aquifer qualities that makes drinking water a problem (Berg et al. 1978:14). A series of epidemics that ravaged the White and Red Volta Valleys in the 1940s (preceded by nineteenth century slave raiding and warfare) contributed to the depopulation of certain areas. Contemporary research suggests that onchocerciasis simply completed the ravages

of these epidemics and wars by destroying the scattered, low-density settlements that were left in their wake (Hervouet 1978).

In addition, earlier studies may have overestimated the total area of valley land that was available in the sense that it was not settled and was of sufficiently high quality soil (i.e., not covered by rock debris, iron pans, and gravel at the soil surface, or of a very shallow profile) (Berg et al. 1978:14). Many of the valleys are subject to frequent flooding and/or suffer from excessive moisture (ibid.:15). The heavy vertisols that are characteristic of much of the area are also difficult to work with only a hand-held hoe (ibid.).

The presence of other historic constraints to settling lands in the region, however, does not diminish the importance of onchocerciasis in deterring settlement. It was assumed, therefore, that the rate of spontaneous settlement to the valleys would increase once spraying to curb the disease began.

### Early Development Planning for the OCP River Basins

In an effort to control the projected immigration into the underpopulated river basins, the Burkina government created a special national agency, the Volta Valley Authority or AVV (*Autorité des Aménagements des Vallées des Volta*). By presidential decree, the AVV was given complete control of almost 30,000 km<sup>2</sup> of the least populated river basins where new lands settlement was expected to occur (Map 23842). In theory this mandate was to override all preexisting claims to the land.

The early AVV program focused on the design and implementation of groups of model settlements in the northern river basins with good agricultural potential and a few specialized industrial or irrigation projects. The first settlements were created in the basins of the Nakambe and Nazinon (Map 23842).

### Settlement and Immigration Patterns: 1974-1990

#### *Spontaneous vs. Sponsored Agriculturalist Settlement*

The national government and donors were correct in predicting that the successful control of onchocerciasis would increase existing patterns of rural-rural migration toward the south. Where they were wrong was in their expectation that

spontaneous settlement to the area could be directed and controlled via a centralized program for sponsored settlement.

By 1979, it was already clear that the pace of spontaneous settlement had quickly outgrown the ability of the AVV to finance and create planned settlements in sufficient number. By 1983, studies showed that more than 80 percent of the increase in cultivated land in Burkina's river basins could be attributed to spontaneous settlers (Figure 2.1). This percentage would have been even higher had the research included the Mouhoun and Comoe basins, where the AVV was not active.

#### *Spontaneous Agriculturalist Settlement*

Although the efficacy of larviciding was the same for all the river basins in Burkina, there have been sizable intra- and interregional differences in the rate of new lands settlement since eradication started in 1974. For example, settlement rates north and south of latitude 11° differed significantly (Table 2.2), while within the northern river basins, colonization proceeded much more rapidly along the Mouhoun and its tributaries (a six-fold increase) than in the Nakambe and the Nazinon in the central south (a threefold increase), in large part because of the potential for commercial cotton production in the Mouhoun basin (Table 2.2; Hervouet et al. 1984:4).

**Table 2.2** New Land Cultivated in Major River Basins, 1975-1983

<i>Basin</i>	<i>Land under cultivation</i>	
	<i>1975 (%)</i>	<i>1983 (%)</i>
<b>North of 11°</b>		
Nakambe (ex-White Volta)	9.2	29
Nazinon (ex-Red Volta)	8.1	28
Mouhoun (ex-Black Volta)	3.0	15.7
Mouhoun tributaries	4.1	24.7
<b>South of 11°</b>		
Bougouriba	9.9	13.1
Comoe-Leraba	5.2	15.9

Source: Hervouet et al. 1984:5.

The percentage increase in new land clearance between 1974 and 1983 was lower in the Bougouriba and Comoe-Leraba Basins (Paris 1980, 1983; Clanet 1983). These areas are more distant from population centers in the central plateau where there are fewer opportunities for commercial cotton production was less widespread.

Settlement patterns within the same basin and under identical ecological conditions varied according to ethnic groups. For example, the Bissa and the Nakana showed large land gains, as opposed to the Dagara, Birifor, Wiile, and Lobi (Hervouet et al. 1984).<sup>5</sup>

Different rates of settlement within the same river basin were also strongly connected with the presence of targeted government investment such as the AVV planned settlements, regional programs to promote commercial cotton production, paved highways, and special projects like the Kompienga dam and the AVV industrial wood project at Wayen (Hervouet et al. 1984). In general, the villages with the highest rates of immigration were those nearest roads and/or dynamic markets and administrative centers.

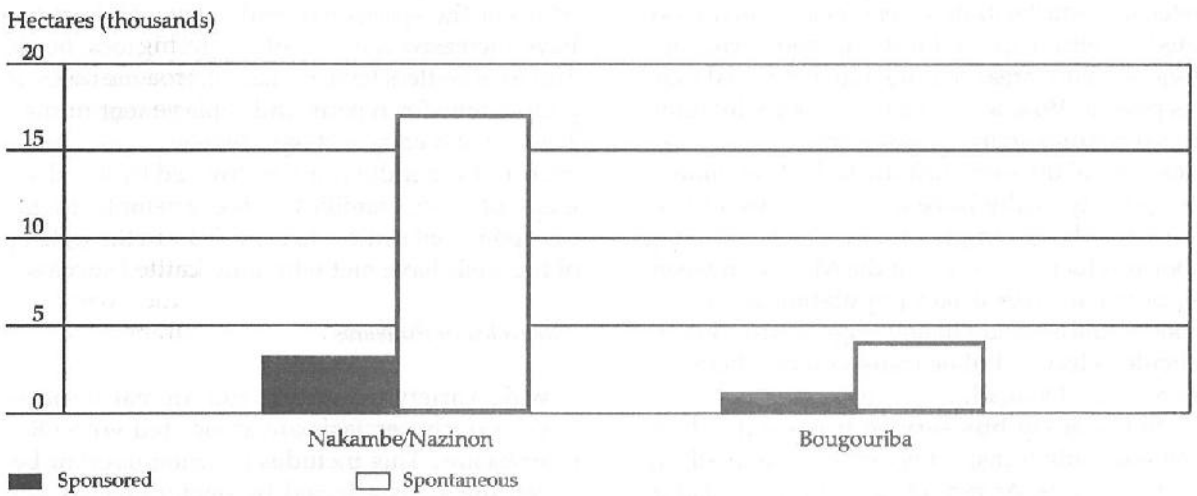
#### *Pastoralist Immigration*

A large portion of immigration to the valleys involves pastoralists and their cattle herds. Even before onchocerciasis control, the river basins were an important part of the transhumant migration patterns of FulBe from the central plateau. During the rainy season, herders would take their animals to the valleys to move the animals away from agriculturalists' fields. As agriculturalist settlement increased, a growing number of FulBe were attracted to the valleys to work as herders for farmers who have livestock. Other FulBe settled in mass around the manmade and natural water resources. A fourth very recent trend involves the forced repatriation of allegedly Burkinabe pastoralists from Ghana and, to a lesser extent, from Côte d'Ivoire. Many of these repatriated FulBe were attracted to the valleys.

#### **Other Physical, Demographic and Social Constraints**

This analysis of migration trends highlights the fact that migrants consider far more than the availability of new land in their selection of settlement sites. The OCP areas are frequently isolated, lack supplies of potable water, and are affected by

**Figure 2.1 Gains in cultivated area by sponsored and spontaneous settlers, 1974-1983**



Source: Hervouet, Clanet, Paris and Some  
1984:16/ see Annex III.

diseases other than onchocerciasis that threaten human and animal life. High rates of immigration may also create social conflicts over land tenure rights (see Chapter 4). All these factors affect the settlers' standard of living as well as the viability of diversified production systems based on crop, livestock, and off-farm employment. In addition, the close proximity of many of Burkina's river basins to national borders makes them highly vulnerable to economic and social problems in adjacent countries.

### *Isolation*

With the exception of a few areas near major cities and towns, the river basins tend to be isolated. This isolation takes several forms. Because of their historic lack of population, Burkina's river basins tend to be distant from prefecture and sub-prefecture administrative centers and their associated health care, education, and extension services. Many areas had no major regional markets prior to 1974, and thus were poorly integrated into national marketing systems.

Because of the same historic lack of settlement, the basins typically have few highways and access roads. For example, unpaved roads linking major production centers in the Mouhoun basin, like Solenzo, with urban population centers at Bobo-Dioulasso and Ouagadougou exist, but are difficult to travel. Public transportation between Solenzo and Ouagadougou could take two days before biweekly bus service was established. Even now bulk transport is expensive and affects producer prices. As recently as 1983, the 100 kilometer trip from the eastern provincial capital of Fada N'Gourma to the present site of the Kompenga dam in Burkina's southeastern Kompenga basin could take an entire day.

Bridges are another problem. During the rainy season, when waters rise, rivers may isolate entire areas. The road linking Fada with Kompenga is still impassable to normal vehicles for several days after a major rain. If bridges wash out, as they did at the Mogtedo planned settlements in 1977, the travel distance to major markets may be tripled.

### *Lack of Potable Water*

Lack of potable water appears to be one of the principal reasons for sparse preexisting settlement in the area occupied by the AVV planned settlements to the east of Ouagadougou. Geologi-

cal formations make it necessary to drill 40-50 meters for drinking water. Prior to the creation of the AVV the sponsored settlements, there were few permanent water points. As a result, spontaneous settlement remains largely confined to areas adjacent to sponsored settlements with borehole wells. Even with sophisticated machinery, however, the AVV was not always successful in drilling new wells. The woods around the AVV sponsored settlements are littered with the bases of wells that either did not work or have dried up. More recently, many of the profitable wells that were drilled when the planned settlements were first created in 1974-1977 are drying up; the original pumps are wearing out and need to be replaced—pumps that can cost up to 500,000 CFA. At the same time, demand for water has increased because large numbers of spontaneous agriculturalists and pastoralists have settled around the edges of the sponsored settlements, and settlers have increased the size of their livestock herds. The AVV settlers have managed, in some cases, to pool money for repairs and replacement pumps. The cost of repairs and replacement is steep, however, and generally must be covered by small villages of 25-50 families, since attempts to get nonsponsored settlers to contribute to the upkeep of the wells have met with only limited success.

### *Other Health Problems*

A wide variety of human and animal diseases besides onchocerciasis are associated with OCP river basins. This includes a strong overlap between the areas affected by onchocerciasis and bovine trypanosomiasis (animal sleeping sickness). One consequence of the river basins' low population densities is that health hazards are not always known. For example, a mysterious virus contaminated the water supply in one of the early AVV planned settlements at Mogtedo in 1978. The original village site was abandoned, but not before the entire village population and the extension staff found hands and arms covered with painful skin growths.

New settlers in the river basins are not familiar with local medicinal plants and healers. They are also vulnerable to new risks. The hard work associated with clearing a new farm can weaken them, making them susceptible to various illnesses or injury. Snakes and wild animals are another problem. Two farmers in the economic survey were bitten during the 1989-1990 agricultural season. Although



both survived, one was hospitalized for a week, then spent several months in painful recovery at home. It is symptomatic of the priority placed on increased health risks, that one of the first independent activities undertaken by new settlers in the AVV was to organize a group meeting to learn who knew different cures for snake and scorpion bites and other illnesses (McMillan 1983).

#### *Proximity to International Borders*

Many of Burkina's OCP areas are in politically sensitive border areas. Some, like Kompienga, border more than one country (Ghana, Benin, and Togo). The Leraba and Comoe basins are in the frontier zone near Côte d'Ivoire; the Po and Nouhao basins are close to Ghana.

On the positive side, when international borders coincide with paved or all-weather highways, they generally give rise to prosperous trade centers at the border crossings, as is the case at Po and Niangoloko. On the negative side, proximity to an international border introduces a new level of uncertainty into national, regional, and local development plans. Livestock disease control programs in Kompienga, for example, have been plagued with a fluctuating disease control environment because of the uneven animal disease control standards of their neighbors in Ghana, Benin, and Togo.

Border areas also receive the brunt of economic or social changes in the adjacent countries. For example, the expulsion of pastoralists from Ghana flooded the town of Kompienga and Kompienga basin. This sudden influx of pastoralists and their animals put additional strain on the area's indigenous land tenure systems and resources, which were already under pressure because of immigration associated with the Kompienga dam.

The recent downturn in the Côte d'Ivoire economy has had a similar broad impact on the Niangoloko region. Growing numbers of migrants are returning to Burkina and settling in the Comoe and Leraba basins rather than returning to the plateau. This economic malaise also contributed to armed conflicts between pastoralists and agriculturalists, and forced thousands of pastoralists, alleged to be Burkinabe, to flee across the border, some without their animals.

#### **Projected Immigration Trends: 1990-2000**

In general the case study research shows a slackening off of migration to the less isolated northern river basins near Solenzo and the AVV sponsored settlements that have been actively resettled since the early 1970s. Because of mounting population densities, new immigrants have greater difficulty in obtaining good agricultural land. As a result, the factors that tend to motivate later immigrants to an area are often linked to the growing opportunities for non-farm employment in the region or the desire to rejoin family members who immigrated earlier.

One of the first indications of settlement saturation is a reorientation of pastoralist immigration. Recent research by the National Village Land Management Program (PNGTV or *Programme National pour la Gestion des Terroirs Villageois*, now known as PNGT or *Programme National pour la Gestion des Terroirs*) supports our own findings that pastoralist immigration is being redirected from the northern basins of the Mouhoun, Nakambe, and Nazinon, to southern basins like the Leraba, Comoe, and Kompienga—basins that did not show a significant increase in forest clearance or new lands settlement during the first decade of control.

Although aggregate immigration rates have been low in the southern river basins, we can predict that the rates of new lands settlement in these areas will increase substantially over the next decade. Our best macro-level evidence for this trend is the 1985 census which shows that the southernmost provinces are—with the exception of the province surrounding Ouagadougou—the provinces that are experiencing the highest in-migration. Our best micro-level evidence are our two regional surveys and the research by Agrotechnik (1989) which show a sharp increase in immigration to the regions surrounding the Kompienga and Niangoloko research sites. Especially important for Burkina will be the reduced opportunities for employment in Côte d'Ivoire.

About one million Burkinabe were living in Côte d'Ivoire in 1985. With the decline in cocoa prices, short-term labor migration is no longer the profitable option that it used to be. Thus we can expect large numbers of Burkinabe to return to Burkina. It would be naive to think that many of these immigrants—especially those



who remained for long periods of time in Côte d'Ivoire—would return to the impoverished Mossi Plateau. We can also predict that the reduced opportunities abroad will encourage young farmers and pastoralists to develop commercial opportunities in the OCP river basins, as well as to augment the labor resources of their extended families. While new wage labor opportunities may be created in Ghana, it is unlikely that these opportunities will result in any sort of dramatic reorientation of foreign wage labor flows, at least in the short run.

### Potential Policy Implications

To summarize, while lack of opportunity for development in Burkina's densely populated Mossi Plateau may be the basic force driving immigration to the valleys, many factors affect the choice of a settlement area. These factors include placement of infrastructure, possibilities for livestock, type and level of extension services, opportunities to develop commercial non-farm income producing activities, and the presence of relatives or other individuals from the same home area, as well as the availability of "new lands."

Within each subregion, the villages that attracted disproportionate numbers of agriculturalist immigration were those in which we found: (1) available land; (2) concentrations of immigrants from a single area of origin; and, (3) opportunities for engaging in commercial activities. The very highest rates were observed in areas that included these three characteristics in addition to opportunities to engage in commercial cotton production.

These predictable patterns have a number of policy implications.

#### *Need to Consider Other Constraints to Development besides Onchocerciasis*

Policy planners need to consider a whole range of factors that may impact upon or constrain development of an area, including isolation, health risks, and lack of water. Failure to consider these factors, or the high risk and uncertainty associated with location near a major border, can reduce the efficiency of development planning. In a worst case scenario, lack of attention to such factors can lead policy makers to create projects that may actually endanger peoples' lives.

#### *Need to Develop Better Methods of Predicting Immigration Flows*

National censuses tend to be conducted only every decade. Yet dramatic changes in the rate of new lands settlement and land use patterns can be set in motion in less than five years. There is a strong need, therefore, for planning agencies such as the PNGT to develop more cost effective tools for assessing settlement trends.

Much can be learned from interviewing farmers. We found their perceptions almost always to be correct—and generally far in advance of our own. The settlers at Kompienga, for example, predicted that contrary to government thinking a high percentage of the immigrants to the town would remain after the inauguration of the dam. This is what has happened. The settlers we interviewed also said that many of the agriculturalists would immigrate to the Bagre site during the 1989-1990 dry season but return to Kompienga to farm in 1990, as they expected the indigenous Bissa near Bagre would be far less welcoming to immigrant workers and farmers than the indigenous Gourmantche near Kompienga. In contrast to the Gourmantche, Bissa in the Bagre area generally live in large, high density settlements where good agricultural land may already be in short supply. Have again their predictions are correct.

Very useful quantitative information can be gathered through interviews with village migrant and host leaders concerning the name, approximate size of household, and length of residence for immigrant agriculturalist households. This information was more difficult to acquire for immigrant pastoralists. Nevertheless, the analysis of these figures can help policy makers to quantify inter and intra-regional settlement trends.

#### *Selection of Priority Sites for Government Assistance*

In view of the marked preference of settlers for migrating to less isolated areas near roads, preexisting markets, and administrative centers, we recommend that national governments seriously consider putting their initial priority on developing sites already receiving immigrants. (McMillan, Painter and Scudder 1990).

Special programs will be needed to develop high potential areas like the Kompienga and Bagre dam basins or isolated areas in the Comoe and Leraba basins where we can predict that future settlement will

occur. Careful planning will be necessary, however, to insure sustained funding for some of the necessary urban functions (health services, reliable water installation and maintenance programs, reasonable assurances for animal and human health) that are ordinarily fulfilled by proximity to preexisting indigenous populations and/or population centers.

#### *Need for Guided Assisted Settlement in Saturated Areas*

The site reports provide strong evidence to support PNGT research showing that certain villages in high potential river basins are already becoming saturated. Land management programs like the PNGT might therefore consider targeting investment in nearby less populated villages. This sort of "guided" assisted settlement is likely to attract recent migrants who have lower quality holdings away from the more saturated area villages and to give these older settlements more latitude in reorganizing village land use patterns. Again, however, we would caution that this type of targeted investment will necessitate the same sort of careful consideration of other reasons why the less congested villages might not have been settled extensively before encouraging people to move there.

#### Notes

1. The exceptions to this pattern are a few large Bissa communities on the Nakambe (Hervouet 1977) and the Dagara villages on the Mouhoun (Paris 1980, 1983). In studying these anomalies, researchers discovered that onchocerciasis does not generally pose a threat to groups with population densities above 50 persons per km<sup>2</sup> (Hervouet et al. 1984; Remme and Zongo 1989).
2. Burkina Faso has one of the highest rural population densities in West Africa, more than half of it concentrated in the central plateau (Map 23841). The majority of farmers on the plateau were and continue to be dependent on extensive rainfed farming. Because of high population densities, most plateau farmers have been forced to shorten the fallow cycle necessary to restore soil nutrients lost in cultivation. This has had a negative effect on soil fertility and yields and increased the farmers' vulnerability to periodic and lengthy drought (see, for example, de Wilde et al. 1967; Barrett et al. 1981; Jaeger 1983; Broekhuysse 1974, 1982a, 1982b; Rey 1980; Nagy, Sanders, and Ohm 1987).
3. Songre 1973; Deniel 1967; Gregory 1974; Coulibaly et al. 1980.
4. Conde 1978; Capron and Kohler 1975; Remy 1973; Marchal 1975; Lahuec 1970; Lesselingue 1975; Ancey 1974; Izard and Izard-Hertier 1958; Izard-Hertier and Izard 1958; Queant and Rouville 1969; Kohler 1968, 1972; Benoit 1973a, 1973b; Bakyono 1989; Terrible 1979.
5. The lack of interest by certain ethnic groups in recolonization of basins adjacent to their home areas was attributed to their historic pattern of loose settlements and extensive cultivation practices, both of which had made them vulnerable to onchocerciasis infection in the past (Hervouet 1980).

# 3

## *Types of Settlement and Settlement Dynamics*

The types of new lands settlement taking place in Burkina's river basins can be characterized according to the degree of intervention by government or other agencies as they assist the settlement process (Figure 3.1).

### **Immigration to the Study Sites as Examples of Settlement Types**

The case study sites represent a cross section of important settlement and government interventions in different ecological and climatic zones (Map 23846).

#### *Older Sponsored Settlements and an Experimental Assisted Settlement Program in the AVV-UP1*

The first case study site includes three groups of planned settlements created by the AVV in the Nakambe river basin east of Ouagadougou: Linoghin, Mogtedo, and Mogtedo-Bombore. Since 1983, the planned settlements have been administered as Planning Unit One (UP1) under the new model of decentralized administration that characterized the AVV after 1982 (see Chapter 11). With an annual rainfall of 700 mm, the AVV-UP1 is considered to have only medium potential for intensive rainfed farming. That is to say, the river basins have the same constraint of low and variable rainfall as the neighboring central plateau, from which the settlers presently living at UP1 planned settlements immigrated. The river ba-

sins, however, have more alluvial soils and higher initial soil fertility than the plateau region.

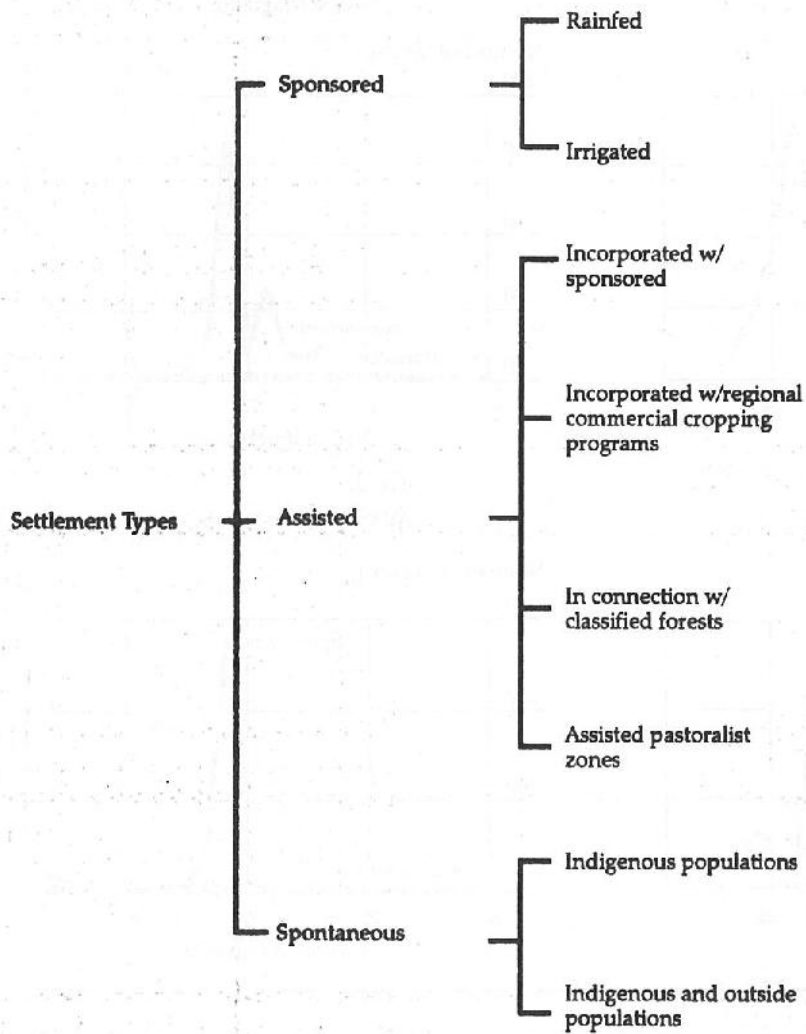
Prior to the creation of the first AVV planned settlements in 1973, there was little immigration to the region. Since planned settlement started, the area around the sponsored settlements has attracted large numbers of spontaneous agriculturalists and pastoralists as well as the sponsored migrants (Figure 3.2).

In January 1988, the AVV started an experimental program to incorporate spontaneous settlers into village land management groups and into coverage by the extension services based in the neighboring planned settlement at Rapadama (see Chapter 11). A less intensive study to examine the early economic and social responses to this program was conducted. We also conducted a small number of supplementary interviews among pastoralists recently settled in the new AVV agropastoral zone at Gadeghin, immediately adjacent to the Rapadama planned settlements.

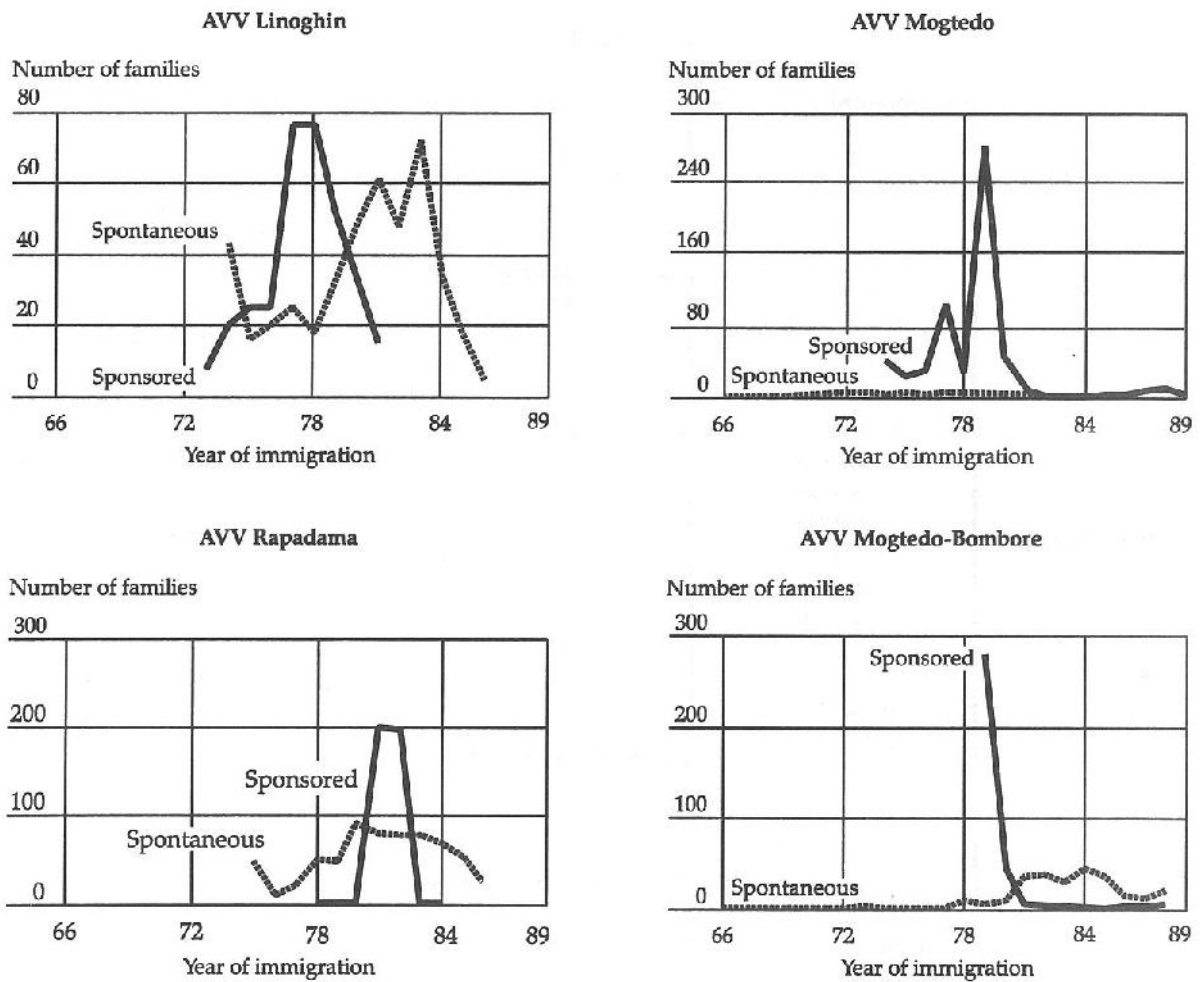
#### *Older Spontaneous Settlements and an Experimental Assisted Settlement Program at Solenzo*

Like UP1, Solenzo, the second study site, is located on the northern fringe of the area that was highly endemic for onchocerciasis before 1974. The area has higher rainfall and heavier soils that are better adapted to cotton than the AVV sponsored settlements. Solenzo is a recent northern extension of Burkina's southwest "cotton boom" that took off in the 1960s. Since 1970, the Solenzo

**Figure 3.1 Types of government intervention and immigration to Burkina's OCP River Basins**



**Figure** Sponsored and spontaneous immigration in connection with the AVV planned settlements at Linoghin, Mogtedo, Mogtedo-Bombore, and Rapadama



\* Incomplete data after 1985.

Source: AVV 1985c.



subsector has experienced rapid spontaneous settlement (Figure 3.3), relatively high crop yields, and relatively high input use (fertilizer, insecticide).

This continuous stream of immigration, coupled with the extensive cultivation practices used by most migrants, is putting stress on area soils. Planners are especially concerned about the steady decline in soil fertility related to decreases in soil organic matter. More intensive cultivation practices, using manure and the reincorporation of crop residues, have enjoyed limited success. Local authorities believe that because the migrants had insecure land rights, they tended to farm the largest area possible rather than to adopt more intensive soil conservation practices (CRPA 1988).

In an attempt to intensify the high yielding cotton production systems, the CRPA created three pilot village land management projects in 1988 (CRPA 1988, 1989d, 1990a; Kafondo 1987). The pilot projects' objectives are to help farmers create viable local institutions (village land management committees) for determining access to and management of village land resources with a minimal amount of outside intervention from the government. The program hopes to accomplish this goal through a combination of voluntary restriction of the total area that farmers are allowed to cultivate, promotion of extension themes, and stricter regulation (though not restriction) of the terms under which new migrants may occupy village lands. Preliminary planning for the pilot assisted settlement program began in 1988. One of the pilot projects is at Daboura, one of two Solenzo villages in the economic survey.

#### *Recent Spontaneous Settlement in Connection with the Creation of a Development Project*

The Kompienga region provides a graphic illustration of the way that creating a special project (such as an industrial wood plantation, a major road, or a hydroelectric dam) can increase on spontaneous settlement. Until recently, spontaneous immigration to the Kompienga River Basin has been sparse. Living in small, scattered, low density settlements, the indigenous Gourmantche have generally shunned cultivation in the fly ridden, low lying marshes and river basins. Until preparations for the Kompienga dam began, the area commercial centers or production opportunities

Construction of a road linking the provincial capital at Fada N'Gourma with the proposed

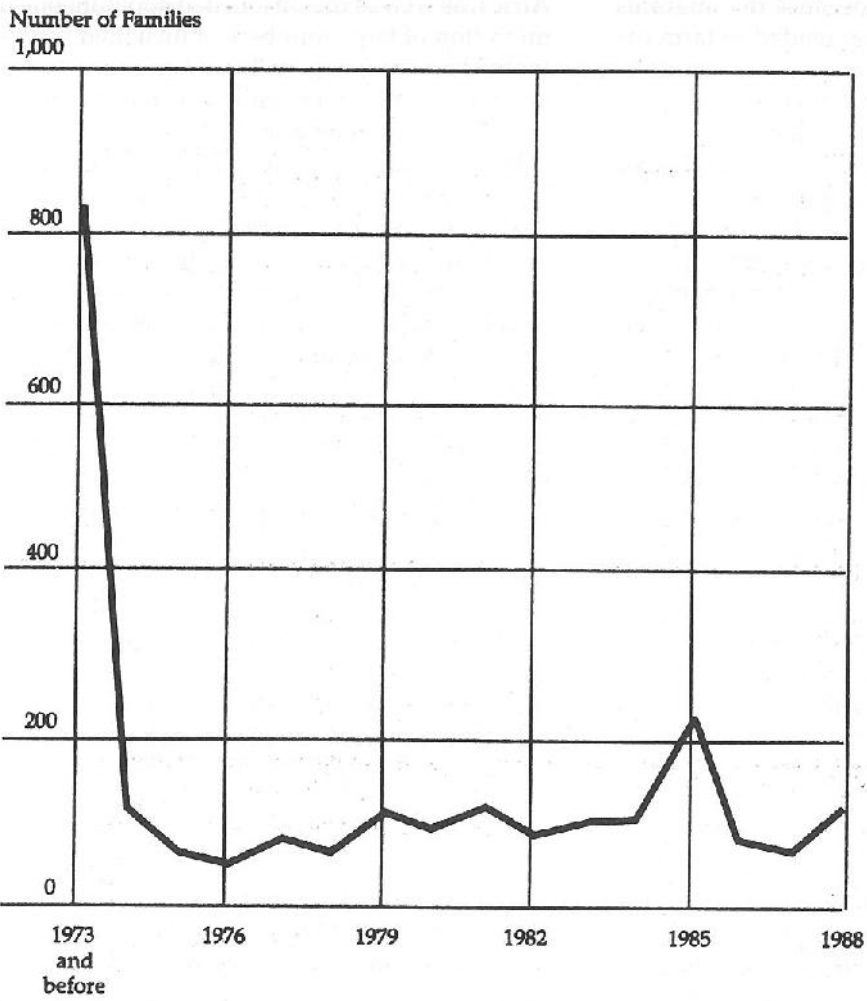
dam site dramatically increased immigration to the river basin in the mid-1980s (Figure 3.4). A second, smaller wave of immigration involved Mossi migrants to the villages adjacent to the proposed site and new access road (Figure 3.5). Unlike the indigenous Gourmantche and earlier immigrant Yarse, the new Mossi immigrants tended to settle closer to the rivers and "bas fonds" (Figure 3.5). A third wave involved the "sponsored" immigration of skilled construction workers from Europe, Canada, and other parts of Africa, as well as the unsolicited spontaneous immigration of large numbers of unskilled workers to the dam site location. The labor migrants were accompanied by merchants and farmers hoping to supply them food and services.

Most of the workers left before or immediately after the official inauguration of the dam in April 1989. Their exodus coincided with a fourth immigration to the former dam construction site, which is now Kompienga town (Figure 3.4). In contrast to earlier immigrants, these settlers tended to be agriculturalists who were attracted by the area's prospects for irrigated dry season farming. In August 1989, the town of Kompienga numbered 3,239, not counting civil servants. Ninety-eight percent of the inhabitants had immigrated since 1985 (Figure 3.4). Only 63 (15 percent) of the heads of household indicated that they had worked for the dam, and 310 (75 percent) of the household heads reported that either agriculture or livestock production was their primary activity.

#### *Recent Spontaneous Immigration to River Basins with Large Concentrations of Classified Forests*

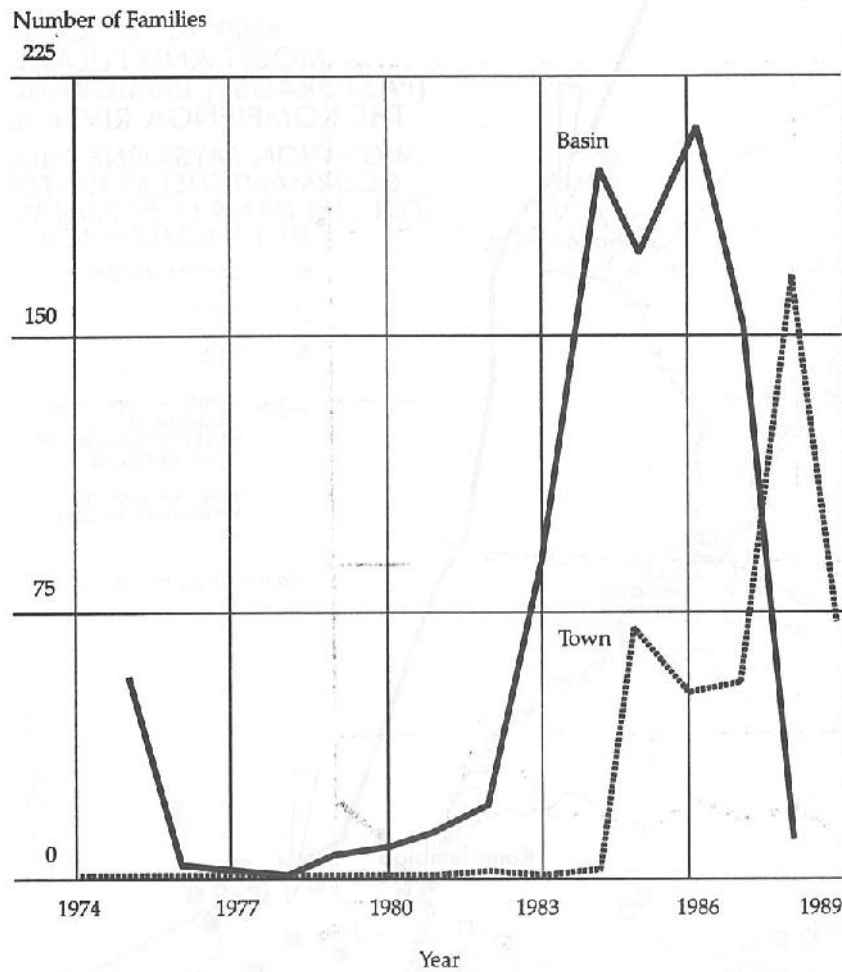
The fourth case study site is in Comoe Province in the extreme southwest along the Côte d'Ivoire. The area is traversed by the Comoe and Leraba river basins and has many similarities to the Kompienga basin. Before 1974, both the Comoe and the Leraba were highly infected with onchocerciasis. Here, as at Kompienga, the indigenous people traditionally shunned cultivation of the low lying, riverine areas. Despite some of the highest rainfall, and soils with relatively good agricultural potential, the Comoe and Leraba basins have experienced little immigration in comparison with the other valleys. Especially important for the LSR is the fact that Comoe Province has more classified forests than any other province in the country (Table 3.1).

**Figure 3.3 Year of immigration for male heads of immigrant households, Solenzo subsector, 1989**

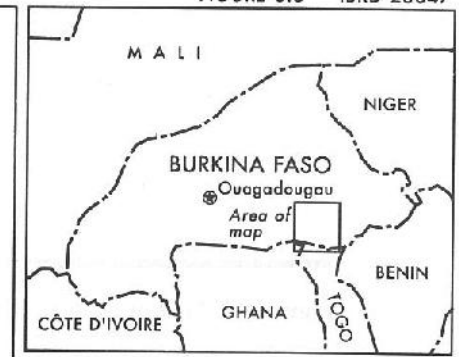


Source: Nana 1989c.

Figure 3.4 Year of immigration for settlers in the Kompienga Basin and town of Kompienga, 1989



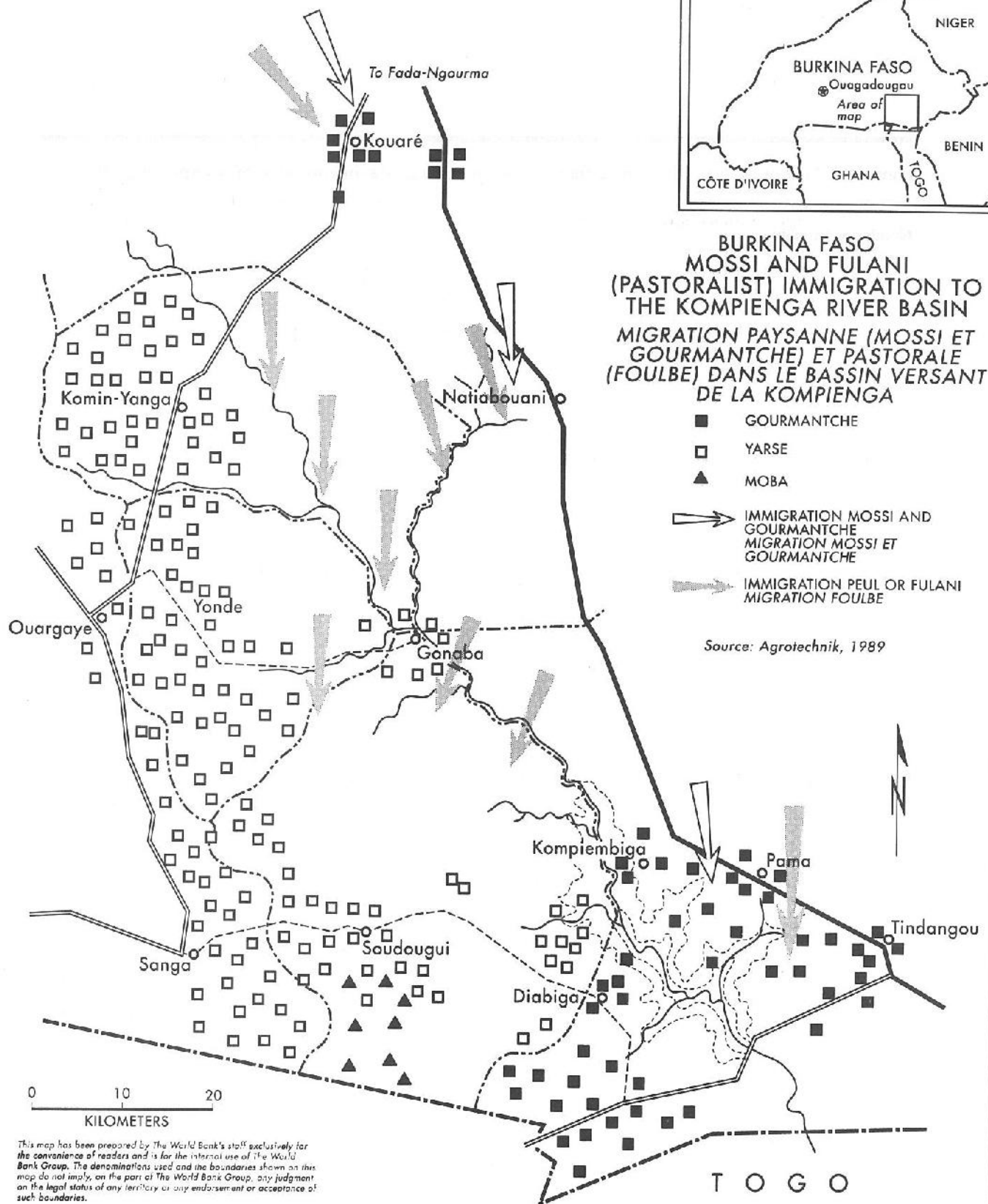
Source: Agrotechnik 1988 and McMillan 1989



**BURKINA FASO  
MOSSI AND FULANI  
(PASTORALIST) IMMIGRATION TO  
THE KOMPIENGA RIVER BASIN  
MIGRATION PAYSANNE (MOSSI ET  
GOURMANTCHE) ET PASTORALE  
(FOULBE) DANS LE BASSIN VERSANT  
DE LA KOMPIENGA**

- GOURMANTCHE
- YARSE
- ▲ MOBA
- ➔ IMMIGRATION MOSSI AND GOURMANTCHE
- ➔ MIGRATION MOSSI ET GOURMANTCHE
- ➔ IMMIGRATION PEUL OR FULANI
- ➔ MIGRATION FOULBE

Source: Agrotechnik, 1989



0 10 20  
KILOMETERS

This map has been prepared by The World Bank's staff exclusively for the convenience of readers and is for the internal use of The World Bank Group. The denominations used and the boundaries shown on this map do not imply, on the part of The World Bank Group, any judgment on the legal status of any territory or any endorsement or acceptance of such boundaries.

Until recently, the major force driving immigration to the Niangoloko subsector was transhumant pastoralists. Agricultural immigration to the area has increased, however, since 1983, mostly because Burkinabe immigrants have been returning from Côte d'Ivoire as a consequence of that country's growing economic problems (Figure 3.6). These returning migrants are primarily responsible for the pronounced increase in animal traction and cotton cultivation that has emerged in certain areas of the Leraba since 1983. Although immigration to the Niangoloko subsector is still weak compared with other sites included in the study, spontaneous agriculturalist and pastoralist immigration will undoubtedly continue. The main impetus for this is likely to be a steady increase in the number of Burkinabe returning from Côte d'Ivoire. We also anticipate that a significant portion of the pastoralist and agriculturalist immigration to the river basins of Kossi, Mouhoun, Bougouriba, and Houet Provinces will be redirected to this area as the more northern basins become saturated.

Development planners must accommodate and, if possible, control the depredations of the expanding herds and farmer populations on the area's classified forests. As one solution, new sources of income from renewable forest resources are being developed. These multiple use forest development projects are intended to encourage local people to take a more active interest in the management and preservation of the forests. One of these experimental "assisted" settlement

projects, the Classified Forest at Toumousseni, was included as a study site.

### Settlement Dynamics at the Study Sites

Our research revealed strong similarities in settler response patterns at all four sites. These responses were predictable and reflect the manner and results of settlers' adjustments to their new social, ecological, and economic settings.

Initially the settlers at all the study sites focused primarily on reinstating their basic social and food production systems. In the older settlements at Solenzo and AVV, most settlers shifted to a more dynamic phase of economic and social development after three to five years. It is during this later stage that the settlers were generally most willing to experiment with new types of crop technology and income earning opportunities. This stage was also characterized by:

- (1) increasing problems with loss of organic matter (at Solenzo) and erosion (at the AVV) in village cropping areas because of extensive cultivation and livestock practices with little attention to preserving soil fertility despite the actions undertaken by their respective extension services;
- (2) reduced access to new uncleared fields because of the expansion of the first generation of settlers' fields and the attraction of additional pastoralist and agriculturalist immigrants to the areas;
- (3) increased competition between agriculturalists and pastoralists, hosts and settlers, over pasture and water for livestock because of a substantial increase in the size of both the pastoralists' and agriculturalists' herds;
- (4) a shift in settlers' goals because of the emergence of a second generation of adult settlers with goals and resources different from those of their parents;
- (5) termination of first generation funding for special programs that initially attracted settlers to these areas;
- (6) greater replacement and maintenance costs of first generation infrastructure (wells, roads); and

**Table 3.1 Classified Forests in Comoe Province**

<i>Name</i>	<i>Area (hectares)</i>
Toumousseni	2,500
Bounouma	1,300
Beregadougou	5,000
Badolo	500
Boulon	1,200
Diefoula	8,500
Dida	7,500
Gaoandougou	12,000
Konkogo	25,000
Koflande	30,000
Logonegue	23,000
Niangoloko	700
Source Volta	100
Total	117,300

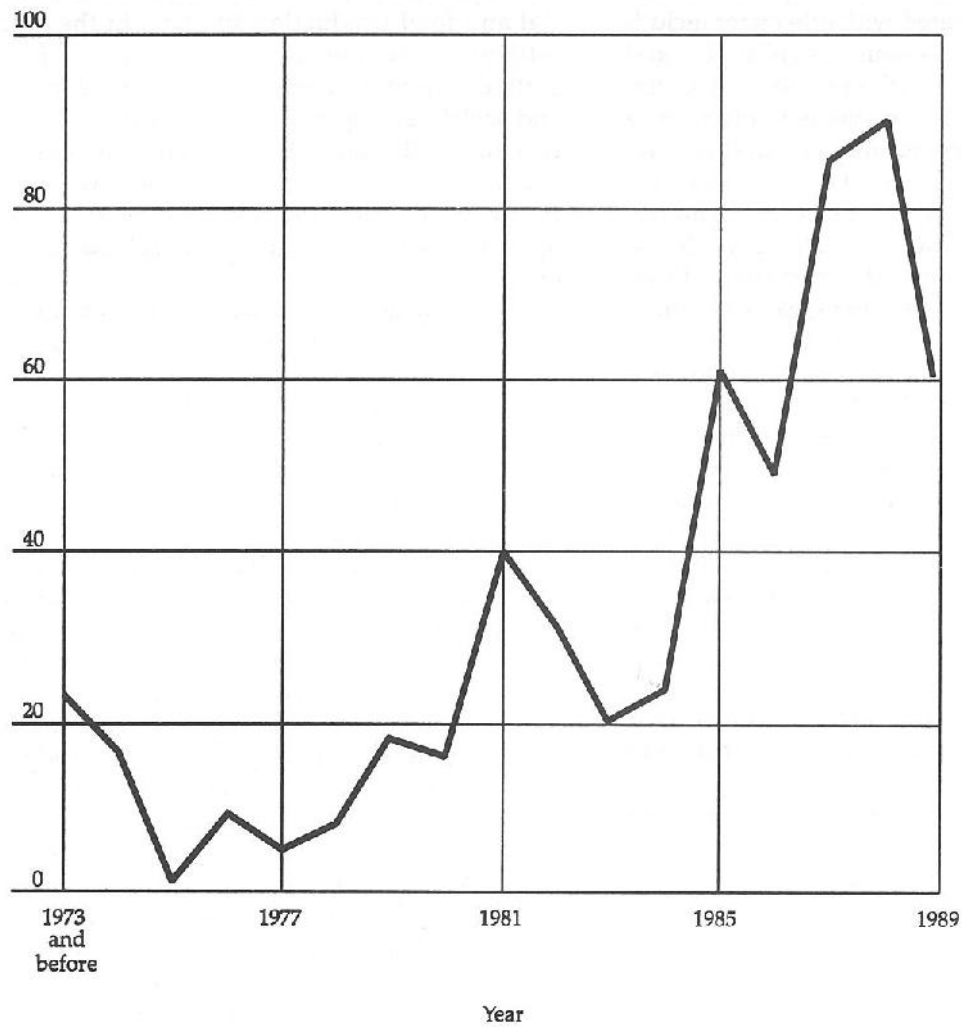
Source: Nana 1989a.



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**Figure 3.6 Year of immigration to the Niangoloko subsector for male heads of immigrant households, 1989**

Number of Families



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Source: Nana 1989a.

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- (7) mounting pressure from adult males and females for the creation of new ways to generate private income.

The period was also characterized by increased conflict over the allocation of land, water, and forest resources. Predictable sources of conflict included livestock damage to settler crops as herd sizes increase, and jealousy created by widening gaps between new economic groups.

The way settlers responded to the resolution of these different problems depended on a wide range of factors in the macro and micro policy environment. These are discussed in succeeding chapters.

### The Concept of Settlement Stages

The concept of settlement stages has been used to describe similar sorts of interrelated social and economic change in older settlement schemes throughout Latin America, Africa, and Asia (Nelson 1973; Chambers 1969; Scudder 1981, 1985) (Table 3.2). The policy significance of the concept is that it can help policy makers to anticipate the problems and opportunities that are likely to occur at each stage.

#### *Stage One: Planning*

Comparative analyses of successful assisted and sponsored land settlement projects worldwide highlight the critical importance of advance planning (Scudder 1985). During the planning stage, a broad range of important decisions are made regarding site selection, management structure, settler recruitment, crop extension programs, and basic infrastructure. Planning also considers the extent to which members of the host population will be included in the settlement process.

The AVV experience highlights the crucial importance of this stage. Early recruitment policies had a dramatic impact on the development of settler institutions 10-15 years later (McMillan 1983). Other initial decisions about land tenure have had far ranging effects. In particular, hostile feelings created by tenure policies blocked effective integration of the settlers into regional market systems, a fact reduced the potential regional effects of government and donor investment in sponsored settlements by inducing the

**Table 3.2. A Stage Model of Settlement-Related Development Planning**

Stage One	Planning
Stage Two	Initial Infrastructure Development, Recruitment, and Installation
Stage Three	Adaptation (Transition; Settling In)
Stage Four	Economic and Social Development
Stage Five	Handing Over and Incorporation

Source: Scudder 1981, 1985

more diversified, success-ful settlers to leave (see Chapter 6).

#### *Stage Two: Initial Infrastructure Development, Recruitment, and Installation*

Ideally, major construction of roads, wells, and other community infrastructure does not start until after planning is completed. A key planning problem at this stage involves decisions about how best to develop basic infrastructure. The AVV and Solenzo experiences highlight the need for planners to think ahead 10 or 15 years in planning infrastructure, to a time when population densities in the surrounding areas will be much higher. In view of the difficulty of predicting future immigration trends, it is recommended that infrastructure development be phased in over a longer period of time, like fifteen years.

The concept of "recruitment" refers to a variety of deliberate or implicit policy decisions that affect the types of settlers and settler households that are attracted to a project. During this stage it is extremely important that policy-makers consider how certain attractive features, such as food aid, may encourage immigration by families that might not be able to survive once special subsidies are removed.

Policy-makers should also remember that the long-term social security of the settlers rests on their extended family networks created by birth and marriage, and that these networks are reinforced by residential patterns. The experience at the AVV at Mogtedo and Mogtedo-Bombore suggests that high levels of government intervention in settler selection and installation can actually retard the process of community reintegration. This seems to be true whether the project followed a

strategy of recongregating home village groups (the case in certain villages at Mogtedo) or deliberately tried to mix them (the case at Mogtedo-Bombore). Whenever possible, immigrants should be allowed to self-select the particular social groups with which they choose to immigrate and live.

Our experience with spontaneous settlement at KOMPIENGA and SOLENZO suggests that, left on their own, immigrants will typically choose to move in small extended family groups of two or three related brothers and then intermarry, over the next two decades, with other immigrants from the same home area. The only area where we saw pronounced intermarriage between hosts and migrants was at LINOGHIN, where both hosts and migrants were from the same home area. Marriage linkages were extremely important in defining new economic and social alliances at all of the sites.

Sociologist SOME (1992, personal communication) notes that it is increasingly common to find new settlements in the valleys that are created by a religious leader and his disciples. In this case, the religious settlement creates a new set of social norms particular to itself.

#### *Stage Three: Adaptation (Settling In)*

The concept of a third stage of adaptation or settling in refers to the complex period of adjustment during which the settlers adapt to their new economic and social environment. This integration is likely to proceed more quickly if the migrants do not constitute a rival social unit that is perceived as a danger for the social order of the indigenous people. Indigenous populations seem more willing to accept individuals or small family groups. Larger groups are usually more difficult to assimilate (personal communication, J. SOME, March 1992).

During stage three settlers tend to be strongly focused on the reinstatement of basic subsistence levels, and the re-creation of wider social linkages with other settlers and hosts. Under such circumstances it is understandable that their first priority is to establish food security, rather than to experiment with new cash crops or the development of new, more diversified income sources. During this stage, settlers at all the sites typically placed a high value on social cooperation with one another and with hosts.<sup>1</sup> This phase of adjustment typically lasts three to five years.

#### *Stage Four: Economic and Social Development*

The adaptation phase ends when enough settlers shift from a conservative stance to a dynamic, open-ended stance, hence initiating a new stage of economic and social development (SCUDDER 1981, 1985). This transition usually occurs once food security has been established and the settlers begin to feel "more at home" in their new environment.

One of the clearest signs that AVV settlers were moving toward a more dynamic period of economic and community development was the increase in new conflict situations whose origins could be traced to greater social and economic diversity within the population. The transition was also signaled by a reinstatement of some of the traditional harvest and circumcision ceremonies, and a greater willingness and ability to resolve internal economic and social problems without relying on the extension agent. In addition, the period was associated with greater ease and frequency of dealing with local civil and traditional authorities.

A comparison of these stages with the economic results that were being obtained in other areas of the program suggests that important interrelationships exist between community development and settlers' willingness to modify the proposed extension program. This is also the period when certain settlers increased their interest and ability to invest in such nonproject areas as extensive livestock herding and off-farm trade.

One of the more dramatic indications of diversification at the Solenzo and AVV sites was an increase in the number of large and small livestock, as well as a parallel increase in the number of conflicts related to livestock depredations. The desire for diversification (Solenzo and AVV) and increased investment in new labor saving technology (Solenzo) was linked to increasing demands by the first generation of settlers' wives and children for semi-independent sources of income or for redistributing revenues produced on the families' collectively worked fields.

Success among first generation settlers at Solenzo and in the AVV sponsored settlements led to a substantial increase in spontaneous immigration of agriculturalists and pastoralists to the area surrounding the settlements. This tended to expand local markets and to offer other opportunities for exchange. At the same time, it increased competition for scarce forest, water, and pasture

resources and exacerbated the problem of crop damage by livestock. Opportunities for conflicts between hosts and settlers also increased as the settlers' wealth increased and their immigration began to appear to be increasingly permanent.

This stage of economic and social development was also associated with increased stratification among settler and host households at the Solenzo and AVV sites. At each site, only a small percentage of households was highly successful. At the other extreme, 20 to 30 percent of the settler households at both the Solenzo and AVV sites were considerably poorer than the rest (see Chapters 6 and 7I). Their poverty could be measured in terms of the CFA value of their crop production, the small size of their livestock herds, and, in a few of the worst cases, their need to sell livestock in order to buy food grains. At the AVV, these poorer households tended to be older couples without adequate access to labor or capital, or households that had to adjust to the loss of a major part of their labor force through death or migration. At Solenzo the poorer households tended to be new immigrants who were still adjusting to the new area or, in villages where new land was already in short supply, late arrivals who may have been given less and/or poorer quality land for settlement. In any case, the needs of each category—the wealthier and the poorer—were quite different.

#### *Stage Five: Handing Over and Incorporation*

Scudder (1985) emphasizes that no type of government intervention is considered complete until the activities have been taken over by a second generation of settlers and the operation of many project specific activities have been taken over by local, regional, and national authorities.

One of the striking features of new lands settlement in the older settlements at Solenzo and the AVV was the speed with which a new generation of settlers—who were teenagers or children when their parents immigrated—have assumed various leadership positions in the settlements. The decision of the first generation “millionaire” farmers to immigrate to Kompienga was spearheaded by the older sons and younger brothers of the first generation “millionaires” who were frustrated at what they perceived as limited opportunities for advancement. It is symptomatic of the generational change that of the eight households who immigrated to Kompienga from one AVV

village in 1988 (after an average of 13 years of living in the sponsored settlement), only two of the male household heads continue to work regularly in the families' cooperatively worked fields.

Most leadership positions in the village Revolutionary Committees (CRs) and in village land management committees at Solenzo are filled by the younger brothers and elders sons of the first generation settlers. The AVV planned settlements experienced a similar sort of generational change. Although the father may remain the titular head of the family in dealings with the project younger brothers and sons made many of the key production decisions by 1989.

The village *groupements* at both the Solenzo and AVV sites have taken over many of the functions once fulfilled by the project administration, such as marketing their cotton and managing the input warehouses. In general, however, this transfer to farmer managed institutions has been much slower in the sponsored than in the assisted settlement areas (See Chapter 12).

#### **Policy Implications of Interrelated Social and Economic Stages**

The concept of settlement stages has important implications for future development planning.

#### *Need for a Longer Time Perspective in Project Evaluation*

Project evaluations conducted after only three to five years are likely to be carried out too early to find evidence of the wider regional impact of a development intervention. Such premature evaluations can lead national governments and donors to either underrate or overrate the long-term development potential of new lands settlement. It can also encourage donors to cut off funding for projects at key points in the settlement and development cycle. A myopic focus on the first five years of settlement can also encourage national governments to ignore the need to adapt extension programs to the evolving needs, concerns, and farming systems of the settlers.

#### *Need for Phased Assistance to Anticipate Evolving Needs*

Settler and host needs and concerns are very different at different settlement stages (Table



3.2). During the initial installation and adaptation period, for example, settlers are primarily concerned with the reinstatement of basic food security. Government assistance during this period should focus on providing access to production supports (extension, inputs, credit) that will enable settlers to establish satisfactory consumption levels. The intermediate goal of assistance should be to bring the adaptation phase to an end as quickly as possible.

If government assistance succeeds in facilitating the development of higher yielding production systems in the third stage of settling in or adaptation, then it typically creates a group of settlers with very different expectations, resources, and goals at the fourth stage of economic and social development. If "captured" by new technology and opportunities for diversification, the wealthier, more entrepreneurial farmers can be a force for economic change and development. If not captured, that is, if settlers do not see adequate opportunities for local investment in the development of crops and in off-farm employment, some of the wealthier settlers and settlers with alternative opportunities in their home areas are likely to move.

The problems with increasing competition for pasture, water, and agricultural land at this later stage are predictable. Zoning to reserve certain areas exclusively for pasture offers one potential policy option for reducing agriculturalist-pastoralist conflict. These zones must therefore have sufficient pasture and water, which is not, for example, the experience at Gadeghin. Policies that increase land security for the indigenous hosts and migrants in the early stages of development can reduce settler-host conflict and facilitate a peaceful integration of the economic and social interests of the two groups.

The primary roles of government at this later stage—when incomes are on the rise, population densities are increasing, and settlers are feeling more "at home"—should be to continue to promote the types of appropriate technology and regulated land use management that encourages farmers to invest in sustainability. Another role of government should be to assist with economic diversification by providing information relating to new opportunities, and to facilitate linkages with outside markets.

### *Difficulty of Administering Supplementary Food Aid*

NGO and government assistance for new lands settlement tends to consume large quantities of administrative and extension talent in the distribution of food aid. While food aid may be necessary in some cases, especially where displacement is forced or where settlements are in isolated, alien surroundings, the importance of food aid should not be overemphasized, either in the advertisement or the design of project interventions.

New settlers at the AVV received one year of full rations and a second year of half rations from foreign donors. In theory, the food aid allowed settler households who might otherwise not have been able to afford to do so to migrate to the project. The promise of food aid, however, seems also to have attracted an unusually high percentage of poor households, headed by elderly male and female farmers with few other workers who were unable to survive once the food rations were withdrawn. These households were among the more than 50 who immigrated to the Mogtedo sponsored settlements between 1974 and 1977 but left within two years of coming to the project. We understand that Linoghin experienced a similar high initial dropout during the initial 1973-1977 settlement period. Unfortunately this is not reflected in our data, which only examine settler dropout between 1979 and 1989. One of the other negative impacts of food aid was to create a high level of dependence on the extension agent and that retarded the early development of dynamic local institutions.

In project villages where other conditions were favorable, the first generation of settlers showed a strong willingness and ability to sponsor new immigrants. Several of the average income migrants to Kompienga from the AVV settlements at Mogtedo had their transportation expenses paid for by wealthier AVV settlers.

Settlers who had migrated to the AVV from 1975 to 1977 gave substantial amounts of sorghum to new settlers who arrived at the neighboring group of sponsored settlements at Mogtedo-Bombore after 1979. The new settlers would also sometimes be helped with clearing their fields. Several of the new settlers' wives spent one week visits in the older settlements—the ostensible reason being that they could thus learn about the local wild vegetables that they needed to gather and dry for sauces. Almost every one of the sponsored settler households at Mogtedo V3 has hosted at least one (and



more often two) farm families for all or part of one agricultural season before the family acquired its own AVV farm. We estimated that this sort of gift exchange of grain and hosting new immigrant households accounted for as much as one-third to one-half of the grain produced in one Mogtedo planned settlement in 1983 (McMillan 1987a). Life histories of the Solenzo settlers showed that the early spontaneous settlers in this region also helped later immigrants by providing food, housing, and supplementary labor on their fields.

Thus, although government agencies often focus on food aid in the early settlement stages, settlers generally perceive this as less important

than reinstating their production systems at higher levels than they had before immigrating. The chief exception to this would be when resettlement was forced, as in repatriation from a foreign land or in response to dam related flooding—circumstances in which the “normal” process of host and early settler sponsorship are likely to be inadequate.

#### Note

1. Although settlers at the AVV placed a high value on social interactions, they were generally not able to interact easily with local inhabitants due to host resentment over the AVV's land tenure policies.

# 4

## Linkages between Local Planning and National Agricultural Policy

Many development projects in general, and development projects in the OCP river basins in particular, are planned as if the delineation of a project zone renders them immune to the impact of national policy and wider socioeconomic issues. Although isolated projects may be immune in the short run, they must be able to survive within a broader national and regional context once special funding is withdrawn. Failure to consider this can lead planners to advocate land management practices and institutions that are not realistic except in the short-term.

Especially important in areas of new lands settlement are national policies relating to subsidies, marketing boards, and transportation that affect the prices farmers receive for their products and pay for yield increasing inputs and technology like fertilizer, insecticide, tractors and plows (McMillan, Painter and Scudder 1990). These prices influence the net income that farmers earn from their agricultural enterprises.

### Producer and Input Price Policies

Burkina's agricultural policies between 1982 and 1987 followed a general trend in West Africa toward removal of input subsidies and government intervention in markets. Although many marketing boards remain, the only one that effectively intervened in the study areas was SOFITEX (*Société des Fibres Textiles*)—the cotton parastatal. SOFITEX has extended short-term credit to farmers for animal traction equipment, fertilizer, and insecticides;

repayments are deducted from the money received at harvest sales. Credit for rainy season crops has generally not been available on any significant scale for crops other than cotton. Extension services and crop research programs also remained strongly focused on cotton production until the mid-1980s.

Because of the efficient operation of SOFITEX, farmers receive a guaranteed market and guaranteed price (95 CFA/kg in 1988; see Table 4.2) for their production. Since 1984 these prices have risen (55 CFA/kg in 1979 versus 58.7 in "real" CFA/kg in 1988, adjusted for inflation with the INSD [*Institut National de la Statistique et de la Démographie*] consumer index [Table 4.1;

**Table 4.1. Official Price Per Kilogram of Fertilizer (in CFA) and Percent Subsidized**

Year	CFA	Percent
1980	35	63
1981	40	64
1982	55	54
1983	62	49
1984	78	40
1985	90	36
1986	114	20
1987	91	5
1988	96 (cash)	0
	106 (credit)	

Sources: World Bank 1985:31; BF Proj. Engr. 1988/89:72, 74; IFDC 1987:63.

Annex 3, Table B-1)).<sup>1</sup> The higher prices received, however, have been offset by the steady rise in fertilizer and insecticide prices, which has accompanied reduced subsidies (Table 4.4). As a result, the possible cash returns for one hectare, at the same level of yields and input use, were 12 percent lower in 1988 than they were in 1979 (Table 4.4).

One serious policy problem is the low profitability and substantial price fluctuation of cereals between and within years (Sanders 1990). Prices for cereals, which are not supported by the government, can fluctuate widely within a single year, between years, and between regions. Producers typically receive the highest prices in the period just before harvest (August), with medium prices at the end of the dry season (March), and lowest prices during and immediately after harvest (December). Average and better-off farmers in the AVV typically "play the market," saving their major cereal sales for the time when outside demand and local prices are highest. A large percentage of the AVV grain that is sold when prices are low is grain produced on men's and women's private fields. When grain is sold from the collectively worked fields under the supervision of the household head during the non-

peak periods, it is typically only in small quantities and in response to specific needs.

In contrast, both price and sure market access are key problems for cereal production in the Southwest. Interseasonal price fluctuations are especially dramatic in the western grain surplus areas like Solenzo. High levels of production and difficult, expensive transport over badly scarred, unpaved roads have meant that the median low price for white sorghum—still the principal food crop consumed and the principal food crop grown by all but a very small minority of mini-tractor farmers—was 35 percent below the median low price in the AVV, and 45 percent below the median price at Komienga. Median prices for white sorghum in the Solenzo region were 28 percent below AVV and 60 percent below Komienga town; even the highest prices in the study were 20 percent below those recorded for the AVV farmers, and 40 percent below Komienga (Table 4.3). Price differences between the regions were less extreme for red sorghum and millet, which are grown in smaller quantities.<sup>2</sup>

We recorded a higher median price for maize than for sorghum at Solenzo (Annex 3, Table B-3)—a fact that reflects state intervention to

**Table 4.2 Official Prices for Cotton and Cotton Inputs at the AVV, 1979-1989 (in CFA)**

Year	Cotton/kg <sup>a</sup>	Fertilizer/kg		Insecticides/liter	
		AVV <sup>a</sup>	Min. du Commerce <sup>b</sup>	AVV <sup>a</sup>	Min. du Commerce <sup>b</sup>
1974	40	35	-	115	—
1975	40	35	-	115	—
1976	40	35	-	115	—
1977	55	35	-	115	—
1978	55	35	-	360	—
1979	55	40	-	400	—
1980	55	40	-	400	—
1981	62	40	-	400	—
1982	62	60	-	400	—
1983	70	60	-	450	—
1984	90	97	-	450	—
1985	100	97	90	450	500
1986	100	120	114	825	800
1987	95	120	91	1,710	1,595
1988	95	106	86	1,260	1,260
1989	95	114	105	1,386	1,582

— Not available.

a. AVV, Credit Agricole.

b. Ministère du Commerce, Burkina Faso.