CHAPITRE III

Les types de stratégies spatiales

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A - Land use in West Africa is being intensified with growing demographic pressure (and the resulting need for subsistence food) and the demand for marketed produce (locally used or exported) as the driving forces behind the process. Most of the land use intensification is nothing else but increased soil-mining. More land is being overgrazed, more land is put to arable crops. The vegetation cover is increasingly destroyed, soils are leached and nutrients are exported, erosion is in the increase. Most types of farming in tropical Africa are further away from balanced systems of land use than ever before. Increases in food crop production are registered as success in terms of national development plans, but they imply a speeding-up of a type of agriculture which is still primarily a mining industry. Agriculture could be a permanent and efficient converter of solar energy into products useful to man, but the present types of land use mostly lack permanency.

B - DIARRA in his paper, which relies on most pertinent observations in Central Niger, points to the fact that settled pastoral people (Peul) acting on the principle of challenge and response developed viable systems of mixed farming (association cultures-élevage). In his case livestock production went through the usual stages of degradation which can generally — with population increase — be observed in the semi-arid savannas:

Expansion of arable cropping at the expense of fallows and grazing land, reduction of dry-season grazing, reduction of the livestock population that can be maintained locally, decline of the quality and the output of land and livestock. In DIARRA'S case the pastoralists reacted in various and most ingenious ways. They changed to intensive types of crop production with the systematic use of manure, and their yields are higher than those of the neighbouring Hausa with no pronounced manure-economy. They organise the seasonal migration of much of their livestock into drier Sahelian territory. This implied profound changes for the Peul economy. The emphasis changed gradually from livestock production to crop production. There is a most profound change in the role of livestock

which increasingly is considered as a crucial element of the crop economy : livestock collects the nutrients from wider spaces and concentrates them on the dungland around the hut.

DIARRA's observations confirm what is reported from many other parts of semi-arid Africa :

1. Kain slew Abel, says the Bible, and this seems to be true for today's Africa. Wherever we have arable grazing land it is sooner or later transferred from pastoral use to crop production. The economics are clear : arable land use, even under rather marginal rainfall conditions, produces much more income and welfare than pastoral land use. Innovations such as short-maturing varieties, mineral fertilizers and new cultivation methods increasingly become available. More and more dry land becomes suitable for cultivation, as indicated by DIARRA. Pastoral people have to adjust and this is often rather painful. A belt of crop production develops between the pastoral areas of the north and the ample grazing of the Guinea savanna, as pointed out by BENOIT in his recent study on livestock migrations in Upper Volta.

The lesson, I feel, is clear. Given the demographic trends and the resulting need for food we have to expect that more grazing land and fallows will be cultivated. Pastoralists have to adjust. The important question is to develop modes of arable farming and pastoralism under rather dry conditions which are economically viable and not too risky in years of drought.

Fallows tend to disappear. The tendency is towards permanent cropping. Reduction in fallowing reduces yields per hectare and decreases returns per hour of work, but total output is up, because more land is under crops. The final stage of this process of « involution » is smallholder hoe-farming in low-level equilibrium situations. Yields stagnate and employment per labourer goes down with increasing numbers of family members (compare NORMAN'S studies in Zaria, Northern Nigeria). The final result is a poor-house full with people living under the condition of high risks of famine.

Are there any ways out of the low-level equilibrium trap of rural development in a decidedly semi-arid setting? DIARRA points to the relative wealth of his manure-using Peul and their well tended plots. The implicit question is : are mixed farming systems a viable proposition for land use in the area? The agronomic evidence is fairly ample. Mixed farming would protect the land, reduce erosion, increase employment and out-put and improve nutrition. We should not overlook, however, that most existing mixed-farming systems in this climatic zones are due to «squeeze» situations. This apparently applies for the Peul, described by DIARRA and also for the Wakara on an island in Lake Victoria who developed what is probably the most advanced traditional mixed-farming system in tropical Africa. Returns per hour of work are low, mostly lower than in other modes of farming.

Modern technology changes the environment. Sooner or later mineral fertilizer use will become appropriate. This then reduces the dependence on manures. Farmers in a semi-arid setting face a most pronounced dry-season feeding problem. They tend therefore — once closely connected with the market — towards arable production with little or no livestock and wherever feasible they tend towards tractor use. The population absorption capacity of such modes of farming are low. In other words, the trends are such that we should increasingly prepare for migrations from the Sahel and the northern Sudan zone to the northern Guinea zone and the southern Sudan zone where rainfall is more ample and where extended areas of valley bottom are available. Agricultural development usually implies a spatial concentration of production in areas which are relatively better in their potential. West Africa is unlikely to be an exception in this respect.

C - CU-KONU, in describing the land use pattern in south-eastern Togo also points to a « squeeze » in land, but with different causes and different solutions. Here land is getting scarce in a process which might be summarized as follows :

1. The initial phase is characterised by low population densities and crop production for subsistence needs only.

2. The introduction of coffee and cacao claims more and more land. Gradually food crop production is pushed out of the forested area into the open savanna where yields are lower, but the opportunity costs of land are lower also.

3. Subsistence food requirements increase with growing population densities. Another very important element is the growing food demand of local urban markets which is so attractive that — in

times of low prices for coffee and cocoa — farmers tend to neglect their export crops and intensify food crop production for local urban markets.

4. Increased arable cropping reduces fallowing, soil fertility is affected, yields decline.

So there is also a growing degree of land shortage as a result of the interacting impact of population increase and production for sale.

In southern Togo the smallholders' reaction seems appropriate and is well pointed out by CU-KONU :

1. Valley bottom land is cleared and developed for wet rice. The agricultural history of South-east Asia clearly shows that wet-rice is a most suitable response to the food requirements of a growing population. Paddies « respond to loving care » writes Clifford GEERTZ about wet-rice production in Java and indicated that with rice the production function of labour is yielding positive returns even at very high labour inputs. Wet-rice lends itself to modernisation with fertilizers and high-yielding varieties. Valley bottoms may yield several crops per annum. The smallholders in southern Togo enter into an activity which, over time, may become a major source of food in western Africa. Wet-rice production in valley bottoms is an ecologically stable way of farming open to modern farming methods which lend themselves for smallholders.

2. The other avenue for expansion under the condition of growing land shortage is the introduction of modern tree crop production. The crop described by CU-KONU is oil-palm in village plantations. I must admit that I wonder about the competitiveness of oil-palms in relation to coffee and cocoa, and I doubt the long-run viability of the village plantation concept. But this is a minor point in the context of this seminar. The essential point is that tree crops offer much scope for intensification, and with increasing land shortage they are bound to change from extensive forest-type plantations to modern, intensive smallholder plantations.

CU-KONU also mentions the changes in arable cropping, in particular with yams. It should be added that important innovations are likely to become avaible for arable crop production in West Africa. Root crops such as yams and manioc are priority targets for research in many tropical agricultural research stations. Yams may now be seeded and is thus open for conventional plant breeding methods. High-yielding varieties may become available. Also much work is done with tropical grain legumes, in particular with cow peas and pigeon peas. New varieties have to be seen in interaction with chemical inputs. Herbicides may make it possible to apply minimum or zero-tillage crop production techniques. Mineral fertilizer is bound to be applied in larger amounts once land is getting scarce. Organic fertilizers are important, but there is simply not enough organic material to allow balanced arable farming under tropical lowland conditions. Consequently, mineral fertilizer use will be the inevitable reaction to growing land scarcity and ruban food shortages. CU-KONU's example from southern Togo thus depicts a situation where land shortage may be considered as a necessary stage in attaining modern farming on a smallholder basis. Rainfall is sufficient for land use intensification and we probably have important possibilities for irrigation also.

D - The papers submitted by DIARRA and CU-KONU basically rely on intuitive observation. The paper submitted by DE MIRANDA and BILLAZ indicate that there are also stages in land-use research. The initial stage is clearly characterised by intuitive observation, the next stage will require measurement. DE MIRANDA and BILLAZ submit a methodology for complete observation. The important point in my opinion is that they relate observations to farms as decision-making units. Regions as they are usually observed and measured by geographers may be natural units, but not decision-making units. If we want to be useful in terms of agricultural development policy, then, I feel, DE MIRANDA's and BILLAZ' approach is the right one. The only question I would have is that their methodology may be too ideal for application. It will be very difficult to find the resources in terms of personnel and funds in order to implement several such surveys.

E - The various papers concern the same problem in different environments : what are the pattern of land-use intensification with increasing population pressure and growing production for local or export markets? How are cultivators adapting their practices to changing environments, and what strategies are or should be pursued?

I take from the papers three basic points :

1. There is the need for farm- or village-level studies. Development policy planning often means to plan for the unknown, because so little information about smallholders, the actual decision-makers, is available.

2. The analysis of the existing is greatly facilitated by appropriate theories and methodologies. My suggestion would be that the use of system theory would greatly contribute to make farm- or village-level studies more effective. A generally accepted theoretical background economises in what ought to be observed and measured, comparisons are easier and more scope can be given to prognosis.

DE MIRANDA and BILLAZ correctly emphasise the need for measurements. Increasingly descriptions of trends in land-use should be supplemented by quantitative analyses and an effort to explain why things are as they are.

3. I do not think social sciences are in a position to claim that they possess a theory of man and his behaviour which is powerful enough to allow much prognosis, but I feel it is useful to approach any decision-making unit — as for instance the smallholder — with a set of hypotheses. Theodor SCHULTZ proclaimed — several years ago — the theory of the optimising peasant. This theory expounded that farmers generally, also illiterate farmers, are intelligent beings who, gradually over time, improve their land-use pattern and arrive, if nothing changes over some length of time, at the best possible solution in land use, given their objectives and their environment. SCHULTZ' theory has the problem that it cannot be falsified, because we never face completely static situations. African land-use systems are changing and more rapidly in our time than ever before. Existing land-use systems are rarely optimal solutions in terms of the various objectives farmers may have. Schultz' starting point is nevertheless useful. It underlines the need to start an analysis of the existing with the conscious use of a theory and a set of hypotheses about the smallholders which may explain what we find. This has appropriately been worded by SHAKESPEARE : « Find out the cause of this effect or rather say of this defect, for this effect defective comes by cause ».