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SUDAN ECONOMY RESEARCH GROUP

DISCUSSION PAPERS

Sudan's National Policies on Agriculture

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Sudan Economy Research Group
Discussion Paper No. 10
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Bremen, June 1987

This is an extended version
of a paper submitted to an
Oxford University Press Volume
on 'Sudan's Agriculture'
(edited by the Centre for
Agricultural Strategy,
University of Reading, U.K.)

1. Introduction

The economic crisis in Sudan since 1977/78 is affecting all economic subsectors, especially the productive subsectors as agriculture and industry. The agricultural subsectors (irrigated agriculture, mechanised rainfed farming, traditional rainfed farming, livestock-raising and forestry) and the industrial sector of the country suffer from the repercussions of the most severe economic crisis since Independence (1956), a crisis which is the result of unfavourable world market trends, overambitious development programmes in the 1970s and a failure of policy reform at the macro-level and the sectoral level in the 1980s. The worsening balance of payments situation, the increasing indebtedness, the failure to come to terms with the International Monetary Fund, the banks and other donors, the decrease of official transfers from the side of Sudanese workers abroad, the decreasing level of foreign aid, the increasing pressure on the Sudanese Pound (LS) and the capital flight go parallel with unfavourable cotton marketing conditions and unstable internal political developments (see Sudanow May 1987; Ottaway 1987).

The pressure for policy reform from the side of the IMF and the World Bank on the Government of Sudan is strong but up to now the results of policy reform measures for the productive sectors and at the macro-level are not impressive at all. In 1980, the Government of Sudan had presented a Recovery Programme to the donors to regain confidence in international finance circles. This programme aimed at adjustments of the price structure, demand control, institutional reforms, especially at the level of Government

administration, restoration of the economic functions of the market (and privatisation) and rehabilitating the productive sectors of the economy (agriculture and industry). Some progress in rehabilitation and policy reform was made, especially in the years 1982 and 1983, as cotton exports could be restored to the 1975/76 level and as budget and balance of payments figures improved somewhat (World Bank 1985, p. IV). But the trend did not last long. The deadlock of negotiations with the IMF and the unsolved question of rescheduling the debt affects the productive sectors via scarcity of hard currency, inflation, overvalued currency, price distortions and capital flight. The major issues of economic management are now - in August 1987 - unresolved.

There had been some action from the side of the Government in agriculture, but action was mainly limited to irrigated agriculture. Main focus was the change of the production relationships between the tenants and the Sudan Gezira Board management. The unfavourable world market situation for cotton, the continued overvaluation of the currency and many internal weaknesses of irrigated agriculture (as ageing installations) make this subsector a special area of concern for planners, as this sector had traditionally been the main source of foreign exchange and government revenues. The Gezira is also important as an area where markets for industrial expansion were located. It is now acknowledged that the rainfed sector 'shows social rates of return that are generally higher than for irrigation' (World Bank 1985, p. 14), but this wisdom is not reflected in drastic policy changes towards the rainfed farming and livestock sectors. As the rainfed sector has a higher share in Gross Domestic Product (GDP) than the irrigated sector (World Bank 1985, p. 14) and generates higher net foreign exchange earnings, such a policy change could contribute to a solution of so many interconnected problems (enhancing growth and employment, basic needs provision and income redistribution, elimination of inflation and balance of payments imbalances).

The Government has launched a major study programme on a 'Strategy For Development Of Rainfed Agriculture' (The Republic Of The Sudan

1986), which is emphasizing the potentialities of the rainfed sector, the framework for its improvement, the objectives of a strategy and the basic conditions for the success of such a strategy. The strategy aims at food self-sufficiency and regional food security; production of surpluses for export; increased incomes for producers and sustained employment for the rural population; conservation, rehabilitation and improvement of the natural resources; encouragement of private investments and initiatives for increased production by providing infrastructure, services and policy support. It is a far-reaching programme, but unfortunately no decisions had been taken up to now to implement such a programme. This can be seen when reviewing the Development Budget for the Fiscal Year 1986-87 (MFEP 1986[3]).

It is very unfortunate that the dynamics of the Sudanese economy now centers exclusively on services and the informal sector (which already absorbs 1/10 of the labour force), whereas the formal (mostly public and urban) employment sector (absorbing also 1/10), the irrigated agricultural sector (absorbing also 1/10 of the labour force) and especially the rainfed farming and livestock-raising sector (absorbing 70 per cent of the labour force) are stagnating or on the decline (see ILO 1986).

In Part 2 of this paper the evolution of agricultural policies in Sudan will be reviewed; in Part 3 the policy implications of the three-tier structure of agriculture for resource allocation and resource use will be discussed; in Part 4 subsectoral agricultural policies with special emphasis on the traditional agricultural sector will be analysed; and in the concluding Part 5 the policies which aim at linking the agricultural sector with industry and with overall structural adjustment policies in Sudan will be reviewed shortly.

2. Evolution Of National Policies For Agriculture In Sudan

Four periods in the evolution of national policies for agriculture may be distinguished for Sudan (see on the evolution of policies Oesterdiekhoff 1980; FAO 1986; Elton 1986; Salam 1986): first, the colonial period; second, the post-independence period (1956-1969); third, the period of the 1970s (Numeiri's May Regime and the period of the Breadbasket Strategy); and fourth, the period of Recovery and Rehabilitation in the 1980s.

In the first period, agricultural policy was characterised by the promotion of cotton growing concentrated on the Nile Basin while disregarding agricultural production in other areas of Sudan. In British colonial times the natural and human resources of other areas remained undeveloped, although the 'hinterland' of Sudan was important as a source of cheap labour for the Gezira project. Only to a very limited extent other areas were transformed as regards agricultural development: some so-called 'livelihood schemes' may be mentioned, in the Northern Region, in the Nuba Mountains, in the Gash and Tokar Deltas and the Zande Scheme in the South. Some of these ventures were even cash- and export-oriented. During the Second World War mechanised rainfed farming was started in order to provide the food for the fighters. Infrastructural development for agriculture did not take place with the exception of the railway to EL Obeid which helped in the transportation of Gum Arabic and of some exportable seeds. Agro-industries in this period were rudimentary only. No other forms of support or extension services were provided systematically for farmers.

In the second period the colonial-type agricultural policy continued basically unchanged (1956-1969). The Gezira Scheme was nationalised and considerably extended (Managil Extension). In the Gezira Scheme the measures to intensify and to diversify production towards wheat and groundnuts aimed at changing Sudan's production and trade structures for the first time. Some railway development in this period allowed for the expansion of

traditional cash crops production, an increased monetisation of the livestock economy and the overall expansion of food production. Mechanised farming was expanded considerably; also an expansion of agroindustries took place (towards flour mills, textiles, sugar and vegetable oils). The national policies on agriculture were implemented on the basis of the 'Ten Year Plan of Economic and Social Development 1961/62-1970/71'. This plan emphasized the modern sectors of agriculture only (irrigated and mechanised farming). Although the Plan was abandoned in 1964, the emphasis on large-scale irrigation and mechanised farming was continued. Private investments into large-scale mechanised farming were encouraged and a Mechanised Farming Corporation (MFC) was set up in 1968. In this period already, unplanned and irrational expansion of mechanised farming into the Central Clay Plains caused serious deterioration of soils and pastures.

No fundamental change of colonial-type policies on agriculture took place. The livelihood schemes established in colonial times even deteriorated, especially in the Northern Region and in the Nuba Mountains. Beyond this, the socio-political and socio-economic changes during this period have intensified the exploitative role of the middlemen in Sudan's agricultural sector.

In the third period (starting with Numeiri's May Revolution in 1969) the colonial bias against traditional agriculture continued to remain unchanged. The unplanned expansion of mechanised farming and the neglect of traditional farming led to productivity decreases in rainfed farming and to enforced migration of labour to modern sector agriculture and to urban areas. The implementation of the nationalisation of the private cotton pump schemes brought with it lastly a continuous decline of production and productivity; the issue of privatisation of these schemes had been taken up recently by the Government of Sudan at the request of IMF and World Bank within the context of rehabilitation programmes for irrigated agriculture. Agro-industries were expanding and diversifying considerably in this period. The Russian-inspired 'Five Year Plan 1970/71-1974/75' even enforced

the bias towards modern agricultural subsectors and the promotion of agro-industries. Although the Plan was extended to 1977, the orientation of the Plan itself did not change. The focus on food import substitution via the horizontal agricultural expansion route (using new areas of cultivable land instead of using more intensively the already used land) was characterising the agricultural policies of that time.

However, the neglect and the degradation of the traditional sector became a policy issue in this period. The 'Six Year Plan 1977/78-1982/83 (MNP 1977) was the first to recognize explicitly the importance of the traditional sector for Sudan's development, although the allocation of public funds did not reflect the new insights gained. A new strategy was emerging: the parallel development of modern and traditional agricultural subsectors. Thereby, the sustainability of both subsectors should be made possible and income redistribution and equity objectives should get more weight. Influential in this policy change was the 1975 ILO Mission Report (ILO 1976), published at the request of the Government of Sudan. The Report discussed several strategies to correct the dualism between the high-income irrigated and mechanised rainfed agricultural sectors, on the one hand, and the low-income, traditional agricultural and livestock raising sectors, on the other hand. The first strategy discussed was to bring population from low-income to the high-income regions by allocating tenancies to them in new irrigated schemes. Although in fact the Rahad Scheme as a new irrigation project was a step in this direction, the Report did not consider this option further as a viable solution to Sudan's agricultural development problems because of the limited chances to absorb even the expected population increase by such a strategy. The second strategy discussed was to establish modern production units in low-income areas. Although in fact the expansion of mechanised farming was operating in this direction, the Report argued convincingly that the system of having large farming units of 1,000 fd (1 feddan = 0,42 hectares = 1,04 acres) or more may benefit only well-off investors, so that a

contribution towards reducing the income gap could not be expected by following such a strategy.

The third strategy proposed was at that time recommended to the Government of Sudan. It was proposed to develop traditional agriculture and livestock-raising in the low income regions while continuing to promote the growth potential of modern agriculture in order to generate there the savings which were considered as a requirement for developing the traditional sector. However, this recommendation was not followed by the Government of Sudan in the years after. On the contrary, the traditional sector even had to contribute to the development of the modern sectors, e.g. by providing cheap labour (so low as to create labour shortages in modern sectors from time to time) and by being heavily taxed (directly and indirectly) in the production of cash crops (producers were receiving prices far below the minimum or floor prices announced by the Government). The result was a highly unbalanced development of agricultural subsectors which led to a further erosion of the production potential of the traditional agriculture. The ILO Strategy of 1975 was set up in terms of a two-periods time horizon for the transformation of the traditional agriculture: the 1975-1985 period was expected to be used for creating the preconditions for a take-off in the traditional sector, whereas the 1985-1995 period should see massive resources to be invested in traditional farming comparable to the investment efforts in modern farming. Such a Strategy would have required a massive increase of the historically meagre allocation of public funds to traditional agriculture; public investments would have to be a "spearhead" in the process of developing this sector.

The Government of Sudan did not follow the ILO Strategy recommendation at all. On the contrary - following only recommendations for the development of modern agricultural sector development - the Government speeded up since 1973 enormously its development expenditures to implement an ambitious programme related to modern agricultural subsectors and agro-industries, the so-called Breadbasket Strategy (see on this Strategy Awad 1983;

Oesterdiekhoff/Wohlmuth 1983[1], 1983[2]). This programme aimed at the diversification of Sudan's production and trade structures to make the Sudan an important food supplier to Arab countries. Huge production increases and large-scale processing of local raw materials were envisaged. In the years 1972/73 to 1974/75 development expenditures went up from LS 29.6 m to LS 102.4 m (Wohlmuth/Hansohm 1984, p. 46). This policy was laid down in the Six Year Plan document which foresaw an annual planned growth rate for agriculture of 6.5 per cent and of 9.5 per cent for manufacturing and mining. The Government of Sudan in its agricultural policies assumed that a 'vast' amount of untapped natural resources waits to be exploited, so that horizontal (land-consuming) agricultural policies were justified. The objectives of agroindustrial expansion were both import-substitution (in sugar, textiles and clothes) and export-substitution (cotton by yarn and clothes, hides and skin by leather, live animals by meat). From the outset, this strategy was limited in terms of creating domestic intersectoral and intra-sectoral linkages, as the intention was only to replace raw materials exports by exports of semi-finished products. In order to finance this 'leap-forward' strategy the Government of Sudan relied on external resources to the extent of 52 per cent of the total (public and private) planned investments. Not less than 88 per cent of the planned investment in agriculture were scheduled directly for modern sectors (irrigated projects; promotion of new export crops as coffee, tea and rice; and modern livestock ranging). Including also the expenditures for agricultural services which are heavily biased towards the modern sector, the share of modern agricultural subsectors in the total investments as planned for agriculture as a whole was even higher. On the other hand, projects aiming directly at traditional agriculture received only insignificant allocations of 3 per cent of the total investments scheduled for agriculture (Wohlmuth/Hansohm 1984, p. 30). Even this small share was not fully used for the improvement of existing farming systems but for the expansion of modern cultivation practices into traditional rainfed agriculture (via mechanisation programmes for smallholders).

Huge production increases were expected from this Strategy (annual increases of sorghum output of 12.0 per cent, of wheat output of 12.6 per cent, of medium staple cotton production of 18.9 per cent and of groundnuts production of 11 per cent). More important, production increases were expected to result primarily from area expansion rather than from higher yields (Wohlmuth/Hansohm 1984, p. 31). Horizontal expansion became the preferred strategy for quick production increases in agriculture. The regional distribution of planned public investments remained concentrated towards modern sector projects in Eastern-Central Sudan, whereas private investments were expected to expand into new areas (Western Savannahs and Southern Funj). The ecological impact of this strategy was not given any consideration at that time. A similar bias against the traditional sector and towards horizontal expansion for mechanised farming was implicit in the Ministry of Agriculture's Food Investment Strategy of 1977 (MAFNR 1977). This Strategy did not aim at food self-sufficiency by the way of developing peasant farming systems, but through large-scale private capital infusions into mechanised farming. As the areas where mechanised farming was to be promoted by the Government of Sudan (Southern Darfur, Southern Kordofan, Southern Funj) were dominated by subsistence agriculture and were partly densely populated (relative to the available natural resources), this Strategy by implication led to a further displacement of traditional food producers. Even a success of this Strategy would not have led automatically to a solution of Sudan's food provision problems (because of transport problems and rising income disparities, which raise the danger that the people most in need may not benefit from this type of agricultural development). Neither the Six Year Plan nor the Food Investment Strategy did elaborate on the income distribution, employment and regional development repercussions of the proposed strategies.

Another important input to the Horizontal Agricultural Development Strategy was the Arab Fund's Basic Programme for Agricultural Development for 1976-1985 (Arab Fund 1976). It is the most comprehensive and most ambitious formulation of the objectives and the programme of the Breadbasket Strategy. The Government of Sudan is

now thinking about reviving the idea; in September 1986 the Government of Sudan prepared documents for a meeting of the Arab Ministers of Agriculture in Jordan, with the intention to bring up the issue of the Breadbasket again. The Basic Programme is therefore still relevant to some extent. It assumed for the long run that 9.0 m fd could be irrigated and that 71.0 m fd could be cultivated under rainfed conditions (presently utilised are only 2.4 m fd and 17-20 m fd respectively). Such a potential was expected to allow an increase in grain production from less than 2.0 m tons (1972/73) to 27 m tons, of oil-seed crops (mainly groundnuts, sesame and cotton seed) from less than 1.0 m tons to 12.0 m tons, of cotton from 0.6 m tons to 3.6 m tons, of fruits and vegetables from less than 1 m tons to over 7 m tons, of pulses from 35,000 tons to 250,000 tons and of sugar from 110,000 tons to 2.7 m tons. The full implementation of this programme may also allow an increase of meat production by 8-10 times (from 400,000 - 500,000 tons to 3.5 m tons). These figures have to be contrasted with recent developments in the food supply situation (1986/87): the Government had to import sugar (because of production problems) and wheat (under commodity aid programmes), had to ban in 1986 exports of live animals and had even to import meat. Although these targets had been projected to be realised several decades after the turn of the century, even the figures for 1985 are impressive. An increase of wheat production by 470 per cent (between 1972/73 and 1985), of sugar by 660 per cent, of oilseeds crops by 140 per cent and of grains (traditional) by 120 per cent was envisaged. These 1985 targets were projected on the basis of an annual expansion in the area of irrigated land of 150,000 fd and of 500,000 fd in the rainfed area. This was expected to bring the area under irrigated cultivation to 4.5 m fd and the area under rainfed cultivation up to 17.0 m fd. If these figures are compared with recent data (for 1985/86), it is obvious that the actual area expansion for rainfed agriculture had even surpassed the figures envisaged at the time of the Basic Programme (with 9.9 m fd. under traditional rainfed cultivation and 8.6 m fd. under mechanised rainfed cultivation). This huge area expansion was not paralleled however by similar increases in production and yields. Therefore, the Basic Programme's aim to diversify Sudan's production and

trade structure was not realised. It was not possible to bring the share of cotton in Sudan's exports down from 60 per cent in 1970/73 to 23 per cent in 1985 as envisaged in the Basic Programme. However, the Breadbasket Strategy was never implemented as planned (caused by internal and external factors being responsible for the failure; see Hansohm/Wohlmuth 1985[2]), but the main problem with Sudan's Horizontal Agricultural Expansion Development Strategy is that the two basic assumptions are not (no longer) valid (first, the assumption of the availability of a surplus of 'unused' land with considerable underpopulation (relative to the natural resource base), and second, the assumption that the expansion of mechanised farming is feasible from the point of view of social, economic and ecological considerations). Both assumptions have to be questioned seriously (see Wohlmuth/Hansohm 1984). This is acknowledged now even by the Government of Sudan in the documents for its "Strategy For Development of Rainfed Agriculture", by referring to the problems of increasing scarcity of land and increasing competition for land in various regions. In a recent Statement by the Agricultural Planning Administration of the Ministry of Agriculture And National Resources (MANR 1985), the new position is presented: vertical expansion should now increasingly gain in importance relative to horizontal expansion, by introducing and supplying improved seeds, by supplying adequate inputs and essential agricultural services, by efforts to improve crop handling, marketing channels, storage facilities and by developing an appropriate rural infrastructure.

In the fourth period of Recovery and Rehabilitation (since 1980), the Government has worked out (in association with the World Bank) an Export Action Programme which has as its main aims: the provision of spare parts and of machinery needed to reverse the deterioration of the capital equipment; the allocation of more foreign exchange to finance needed inputs; the financing of rehabilitation projects; policy reforms and a revision of incentive systems to stimulate production. The First Agricultural Rehabilitation Programme of 1980 then started to finance needed inputs. It was financed by the World Bank to support the Government of Sudan

in its Export Action Programme. It provided urgently needed foreign exchange for high priority imports for the irrigated agricultural subsector, but it also encouraged and supported macroeconomic and sectoral policy reforms. Some of the reforms recommended on the basis of studies financed by the Agricultural Rehabilitation Programme had been implemented by the Government of Sudan in the meantime, as the introduction of cost recovery and accounting systems in irrigated agriculture. It is the intention to ensure by such measures a more rational use of inputs and a distribution of earnings according to efficiency and performance. Reforms of cotton pricing, of the system of payments for cotton delivery and reforms of the parastatals dealing with the export crops were other areas for measures proposed; these measures have already partly been implemented. The Second Agricultural Rehabilitation Programme of 1983 aimed at supporting further policy and institutional reforms and provided also critically needed inputs. Another programme - the Gezira Rehabilitation Project of 1983 - refers directly to the rehabilitation of the most important modern sector project in Sudan and aims at raising within five years production and yields considerably.

The Three Year Public Investment Programmes of the Government are more and more reflecting the drive towards recovery and rehabilitation. The Second Three Year Public Investment Programme (1980/81-1982/83) was the first to adopt the new strategy as objectives, but funds were allocated exclusively towards irrigated agriculture. The Third Public Investment Programme mentioned among other goals the necessity to design a strategy for rainfed agriculture. This was also a reflection of the fact that in 1981/82 rainfed crops represented 66 per cent of the total crops produced (FAO 1986, p. 146). The Fifth Three Year Public Investment Programme (1984/85-1986/87) aims at the rehabilitation of projects, the improvement of incentives systems and production relations and changes in exchange rate, taxation and pricing policies to ensure better returns to producers and an optimum supply of inputs.

However, up to now the Recovery Strategy has not changed the colonial bias towards irrigated agriculture. In fact, this bias had been reinforced by the type of rehabilitation going on. This is motivated by the expectation that such a concentration of funds as it occurs can generate more quickly needed foreign exchange than channelling the funds towards rainfed agriculture (what would require long-term programmes instead). In the Recovery Period the concentration on the rehabilitation of irrigated agriculture and the permissive attitude of the Government towards uncontrolled expansion of mechanised farming are clearly motivated by such a 'strategy' to promote quick-yielding projects first. This is a dilemma because of the huge potentials of rainfed agriculture and the decreasing overall importance of irrigated agriculture for the realisation of Sudan's development objectives (see Parts 3 and 4).

We can therefore conclude that since Independence (1956) the Sudan has followed an unbalanced policy towards agricultural subsectors - first biased towards irrigated agriculture, since 1973 more and more biased towards mechanised farming and since 1980 biased towards rehabilitation of irrigated agriculture only. It is obvious that such a policy (or policy failure) disregards the fundamental interconnections between the agricultural subsectors. A careful balancing of the subsectors is necessary; a neglect of forestry will not only reduce the direct output for energy use and industrial consumption, but will affect also the yields in all agricultural subsectors, and even the feeding potential of livestock. The disregard of livestock in agricultural production planning (as in the Gezira where 1 m animals had been kept unofficially for a long time) and the disregard of established stocking routes caused by the uncontrolled expansion of mechanised farming actually lead to losses of welfare to the economy as a whole and to segments of traditional producers. An integrated approach towards policies on agriculture has to consider all these interconnections, a subject which is dealt with in the next part.

3. Agricultural Policies and Subsectoral Resources Allocation

What are the implications of the stated Government's agricultural policy objectives (GOS 1986; FAO 1986, p. 155) for the use of resources in various agricultural subsectors? The agricultural policy objectives are: expansion of agricultural exports; achievement of self-sufficiency in agricultural imports; diversification of agricultural production and exports; increased and more equitably distributed agricultural incomes; integration of the traditional sector into the economy and improvement in the balance of regional development. These policy objectives have be to related first of all to the development and the performance of the subsectors over time to see how far they can contribute to the realisation of these objectives and what the resources needed are.

Out of 200 m fd of cultivable land (1 feddan = 0.42 hectares = 1.04 acres) in 1985/86 only 20.9 m fd were actually cultivated: 2.4 m fd in the irrigated subsector, 8.6 m fd in the mechanised farming sector and 9.9 m fd in the traditional farming sector (ILO 1986). The irrigated subsector with 200,000 tenancies (each cultivating 5 hectares on average) is employing additionally 400,000 persons as permanent wage labour and 500,000 as seasonal labour. The rapid expansion of the mechanised farming sector (which has doubled its area under cultivation within 10 years, and also its potential for sorghum production) implies that 10,000 large-scale farms employ up to 1 m of seasonal labour and provide in years of good crops an important marketable surplus for urban consumption and even for export. The traditional sector has a labour force of 4 m on 2 m smallholder farms and provides 2 m labourers as migrant labour force on a seasonal basis to urban areas and modern agricultural sectors. Although this sector shows a disappointing record in terms of production, yield and area expansion data, it has importance not only as a source of labour supply, but also as a source of foreign exchange earned from export cash crops. As recent data on comparative crop yields show, mechanised farming is not doing that much better than traditional farming (MANR 1986).

In order to balance the development within and between subsectors the Government of Sudan has to assess the relative contribution of the subsectors to the achievement of the overall objectives set out above for the economy as a whole and for agriculture as a sector. This is necessary because of the fact that the subsectors compete for resources (land, capital, credit, public investment, labour, energy, foreign exchange, administrative capacity, transport and communications infrastructure and skilled labour). On the other hand, the subsectors quite differently contribute to the generation of foreign exchange, public revenues and savings, to rural development and basic needs provision, to the conservation of natural resources, to the creation of linkages with other sectors (especially industry), to the reduction of external dependencies and to employment creation, income generation and income redistribution. An overall assessment of costs and benefits of promoting subsectors cannot be presented here (see on this ILO 1986), but some evidence may highlight the tradeoffs and policy issues involved in subsectoral resource allocation. The debt and balance of payments crisis of Sudan has brought up again this important policy issue as a series of devaluations and increases in the costs of imported inputs have considerably improved the comparative advantage of traded outputs from rainfed agriculture.

Data for the relative capital intensity of agricultural subsectors (see World Bank 1983, pp. 24ff.) show that despite of sharp cost increases of imported and capital-intensive inputs and installations the capital-intensity of the major irrigation schemes has further increased in the 1980s (also as a consequence of rehabilitation programmes). This is a perverse response to the underlying factor proportions of the Sudan economy, but is obviously rooted in major price distortions and rigidities. The overwhelming share of public investments is still going to the irrigated subsector (as the Development Budgets reveal). The tendency of a rising capital-intensity is sometimes explained by referring firstly to the labour shortage argument and secondly to the argument that mechanisation will allow better cultivation practi-

ces and higher yields, but firm evidence is not available on these two aspects. From the point of view of capital allocation the subsectoral distribution seems to be far from optimal.

The high foreign exchange intensity of operations in irrigated agriculture is another important and related issue for subsectoral resource balance. It is higher than in the mechanised rainfed sector and incomparably higher than in the traditional sector. The high potential of traditional agriculture as a net foreign exchange earner is brought out in a study (D'Silva 1983, pp. 19ff.) for the years 1980 and 1982 which shows the net value of exports (gross value of exports minus value of imported inputs) and the respective subsectoral shares. The share of the traditional sector (excluding livestock and forestry) increased from 34.8 per cent (in 1980) to 51.0 per cent (in 1982). The irrigated subsector experienced a spectacular decline from 42.8 per cent in 1980 to 19.1 per cent in 1982, so that the mechanised farming sector is now second as a net foreign exchange earner. With ageing irrigation systems and increasing input needs (because of fastly increasing costs of spraying and crop protection) the hopes are not well founded that this tendency can be reversed soon.

Both the capital - and the foreign exchange - intensity in agriculture had been reenforced by the lending policies of the Agricultural Bank Of Sudan (ABS) which are supporting mechanised farming by granting a high implicit subsidy on the use of capital (by low nominal rates of interest in an inflationary environment and uncovered losses of the institution). Thereby incentives are given to use capital and foreign exchange more intensively. However, only 0.5 per cent of the smallholder farms (2 m) benefit from ABS loans; in recent years some donor's funding of ABS operations is giving support to programmes for traditional farmers, but only 9 per cent of the overall ABS funds are allocated to the small farmers. Insofar as such credits can reduce the very high informal credit sector's interest rates which are charged on the smallholders, such programmes can stimulate smallholders' savings and can give incentives for adapted me-

chanisation and for production increases. An example is the finance of animal traction programmes for smallholders in the Nuba Mountains. Government policy will have to do much more to channel credit to the smallholders in more flexible forms. Pilot projects - indicating some support of the ABS for cooperatives - are underway in the Western Sudan, but these moves are limited in various ways (by the number of borrowers, the volume of loans, the coverage of products as limited to sesame and groundnuts, and the area of cultivation). New models of giving credit to informal groups of poor smallholders are experimented with, but up to now the contribution to a reshift of resources towards traditional agriculture is insignificant.

The competition for land is becoming a major policy issue. Sudan already faces the experience of population pressure on land, intensified by population growth, ecological degradation and drought. The overall figures of a large 'reserve' of uncultivated land (see above) have to be interpreted very carefully. The Horizontal Agricultural Expansion Strategy has imposed costs on the traditional producer which are not covered or compensated by the Government or by private large-scale investors. This situation went to the point - as argued in the 1986 Land Tenure Task Force Study (The Republic of The Sudan 1986) - that the traditional producer is forced to resume cultivation of land which has had little time to recover after previous cultivation, so that it cannot provide him with sufficient food for subsistence. Uncontrolled mechanisation has moved into the sandy Qoz soils (which are cultivated by traditional producers) and could not be confined to clay soils. Also increasing is the competition for land between mechanised farming, newly irrigated farming and livestock-raising. The impact had been greates in the Eastern Sudan where substantial adjustments in stock routes had to take place, under pressure from mechanised farming, but also from irrigation schemes as Rahad. The 1986 Land Tenure Task Force Study also points to the fact that in the intermediate grazing areas of Southern Kordofan the Mechanised Farming Corporation (MFC) had not followed its own policy of respecting livestock routes.

Energy consumption is another issue of subsectoral resource balance (see D'Silva 1983, pp. 15ff.). 18 per cent of all gasoil consumption for end-use is used up in agriculture, mainly for agricultural operations (63 per cent), for irrigation (32 per cent) and for canal maintenance (5 per cent). The figure of 18 per cent does not include energy use for transport related to agriculture. Irrigated cotton is the dominant consumer of energy (using 4.1 to 8.1 gallons per feddan for all agricultural operations, and 13 gallons for irrigation per feddan). This is far higher than what all the other agricultural modes of production consume. Still higher is the energy use in irrigated sugarcane production. Irrigated agriculture therefore consumes 83 per cent of all the gasoil consumed in agriculture. On the other hand, the traditional sector generates most of the fuelwood and charcoal energy (providing 80 per cent of the total energy base), so that traditional sector-related policies are also effective from the point of view of local energy resources development and from the point of view of reducing external dependency from imported energy sources.

Concerning the competition between subsectors for scarce public investment funds, the neglect of traditional agriculture relative to irrigated agriculture is extremely pronounced. Based on an analysis of the Development Budget for the year 1986/87 (MFEP 1986[3]) we find an allocation of only 9 per cent aimed directly for the traditional sector, of 48 per cent allocated to irrigated agriculture, 2 per cent to mechanised farming (a sector benefiting from public sources more indirectly via low nominal land rents, subsidised credits and incentive exchange rates), with allocations of 16.1 per cent to animal resources development, 11.8 per cent for agricultural services, 10 per cent for natural resources and desertification recovery and other allocations with 3.0 per cent. This implies that now a greater weight is given to traditional agriculture than in the 1970s, especially if we add the shares for animal resources development, natural resources conservation and provision of agricultural services. However, it is not easy to say

what really will be spent for the improvement of existing farming and livestock-raising systems in the traditional sector. Including all the public subsides and support mechanisms towards mechanised and irrigated farming, the share of allocations for traditional agriculture in the Budget may still be assessed as being extremely low.

Administrative capacity and transport and communications infrastructure are also extremely unevenly distributed between the subsectors. The administrative, transport and communications infrastructure being available to rainfed producers is extremely poor. This leads to problems of controlling the mechanised farming activities and constrains severely the market integration of traditional producers. Despite of some political regionalisation moves and considerable investments into the transport and communications system the bias towards irrigated agriculture remains unchanged.

Allocation of skilled labour across the subsectors is also an issue of concern. The Sudan Gezira Board (SGB) may be considered as relatively strong as regards the stock of qualified manpower; the Mechanised Farming Corporation (MFC) on the other hand suffers from a lack of skills to supervise the rapidly expanding areas under cultivation; the Agricultural Extension Service dealing with traditional rainfed agriculture more directly is extremely understaffed and inappropriate as regards its objectives and means; the same is true for the institutions of Natural Resources Conservation and the Veterinary Services.

Even unskilled labour may become a factor in subsectoral balancing concerns. Labour shortages had often been reported in Sudan in some regions and for some modern sector projects, but in the years to come such shortages may also occur in traditional agriculture, because drought repercussions and far-reaching socio-economic changes may have led to more permanent forms of migration fuelling the growth of the informal sector. This may also affect the off-farm activities in the rural areas and the income generation there. Neither in mechanised farming nor in irrigated

farming is any evidence of crops that remained actually unharvested because of labour shortages, but mechanised farming may more easily attract labour for weeding and harvesting activities than irrigated farming because of marginally higher wages.

Taking all these informations together, the neglect of traditional agriculture in subsectoral resource allocations is obvious; by the way of such an allocation of resources neither the objectives of agricultural policy nor the overall developmental objectives can be realised; an erosion of the long run development potential of the country takes place. Obviously, irrigated agriculture is more and more becoming a burden for Sudan's economic dynamics, and mechanised farming is threatening - as it is practised now - the environment and is imposing long term costs on the Government in order to combat environmental degradation. Mechanised farming is however a source of income for up to 1 m seasonal labour, but not a stable source of income as the sharp production and employment decline in 1984/85 shows (ILO 1986, Ch. 3). As the savings from disposing a marketable surplus of this sector are not channelled back to agriculture (but are invested in urban areas and in services-related activities), it may not be easy to sustain this type of farming for long without public subsidies and inducements for private action. The Strategy For Development of Rainfed Agriculture is an expression of the necessity to go along with pronounced subsectoral resource shifts towards traditional agriculture. Concluding, we can say that the abovementioned agricultural policy objectives and development objectives can be realised in a cost-efficient way only by giving priority to policies which promote traditional agriculture.

4. Policies For Transforming Traditional Agriculture: Priority for Integrated Development

A concept of balanced development for agricultural subsectors requires first of all that new models for the support of traditio-

nal agriculture are designed and then implemented. Although the traditional sector in Sudan is now recovering after years of drought (ILO 1986, Ch. 3), the decades of neglect and draining off the resources from this sector limit its actual growth performance. There is a basic dilemma: the difficulties to maintain the competitiveness of Sudan's export crops on the world market make low wages for migrants from the traditional sector and low returns to cash crops produced in the traditional sector a conditio sine qua non for the future prospects of Sudan's export economy. This type of involvement of Sudan's traditional agricultural sector into the world market leads to a precarious balance between destruction and preservation of this sector. Until the 1970s, the balance could be more or less maintained, but the policies of the 1970s, of the early 1980s and the drought years have led to a large-scale destruction of this sector. The issue of developing this subsector is therefore not just linked with the provision of adequate resources (e.g. capital, skills, technology and know-how), but has to deal with the main structural constraint of Sudan's current development model, that cheap labour from this sector (and to an increasing extent also fertile land) has to be mobilised for the continuation of Sudan's export economy which is facing unfavourable world market conditions (Wohlmuth 1980). Therefore, market growth and productivity growth remain stagnant in the traditional sector. In the long run there is no way out of this dilemma than the change the role of the export sector in the context of a development strategy which is based more on internal demand (generated by increasing incomes in rural areas) and on linkages between agriculture and industry to reduce external dependencies (see on elements of such a strategy Wohlmuth/Hansohm 1984 and Wohlmuth 1986).

There is a long history of establishing cash crop production in Sudan's traditional agriculture by the establishment of cotton schemes for smallholders. But there was no serious attempt for decades to improve existing farming systems. 4 approaches may be considered when discussing options of transforming traditional agriculture (see ILO 1976, pp. 31ff.): first, the single-limiting-

factor approach, assuming that it is possible to identify a single limiting factor for improving traditional agriculture, e.g. land tenure, credit availability, extension services or pricing policies. Some programmes based on such an assumption had been experimented with in Sudan, but on a very limited scale, e.g. credit programmes in Western Sudan or marketing programmes for specific crops. The overall impact of such policy moves was negligible. Second, the minimum package programme, assuming that it is possible to improve traditional agriculture by identifiying few essential improvements and inputs needed (as improved cultivation practices, provision of inputs and credit facilities, of infrastructure, organisation and extension services). Some experiences with such programmes (e.g. the agricultural services and seed bank projects) have proved that this approach is too limited to change the overall conditions of traditional agriculture. Third, the nucleus plantation approach may be mentioned, which aims at involving subsistence farmers into cash-cropping, in cases where some industrial processing of crops is required. The Talanga Tea Project in Southern Sudan is an example of a project where smallholders are settled around the tea processing unit. Also such experiments remained isolated and limited in coverage and in prospects.

Fourth, and most important, the integrated regional development programmes, which are based on the assumption that package programmes for a whole region are required to promote broad-based agricultural development. These programmes operate at the level of more than one district (3 to 5) and include economic and social development components. In fact, this approach became in Sudan the most important path for a reform of traditional agriculture. Really important as reference projects are the integrated regional development schemes in the Western Sudan: first, the Jebel Marra Rural Development Project in Darfur; second, the Western Savannah Development Project in Darfur; and third, the Nuba Mountains Rural Development Project in Kordofan.

The Western Savannah Development Project comprises 6 administrative districts of the Province of South Darfur and covers a total

area of 135,000 km² and a human population of about 1.18 m, including about 200,000 nomads. The complex and integrative approach (covering settlements, veterinary services, range and pasture improvement, forestry and rangeland rehabilitation, research and extension, input distribution, training, strengthening of local institutions, building of wateryards, roads and tracks) makes this programme a testing ground for generating experiences to be replicated on a larger scale. According to a recent evaluation, some progress was made.

Another project in Darfur is the Jebel Marra Rural Development Project which has obviously contributed to the improvement of local living standards. Although the projected increases of agricultural production did not materialise fully, mainly because of insufficient research/extension/training facilities, on the whole a positive evaluation can be given (ILO 1986, Ch.3). Technology seems to be the crucial factor for the success of the project: better cooperation between research and extension, emphasis on on-farm trials, enhanced contact between the extension service and the farmers through 'contact farmers' and improved varieties of sorghum and millet adapted to local conditions are some of the recommendations for a technological upgrading and extension package. All the experiences show that these problems can be overcome over time, but that concerted efforts are necessary and that a better integration of research, extension, training and infrastructural development is required.

The Nuba Mountains Rural Development Project in South Kordofan is tackling the problems of agricultural development in the smallholder sector and of the control of ecological degradation through reafforestation. The coverage of the project is still small; only 0.7 per cent of the farm households in South Kordofan are included in the project which promotes the use of agricultural implements (animal traction). Some important questions have emerged, primarily as regards the distributional implications of the project. Farmers participating in the project own more livestock and have better access to alternative sources of income (in activities as

traders and merchants), what may suggest a bias towards wealthier farmers in the area. New measures to include poorer farmers (e.g. group credit programmes) are therefore introduced. The high returns to the adoption of new agricultural implements have therefore to be considered in the context of overall equity and income distribution issues.

These three cases show that mixed results and experiences have to be acknowledged and that the transformation of traditional agriculture in Sudan is a complex and long-term task requiring integrative efforts at various levels and among many actors. Such integrated regional development programmes may be incorporated into multi-regional and/or national strategies for the traditional sector. At the regional level, some developments to this effect are under way. The Kordofan Rehabilitation Development Strategy (MFEP 1986[1]) and the Darfur Rehabilitation Programme (see MFEP 1986[2]) are examples of a comprehensive regional strategy.

The complex and integrative strategy for transforming traditional agriculture requires advances as regards six policy areas: first, the design of a land tenure and land use policy; second, the design of a policy on institutions and institutional reform; third, the design of a policy on production incentives, pricing, marketing and finance; fourth, the design of policies with regard to technology, research and extension; fifth, the design of policies towards infrastructural development; and sixth, the design of policies to create and to maximise linkages with other productive sectors. In the Strategy For Development of Rainfed Agriculture the Government of Sudan is taking up some of these issues.

A policy on land use and land tenure has to relate to the fact that land in Sudan is no longer a plentiful resource.

A policy on institutions has to consider that so many institutions are now relevant for transforming effectively traditional agriculture (policy-making institutions, service institutions, control

institutions, public production and area development institutions, private sector institutions, including cooperatives and farmers' unions, and financial institutions), and that appropriate coordination and institution-building is indispensable for the success of any strategy. Extension cannot really work without the support of all the other institutions.

A policy on production incentives has to consider the fact that the whole marketing system is biased against the small farmer, that new models of input provision and distribution are required, that appropriate low-cost storage facilities are necessary and that all explicit and implicit forms of taxing the agricultural producer have to be reconsidered.

The policy on technology/extension/agricultural research has to consider the fact that the traditional farmers are highly interrelated in their production with cash crop markets (especially sesame, groundnuts and gum arabic) and with labour markets (via migration), but also with livestock-raising. The policy on research, technology and extension has also to address the problems of declining productivity and exhaustion of land, but also the istue of appropriate production technologies. Because of the insufficient links between research and extension, new models have to be developed to support effectively the small farmer. Research on appropriate agricultural implements (as the development of labour-saving devices for traditonal agriculture) may be important. Agricultural research in Sudan has already shown the potential for contributing to productivity increases in rainfed agriculture in areas as applying optimum sowing dates, growing higher yielding varieties, realising higher crop intensities, development of better tillage and land preparation methods, use of quality seed, more efficient weed control, adoption of better crop rotation, intensified crop protection and fertiliser use. The projected productivity increases by applying such measures (see The Republic of The Sudan 1986) justify far higher investments into traditional farming and vertically intensified mechanised farming.

A policy on infrastructure requires that first of all a strategy on rural infrastructure development is designed. Some experiences with public works programmes in the White Nile Province for building up the rural infrastructure (as rural feeder roads, afforestation projects, filter wells and village infrastructure) should be studied carefully. Also the successful work of the Rural Water Corporation may be taken as an example of an institution which performs well in the area of adapted know how transfer; this institution is applying successfully locally adjusted technologies for the provisison of drinking water. An integration of such activities in the frame of a concept of rural infrastructure (comprising roads, water, shelter, health and education) may be envisaged.

A policy on creating and maximising linkages between traditional agriculture and industry has to relate first of all to the maximisation of backward linkages (e.g. producing on a larger scale animal traction equipment) and forward linkages (by processing in small urban centres and villages the crops produced domestically). There is evidence that the potential in rural areas as regards workshops, local capabilities and skills is quite important (ILO 1986); the private capital- given some support from the government to invest in the rural areas- could be mobilised. Another aspect of linkages is the creation of final demand which then allows the utilisation of an increasing market potential in the rural areas for the development of rural and regional industries (see Wohlmuth 1986). This aspect is dealt with in Part 5.

It is evident that such a complex approach for the transformation of traditional agriculture covering six policy areas has relevance also for the mechanised farming sector and the irrigated agriculture sector. These policy areas (land use and land tenure; institutions; production incentives and marketing; technology/research/extension; infrastructure and linkages) matter also in these subsectors although with quite different weights (ILO 1986, Ch. 3). Advances only in some of these policy areas, important as they

may be, will however not lead to overall successful agricultural policies as there are obvious and important interconnections between these 6 policy areas.

5. Conclusions: Towards Agricultural Demand-Led Industrialisation In Sudan

In Part 3 and 4 it became clear that traditional sector development is highly interconnected with the dynamics of Sudan's export economy. As long as low wages and low prices for labour and export crops from the traditional sector are a conditio sine qua non for Sudan's export prospects, the development of traditional agriculture will remain constrained severely. A real integration of Sudan's traditional sector into a modern and dynamic economy requires that industrialisation is related to overall agricultural growth and productivity increases, what Adelman (1984) calls "Agricultural Demand-Led Industrialisation" (ADLI). The ADLI Strategy requests a shift oft public investments towards agriculture to maximise linkages (via creating a domestic mass market for industrial products - intermediate as well as final products - in rural areas), but also an improvement of income distribution parallel to a change of the production structures (what means the production of more wage goods - as food and textiles - and an improvement of the incomes of the rural poor). The ADLI Strategy is simultaneously a programme to accelerate growth, investments and employment, a programme to improve distribution, basic needs provision and food security, but also a programme to realise foreign exchange savings and to improve the overall balance of payments. In the context of Sudan this requires the support of traditional producers (farming and livestock-raising), because these producers have a higher labour - intensity in production and a higher use of locally produced consumer goods and of domestic implements for production. Employment prospects and markets for industrial products would improve, if agricultural productivity increases are stimulated by a strategy which incorporates the abovementioned 6 policy areas. At the macro-level ADLI requires that production incentives are kept neutral, that

they are neither biased in favour of exports or imports, nor in favour of manufactures or agricultural/livestock products. As Sudan's economic incentives are still heavily biased against agriculture (see also Acharya 1979), policy reforms at the macro-level have to be an important part of an ADLI package. Structural adjustment policies for the Sudan based on ADLI-type strategies had been outlined elsewhere (Kursany 1983, Wohlmuth/Hansohm 1986). Complementary are measures to promote small industries/rural industries/crafts (Hansohm/Wohlmuth 1985[1]). The advantages of supporting these industries are obvious as regards local resources utilisation, technological skill acquisition, employment and income effects, and the aim of regionally balanced development.

Regrettably, up to now the necessary decisions to integrate the traditional sector in such a way into the national economy had not been taken by the Government of Sudan. However, projections made give the traditional sector for 1991/92 an overwhelming importance even for the generation of exports: the traditional rainfed sector may export not less than 500.2 m dollars out of 637.2 m dollars of total rainfed crops and livestock products if the Strategy For Development of Rainfed Agriculture gets really implemented. This would imply a share of 78 per cent for traditional sector products in overall rainfed sector exports. The support for traditional sector agriculture therefore also implies a drastic shift of Sudan's export structure and a favourable development of the net foreign exchange earnings (being a precondition for any renewed development effort of the country). The positive effects on the balance of payments and on managing indebtedness would reinforce the chances of an ADLI package.

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