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Mike Speirs and Ole Olsen

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This paper presents the results of a study examining the development of mixed farming systems in the Sahelian region of West Africa. The study was part of a program of research into the future directions of livestock production, agricultural development, and resource management in Sub-Saharan Africa, carried out by the Agriculture Division of the World Bank’s Africa Technical Department. The Danish International Development Agency (DANIDA) provided funds for the study and contributed to the work of the consultants and researchers.

Although it is widely recognized that crop and livestock production in the Sahelian countries is in crisis, the full implications for human welfare, the sustainability of farming systems, and environmental degradation are inadequately appreciated. The population explosion in recent decades is at the root of the crisis, but it is exacerbated by low rainfall, droughts, and infertile fragile soils. The process is characterized by the breakdown of pastoral systems, settlement, and the rapid adoption of integrated crop/livestock systems by traditional crop farmers and settled pastoralists. It is influenced by many factors, the most important being a scarcity of land for crops and grazing. Other factors include the difficult economic environment, changing aspirations and behavior patterns, fragile ecological conditions, and political marginalization of the cultivators and pastoralists.

This study describes the evolution of integrated crop and livestock systems and the underlying causal factors. Particular attention is given to the allocation of resources, especially land and labor, among different crop and animal production activities. The factors that determine the adoption of animal traction, the use of manure and crop residues in farming systems, and the pattern of income generation in households are analyzed and discussed. The study concludes that present farming systems are unsustainable in the long term. Appropriate strategies are recommended to reduce the identified constraints.

The challenge now is to implement these strategies to reduce environmental degradation and improve the welfare of farmers and pastoralists to the greatest possible extent.

Ismail Serageldin
Director
Technical Department
Africa Region
World Bank
May 1992
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A number of descriptive and analytic reports were written by a team of consultants working with Carl Bro International: Charles Gooch, Preben Haugaard, Robert Lallemand, and Henrik Secher Marcussen. Their work was based on case studies undertaken by a team of students from Roskilde University Centre in Denmark. These students, Tine Bensaoula, Tove Degnbol, Dorrit Jensen, Christian Lund, Henrik Nielsen, and Klaus Sall, were assisted by local personnel including Khady Dial, Boubacar Fall, Tapsir Ndao, and Abdoulaye Sy (Senegal); Youssouf Diabaté (Mali); Philippe Bamago, Zakaria Gnégéné, and Bégéu Sessouma (Burkina Faso) and Moussa Assane, Soumana Assane, and Aboubacar Hamidon (Niger).

This final report is based on the original study reports and other documents, taking into account comments and editorial advice given by team members, by John Ashley, by staff in the Agricultural and Environmental Divisions of the World Bank’s Africa Technical Department, by John English, Environmental Department, and World Bank staff in the Africa Region. Many useful comments on an earlier draft were made by Roy Behnke (Overseas Development Institute, London), Anders Hjort af Ornas (Scandinavian Institute of African Studies, Uppsala), Ralph von Kaufmann (International Livestock Center for Africa, Addis Ababa), and F. Riveros (FAO, Rome). The photographs were taken by Tove Degnbol.

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### Abbreviations and Acronyms

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<th>Abbreviation</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>CFA</td>
<td>Franc de la Communauté Financière Africaine</td>
</tr>
<tr>
<td>CILSS</td>
<td>Comité Inter-Etats de Lutte Contre la Sécheresse au Sahel</td>
</tr>
<tr>
<td>CMDT</td>
<td>Compagnie Malienne du Développement de Textiles</td>
</tr>
<tr>
<td>CRPA</td>
<td>Centre Régional de Production Agro-Pastorale (Burkina Faso)</td>
</tr>
<tr>
<td>EC</td>
<td>European Community</td>
</tr>
<tr>
<td>FAO</td>
<td>Food and Agriculture Organization of the United Nations</td>
</tr>
<tr>
<td>ICRISAT</td>
<td>International Crop Research Institute for the Semi-Arid Tropics</td>
</tr>
<tr>
<td>IFAD</td>
<td>International Fund for Agricultural Development</td>
</tr>
<tr>
<td>ILCA</td>
<td>International Livestock Centre for Africa</td>
</tr>
<tr>
<td>IMF</td>
<td>International Monetary Fund</td>
</tr>
<tr>
<td>ISRA</td>
<td>Institut Sénégalais de la Recherche Agricole</td>
</tr>
<tr>
<td>NGO</td>
<td>Non-governmental organization</td>
</tr>
<tr>
<td>OACV</td>
<td>Opération Arachrière et Culture Vivrière (Senegal)</td>
</tr>
<tr>
<td>OECD</td>
<td>Organization for Economic Cooperation and Development</td>
</tr>
<tr>
<td>ONCAD</td>
<td>Office Nationale de Coopération et d’Assistance au Développement (Senegal)</td>
</tr>
<tr>
<td>SODEVA</td>
<td>Société de Développement et de Vulgarization Agricole (Senegal)</td>
</tr>
<tr>
<td>SOFITEX</td>
<td>Société des Fibres Textiles (Burkina Faso)</td>
</tr>
<tr>
<td>TLU</td>
<td>Tropical Livestock Unit</td>
</tr>
<tr>
<td>USAID</td>
<td>United States Agency for International Development</td>
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Exchange Rates

The CFA franc is convertible at a fixed rate of 50 CFAF to 1 FF. The average exchange rates of the CFA franc to the US dollar during the study period were:

1987: 301 CFA = US$1
1988: 298 CFA = US$1
1989: 330 CFA = US$1
Summary

Aims

The principal objective of this study was to examine alternative ways through which the integration of animal production with crop production could contribute to an intensification of both food and cash crop production and encourage the maintenance of soil fertility in the Sahelian region of West Africa. The study was therefore designed to assess the potential role of livestock in integrated farming systems (mixed farming), focusing on the technical constraints as well as social factors and the economic incentives for livestock production and animal products.

Methodology - Country Studies

The study was carried out in several phases which included the collection and analysis of data and information from selected households and villages in Burkina Faso, Mali, Niger, and Senegal. The areas studied are located in the Sahelo-Sudanian and Sudanian agro-climatic zones of West Africa where average annual rainfall is between 400mm and 900mm. Agricultural production in these areas is characterized by modest and highly variable crop yields, where fluctuations in precipitation, recurrent droughts and increasing environmental degradation are significant limiting factors. Declining soil fertility in areas where fallow periods have become shorter (or have disappeared altogether), linked to an expansion of the area under cultivation, pose major problems for the sustainability of farming systems in the Sahel.

Case studies in selected villages revealed the complex dynamics of these processes, and illustrated some of the strategies which have been adopted by different groups of crop cultivators and pastoralists to maintain production and income. The allocation of resources, particularly land, between different crop and livestock production activities, the adoption of techniques such as animal traction, the use of manure and crop residues, and the patterns of income generation and distribution in the households and rural communities, formed the focal points of these studies. Annex 1 outlines some of the methodological difficulties encountered during the various phases.

Economic and Socio-Cultural Factors

The economic policies pursued by the governments of the region during the 1980s, based on the notion of structural adjustment designed to reduce budgetary and balance of payments deficits and to change the structure of production in order to produce tradeable goods in greater quantities, have had various effects on the farming systems in the areas studied. Public expenditure cuts and the withdrawal of parastatal agencies from the agricultural sector have resulted in increased input costs and reduced extension services and credit facilities, which have not been compensated by increases in the prices of crops and livestock. The deterioration in the terms of trade of agricultural products from the Sahel, notably