FOOD SECURITY PROJECT

IER-USAID-MSU

English Summary of Working Paper No.87-01

RESULTS OF THE PRELIMINARY SURVEY OF MALI'S FIFTH REGION

I. THE SENO PLAIN AND THE BANDIAGARA PLATEAU

by

Bruno Henry de Frahan and Moussa Boré Diarra

December 1987

INTRODUCTION

This paper is the first in a series of working papers aimed at analyzing the feasibility of extending the mandate of the Farming System Division of the Rural Economy Institute (DRSPR-IER) to Mali's Fifth Region. This first working paper examines the farming systems of the Séno Plain and of the Bandiagara Plateau and focuses primarily on:

(1) defining homogeneous zones based on agroclimatic and soil characteristics (chapter II);

(2) understanding the two most important farming systems namely, the agropastoral system of the Dogons and the pastoral system of the Fulanis (chapter III);

(3) identifying the main recommendation domains for these two farming systems (chapter IV);

(4) identifying the constraints in these two systems and the technologies or the complementary interventions that may potentially improve productivity (chapter V).

I. MALI'S FIFTH REGION - BACKGROUND

The Fifth region in Mali covers an area of 77,800 sq. km with an approximate population of 1.261 million in 1987. The main economic activities include agriculture, livestock production, fishing and trade. This study focuses on the primary sectors and is limited to the Séno Plain and the Bandiagara Plateau.

A. PRIMARY SECTORS OF THE FIFTH REGION

In terms of average acreage planted during the 1975-86 period, rice production in the Fifth Region accounted for 29% of national rice production, millet-sorghum-fonio accounted for 16%, and maize represented about 1% of total national maize production. Average yields in the Fifth Region are generally lower than the national averages due to less reliable rainfall patterns, and given the dependence of regional rice production on the flooding of the Niger river. Production of grain legumes is also important consisting mainly of cowpeas, groundnuts, and wandzou. The Bandiagara Plateau is a large vegetable producer, primarily onions that are sold all over Mali and in neighboring countries.

Cattle in the Fifth Region represented 23% of the national stock during the 1977-87 period, with an estimated 60% of the

animals brought to market that are actually sold. Prior to the 1984 drought the Fifth Region regularly exported large quantities of livestock to neighboring countries. In 1984 these exports consisted of 21,399 heads of cattle and 67,439 heads of sheep and goats exported mainly to Burkina Faso and Côte d'Ivoire.

Fishing is an important activity in the Mopti region especially around Mopti and Diafarbé and on Lake Débo.

B. THE THREE NATURAL ZONES OF THE FIFTH REGION

The three natural zones in the Fifth Region are the Delta, the Bandiagara Plateau, and the Séno Plain. The Delta is a plain partially exposed to the flood waters of the Niger and Bani rivers, covering an area equal to 46% of the Fifth Region and with 48% of the regional population. Millet and rice cultivation, herding, and fishing are the main economic activities, in addition to trade centered in Mopti.

The Séno Plain covers an area equal to 43% of the Fifth Region with 37% of the regional population. It is essentially agropastoral with an average annual rainfall of 200-400 mm in the north (Séno-Mango) to 400-700 mm in the south (Séno-Gondo). The main crops are millet, cowpeas, groundnuts, fonio, and wandzou, in addition to livestock production (mainly sheep and goats).

The Bandiagara Plateau, with an average altitude of 150 to 300 meters, covers an area equal to 11% of the Fifth Region with 15% of the regional population. Agriculture is characterized by intensive cultivation of millet, cowpeas, groundnuts, fonio, and wandzou, in addition to the numerous potentials for vegetable production along the Yamé River. Sheep and goat herding is the predominant livestock activity.

II. IDENTIFICATION OF HOMOGENEOUS ZONES

In order to identify the relationship between the farmers' practices and the physical conditions of their environment, the Séno Plain and the Bandiagara Plateau were divided into homogenous zones based on agroclimatic and soil conditions.

This approach involved four steps: First, a soil survey identified 5 soil morphological zones in the Séno Plain. Second, these 5 zones were classified according to their agricultural potentials and limitations. Third, this agricultural and soil classification system was extended to cover the arable lands of the Bandiagara Plateau by comparing them to the already identified zones of the Séno Plain. Finally, soil and agricultural zones were further classified based on average annual rainfall.

The above mentioned approach resulted in identifying 6 homogeneous zones in the Séno Plain and the Bandiagara Plateau, based on agroclimatic and soil characteristics. In addition to agroclimatic, soil, and demographic factors, socio-economic factors such as the type of technology used, farm size, and access to markets would allow defining the recommendation domains.

III. PRELIMINARY INFORMATION ON THE AGRICULTURAL AND PASTORAL FEATURES OF THE SENO PLAIN AND THE BANDIAGARA PLATEAU

An examination of the main agricultural and pastoral characteristics of the Séno Plain and of the arable lands in the Bandiagara Plateau resulted in identifying two distinct farming systems. The first one is the agropastoral system of the Dogon farmers, which is the most common and which was the focus of the informal survey. The second farming system is the pastoral system of the Fulani herders, concentrated mostly in the North and South zones of the Séno Plain.

The two systems are complementary in many ways including the exchange of goods and services between the two communities and the spatial distribution of their economic activities. The Dogons are specialized in millet and cowpea production and they tend to invest their agricultural surplus in small and large

ruminants that are entrusted to Fulani shepherds. The Fulanis are specialized in extensive herding of small and large ruminants and concentrate their efforts both on increasing the size of their herds and on milk production.

The way farming and herding activities are undertaken within the two farming systems reflect the priority that each ethnic group gives to farming or to herding. For instance, it has been observed that Fulani herders do not follow the agricultural calendar as strictly as the Dogons, and that they are not as skilled as the Dogons in their use of the plow. Such observations may confirm the hypothesis that Fulanis tend to be less skilled at using agricultural equipment. If this is the case, then it would be possible to design agricultural institutions aimed specifically at improving the technical level of the Fulanis.

IV. PRELIMINARY IDENTIFICATION OF RECOMMENDATION DOMAINS

For each of the two farming systems identified (agropastoral and pastoral), three criteria are proposed to identify recommendation domains. The first criterion consists of the agro-climatic and soil characteristics, the second is access to markets, and the third is population pressure on arable land. The first criterion includes three levels: North, Central

(including the Plateau), and South zones. The market access criterion includes two levels: the enclosed zones for the North and South zones, and the relatively accessible zones of the Central and Plateau zones. The population pressure criterion includes two levels: the very high pressure corresponding to the North zone, and the excessive pressure corresponding to the Central, Plateau, and South zones.

These three criteria will allow the definition of five recommendation domains, including 3 for the agropastoral system and 2 for the pastoral system. These five domains cover a total population of about 31% of the Fifth Region. The relative population size of each recommendation domain studied will be estimated during sampling, prior to undertaking the formal survey.

V. PRELIMINARY IDENTIFICATION OF PRODUCTION CONSTRAINTS AND OF DEVELOPMENT POSSIBILITIES

A. PRODUCTION CONSTRAINTS

The most important constraint to production in both the agropastoral and the pastoral systems is the worsening of rainfall patterns over the last fifteen years. Other physical and biological constraints include the increasing inability of

local millet varieties to complete their cycle due to lower rainfall; soils are generally deficient in phosphorus and are low in organic matter; the increasing crop losses due to insect infestations, especially Raghuva and Acigona; the spread of Striga (a parasitic weed) infestation on millet; in addition to animal diseases and parasites which constitute important constraints to production in the pastoral system.

Technical, institutional, and socio-economic factors are also important constraints to production. These include the obstacles encountered in the adoption of improved millet varieties; the lack of effective demand for chemical fertilizers due to high prices; the limited impact of the Crop Protection Service due to its limited resources; and the excessive delays in the delivery of agricultural equipment due to the financial problems faced by the manufacturer.

In addition to the above constraints, production in the agropastoral system is constrained by the general lack of financial resources available for investment in crop production. This is due to the limited income generated by farming, the burden of various taxes faced by the farm household, and the diversion of monetary resources into increasing herd size.

The development of the pastoral system is also constrained by several institutional and socio-economic factors. These

include the population pressure on the existing level of pastures; the potential conflicts between farmers and herders over land or water uses; the limited effective demand for meat due to low incomes locally and due to competition in traditional export markets; and the recent trend among Fulani herders to diversify into growing their own cereals due to the shift in terms of trade against animal products.

B. HYPOTHESES CONCERNING DEVELOPMENT POSSIBILITIES

Three development objectives are proposed for the agropastoral system: (1) stabilizing yields of food crops (mainly millet and cowpeas), (2) increasing yields of food crops, and (3)diversifying production by developing secondary crops. The first objective is most important in low rainfall zones (recommendation domains I and II), while the other two objectives are more relevant in zones with average rainfall between 400 and 600 mm (recommendation domains II and III).

The informal survey identified several technologies that seem appropriate in attaining the above objectives. These technologies are grouped in terms of their degree of availability, their contributions to the development objectives, and in terms of the actions needed to make them available to the system. The technologies are classified according to the recommendation domains of the agropastoral system, and

distinction is made between the short and long term as to the potential availability of the technologies.

The above hypotheses need to be verified through a formal survey and through complementary interviews with researchers and extension agents. Once these hypotheses are confirmed and adjusted, an analysis of the costs and benefits of the appropriate technologies will be needed. Such an analysis will be undertaken at three levels: at the farm level, at the level of the extension project in the Fifth Region of DRSPR, and at the regional or national level.