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SUDAN ECONOMY RESEARCH GROUP

DISCUSSION PAPERS

Problems in Evaluating the Impact of Structural Adjustment Policies in Sudan: The Case of Agriculture.

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Diskussionsbeiträge

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Sudan Economy Research Group
Discussion Paper No. 15
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Bremen, June 1989

Abstract: The paper attempts to show the effectiveness of the World Bank structural adjustment policies on agricultural performance in Sudan and to investigate about the problems encountered in the assessment of the World Bank policy package. The general argument is that despite a significant change in the agricultural policy instruments since 1980 of the type desired by the Bank, the influence on the agricultural output has been mixed and limited. It is difficult to estabilish a definite trend because the period since the policy changes indicates a three years of drought, thus our assessment is only preliminary. Even if performance improves somewhat, especially in cotton production and productivity, still problems concerning the design of the World Bank's programme exists. The paper evaluates the Bank design of structural adjustments in agriculture and analysis different factors which make the assessment of the structural adjustment more complex to run in practice.

1- Introduction*

In 1981 the World Bank in its famous report entitled: Accelerated Development in Sub-saharan Africa; An Agenda for Action, (The Berg Report),(1) emphasized that the declining per capita income and the standard of living across the region is not only a result of changing weather conditions and political instability, but arose mainly as a result of "inadequate government policies". (1)

Consistent with the Berg report's recommendations a strategy for 1980's was proposed, the Bank shifted away from its old form of lending (project lending) to policy based sectoral and structural adjustment lending. Given the Berg diagnosis, it was therefore no surprise that the report emphasized:

> "Three major policy actions are central to any growth-oriented program: (1) more suitable trade and exchange rate policies; (2) increased efficiency in resource use in the public sector; (3) improvement in agricultural policies. (World Bank, 1981, P 3).

The World Bank attempts to structural adjustment in Sudan (specially in agriculture) are not very different from other countries in the region and directly influenced by the above Berg recommendations.

* I wish to acknowledge the many invaluable comments received from Ms. Diane Elson and Dr. Wendy Olsen from the department of economics, University of Manchester U.K, and Professor Karl Wohlmuth, from the University of Bremen, West Germany. Views expressed here are, of course, my sole responsibility.

This paper attempts to focus on the effectiveness of the recommended policy changes on agricultural performance in the Sudan. Our general argument is that despite a significant change in the agricultural policy instruments since 1980 of the type desired by the Bank, the influence on the agricultural output has been mixed and limited. The paper assesses the design of the World Bank policy package and emphasizes the difficulties encountered in evaluating the structural adjustment in Sudan.

In what follows I will first examine the major characteristics of the agricultural sector on which the bulk of the Bank's programme is concentrated. Before any attempt to assess the design of the policy package, I will briefly review the major policy instruments agreed and implemented with the help from the World Bank (Rehabilitation, pricing and exchange rate adjustments, etc..). The last section offers some assessment of the success of the measures. It is difficult to establish a definite trend because the period since the policy changes indicates three years of drought, thus our assessment is only preliminary. The major problems we encountered in the assessment of the structural adjustment in Sudan constitute the main discussion of this concluding section.

2- Major Characteristics of the Sudanese Agriculture.

Sudan economy is predominantly agricultural. Agriculture (crop and livestock) provides a livelihood of about 80% of the total population. Agriculture constitutes over 30% of GDP and over 90% of exports.

Sudan is known to have a huge cultivable land specially that uses rainfall. According to the ILO (1987), out of 200 milllion feddan, only 20.9 million feddan (2) (i.e only 10% of the total cultivable land) were actually cultivated in 1985/86 (see also the World Bank, 1987 and fig. 1).

The agricultural sector is structured into modern and traditional sub-sectors. The modern sub-sector is composed of an irrigated sub-sector consisting mainly of the Gezira Scheme producing mainly long staple cotton, groundnuts, wheat sugarcane and sorghum (cotton and groundnuts are the main export crops) and a large scale mechanized sub-sector producing sorghum and sesame. These two sub-sectors are surrounded by the largest sub-sector- the traditional sub-sector- producing subsistence crops (sorghum, millet) and cash crops (groundnut, gum arabic, sesame) and almost all livestocks. The share of output of each sub-sector and the productivity of different crops produced can be seen from table (1) and (2).

The area cultivated in each sub-sector is shown on table 4. The traditional sub-sector is the largest (average 9.1 million feddan between 1975/76-1985/86). Out of the actual irrigated area of nearly 4 million feddan, the cropped area is fairly constant and average to 2.3 million feddan. The average area cultivated in the mechanized sub-sector is 5 million feddan. Favourable climatic conditions such as that of 1985/86 allowed expansion of 8.6 million feddan (see World Bank, 1987). The structural characteristics of the three sub-sectors (i.e flexibility of decision making, input distribution, determination of input and output prices and the selected productivity) are shown on table 4. The characteristics of the irrigated sub-sector show a marked distinction from the rainfed sub-sectors. This (as we are going to see later) has implications for the effectiveness of policy measures adopted so far.

The croppping patterns and the output of the irrigated sub-sector experienced many changes during 1970's. Following the diversification drive, the area and yields of cotton (the principal irrigated crop) were declining meanwhile those of groundnuts and wheat increased significantly (3). The responsibilities and the profit sharing arrangements between the managerial board of the Gezira Scheme, the tenants and the government were originally covered by the Joint Account System (JAS) and applied to cotton production. Charges for land, water, managerial services and inputs are extracted from cotton sales and the rest is divided between the three partners using a sharing formula which has been subject to many changes. Following the diversification measures, the inclusion of wheat and sorghum did not change the JAS and they were not included in the sharing formula (see Nashashibi, 1980 and Wilde, 1984).

3- <u>The World Bank Agricultural Policy Package</u>:

Given this brief background, the World Bank analysis of the anatomy of failure of the irrigated sub-sector revealed that the unchanged JAS after diversification measures, the unchanged exchange rate facing cotton exports, (4) the imposition of the development tax on cotton production and the increase in the cost of hired labour for cotton picking are among the main factors that reduced the overall cotton production from 248 thousand MT in 1970/71 to 141 thousand MT in 1978/79. The yield was also declined from 4.2 Kantar/feddan to 2.7 Kantar /feddan over the same period. (World Bank, 1982a).

The World Bank (with other donors) made policy changes a condition of the first agricultural rehabilitation credit for the irrigated sub- sector in 1980. The main objectives of which is to restore output, restructure the cost recovery system, introduce an export action programme to achieve cotton average growth rate of 7% annually, and prepare realistic Three Year Public Investment Programmes (TYPIP's), (World Bank, 1985a, P4). To support these

and other targets, other policies such as exchange rate adjustments in 1981, the liquidation of the Public Agricultural Production Corporation in 1980 and reforms of the pricing structure in the irrigated sub-sector were undertaken (see table 5).

In 1982 the government announced the Economic Recovery Programme (ERP) originally contained in a comprehensive document entitled: Prospects, Programmes and Policies for Economic Development, 1982/83-1984/85, (PPPED I). It had been updated into PPPED II and PPPED III with minor changes. The main thrust of the economic recovery programmeis directed towards agriculture, rainfed mechanized farming, smallholder development, livestock marketing, agricultural credit projects, and mainly the irrigated sub-sector's rehabilitation programmes (see table 6). The Bank support to Sudan has largely given through lending to rehabilitation of the irrigated sub-sector. According to the World Bank the assistance seeks to achieve:

> "A better upkeep of capital assets through adequate allocations for maintenance, rehabilitation and rationalization of existing projects to strengthening the planning and policy making capacity of government at the national and regional levels and to address the problem of policy framework and institutional environment" (World Bank, 1981, P128)

In April 1983, the government negotiated a credit with the Bank in support of rehabilitation phase II. A $50 million soft credit was approved for financing agricultural inputs of Gezira, Suki, New Halfa, White and Blue Nile Schemes. IDA was also approving credits for rehabilitation of other irrigated schemes (see table 6).

Rehabilitation measures were made conditional on changes in production relations in the irrigated sub-sector. According to the World Bank, the Joint Account System (JAS) was suffering from basic weaknesses, namely: The fixed percentage sharing of costs and benefits rewards the inefficient producer, the late payments to the tenants for the purchase of cotton discourage incentives and the decline of cotton production makes it difficult for the government to recover all of its debts from the marginal tenants (World Bank, 1985a, P12). The JAS was replaced by Individual Account System (IAS) (5) in order to "ensure a more rational use of inputs and a distribution of earnings according to efficiency and performance" (Wohlmuth, 1987, P12). Charges for land and water were applied to Gezira, Rahad and New Halfa schemes. Although these rates increased by 12% during the period 81/82-83/84, according to the Bank they are below rates required for full cost recovery (World Bank, 1985a, P13). More recently land and water charges for cotton in the Gezira scheme increased to LS98/feddan in 1987/88 as compared to only LS28.5 when the Individual Account System was first introduced in 1981/82- an annual increase of 40%

during the period 1981/82-1987/88 (Bank of Sudan, 1987),(6). Following the imposition of the IAS the tenants have been allowed to sell their tenancy right to "induce those who are not dedicated farmers to release their lands to those who would take the work seriously" (World Bank, 1982a).

The government announced starting 1980/81 season producer prices before harvest to provide incentives. Official prices for various agricultural crops (including cotton seeds, groundnuts, wheat and Gum Arabic) were significantly increased throughout the period under study. For example between 1981/82-82/83, the official prices of groundnuts, sesame, and gum arabic increased by 43%, 49% and 21% repectively (DRS, 1983). The increase in the prices of output was partly produced by the successive devaluations.

Exchange rate policies in Sudan were used to improve the competitiveness of its agricultural exports. The country's exchange rate system is characterized by the use of multiple exchange rates to evaluate different export commodities. Prior to 1985 agricultural exports were valued at both official and commercial rates. Cotton and agricultural inputs were valued at the official rate. Starting 1985/86 season, cotton and agricultural inputs were valued at the commercial rate. The exchange rate facing sorghum, sesame and groundnuts was adjusted upward twice in 1987 (from $1=LS3.25 to $1=LS4.1 and later to $1=LS4.5) with a view to encourage exports (Bank of Sudan, 1987, P22).

The relaxation of export monopolies through liberalization of export trade for major agricultural crops was also suggested but limited implementation has been undertaken so far. Privatization of part of the irrigated sub-sector was also announced in 1988 (White and Blue Nile pump schemes).

Reflecting the drive towards rehabilitation of the agricultural sub-sector, the Six Year Plan (1978/79-1982/83) was turned into a series of three years public investment programmes (TYPIP's) starting 1979/80. These short term programmes were intended to be linked with rehabilitation, power upgrading and improvement of infrastructure. They helped a great deal to satisfy the Sudan's donors by allocating investable funds in a manner consistent with the main objectives of the ERP (Brown, 1986, P494).

Despite this multiple conditionality, the World Bank financing to Sudan can be considered to be very low compared to other lenders (who, except the IMF, do not directly impose conditionality on the use of their resources). Out of the total Sudan foreign debts of $12.1 billion at the end of December 1987, the World Bank share was around 10% (slightly more than one billion dollar). Almost 50% of loans were spent on rehabilitation programmes (see IMF 1988; DRS 1983, and table 6). Within agricultural rehabilitation, the Bank increasingly favoured the irrigated sub-sector. This can be seen from table 6 . Excluding the finance of Rahad irrigation and

the Jonglei canal (for which the figures are not available), nearly 80% of the Bank's total finance of agriculture was concentrated on the irrigated sub-sector. Around 18% were spent on traditional sub-sector and only 2% for the mechanized sub-sector.

The timing of the World Bank finance is also of a critical importance. The World Bank Programme in its early stages concentrated on the irrigated sub-sector. The traditional sub-sector had got most of its finance before 1980. Later -in 1987-, some attention was again given to the traditional rainfed sub-sector. One wonders whether this change of emphasis was a result of the attention of the newly elected government to concentrate on the traditional sub-sector as clear from the policy intentions of the Economic Salvation Programme (ESP) declared in 1987 (7).

4- Assessment of the Design of the World Bank Agricultural Policy Package:

Given the diagnosis of the problem of agriculture in Sudan, the Bank recommendations are broadly focussed on the development of an agriculture-based, export-oriented strategy, based on increasing the overall efficiency of the publicly owned schemes through rehabilitation programmes, and on improving the incentive structure by means of exchange rate, taxation and pricing policies.

The design of the World Bank policy package in agriculture is critically dependent on the argument that export taxes, production prices, exchange rate and the production relations lay at the heart of the failure to provide adequate incentives for agricultural production. The argument for "getting the prices right" rests on the assumption that prices can influence production decisions in a way which increase production efficiency. This issue has been subject to controversy and research in recent years.

The debate over the effectiveness of the pricing policies is not isolated from the way these policies are set. In almost all Sub-saharan African countries (Sudan is not an exceptional case in the products produced by the irrigated sub-sector) farmers are required to sell their products to the relevant marketing boards for export. The price of the crop is set by the government and announced in advance. The World Bank (1981) argued that the administered producer prices have been kept low at a time when the world crop prices are rising. Moreover; the imposition of export (and other agricultural) taxes on farm commodities hold down prices below the international market level. According to the World Bank (1981), the low producer prices are one of the major reasons behind the poor performance of agriculture in the region during the 1970's.

Generally speaking agricultural production is expected to rise sooner or later in response to the fall in real exchange rate and/or increased producer prices. Despite the drought period of 1981/82- 83/84 which would have hampered agricultural supply from responding to incentives, one can generally say that many changes should not be expected from incentive policies alone. There is now considerable evidence that the total production response to price incentives is small in Sub-saharan Africa (See for example Herdt 1970, Binswanger 1985, and Bond 1983). Bond, for example, estimated the overall output response elasticities for nine Sub-saharan African countries to be 0.18 and 0.21 in the short run and the long run respectively. Bond admitted that the measurement is confronted by conceptual and data problems. Many arguments are cited in the literature explaining why the short run aggregate supply elasticity is low in developing countries eventhough it may be very high in individual crops (see for example Hossein and Cummings, 1976). It is worth summarizing these arguments before we come to see why incentive measures might not be expected to produce considerable results in Sudan. The major arguments run as follows:

(1) Many observers including those of the World Bank (e.g Cleaver, 1985, P28), maintained that the impact of pricing policy is often exaggerated. Other factors including agricultural research, extension, credit and services are of greater importance (see for example, Bond 1983, Streeten 1987).

In response to this point the World Bank (1986b, P150) argued that even though public spending is essential, the rationalization of the pricing and marketing policies is required if the full benefits of the spending are to be realized. Others, for example Lipton (1988, P220), argued that "to get the elasticities up" requires much more action than that embodied within the World Bank programme. It seems to me that the conflicting arguments can largely be explained by whether public spending or pricing policy should precede or whether they have to be adopted simultaneously Given that both policies influence production decisions to a varied degree, the solution which seems reasonable in the case of Sudan is the combination of both pricing policy and public investment programmes in an integrated and non- conflicting way. Moreover the World Bank policy of "getting the prices right", although it seems rational and theoretically justified, is only a necessary condition for growth in output.

(2) The poor nutritional status of many African countries may be one of the reasons why farmers are not price responsive. The World Bank study on Poverty and Hunger (World Bank, 1986a) maintained that about 10-20% of the people in poor countries are so malnurished that they cannot work more even with the incentives.

(3) The welfare increase resulting from high producer prices may induce extra leisure (or more time on non-agricultural activities) (Singh, Squire and Strauss, 1986).

(4) Farmers in developing countries are said to have an income target. Hence in the case of an increase in producer prices, a smaller amount of output is needed to sustain the necessary income i.e the supply curve for output is backward slopping (Bond, 1983, P705).

Agricultural production in Sudan is very much a matter of policy decision (e.g on the allocation of land), rainfall (and its distribution), better control measures against pests and disease, availability of labour supply (specially for cotton picking) and the availability of foreign exchange to buy fuel, inputs and other instruments, and to a lesser extent producer prices (see table 4). The decision making of farmers in the irrigated sub-sector is negligible specially in the allocation of land and the use of inputs. The decision on the area to be cultivated is determined exogenously by administrative boards even under IAS. Even with the diversification of the cropping pattern in early 1970's no flexiblity and tenants' autonomy were introduced. The current cropping intensity of the Gezira scheme (the biggest irrigated scheme in the country) is around 67%. Out of 2.1 million feddan only 1.4 million feddan were cultivated in 1983 (Tounglood, et al, 1983, P7). More than one factor is responsible for this low utilization of the scheme area. Because crops are grown in a rotation system, one fourth of the land is left fallow. This in addition to the limited water supply (related to the level of the Blue Nile and the capacity of the main canal) block any expansion of the area under cultivation whatever the incentive structure. Given the limited area, even if price incentives managed to allocate resources to one or other crops (out of the four crops grown in the scheme), this increases will be at the expense of other crops. In such a case only when yield increases can the price incentive have an output effect. The scope for substantially increasing the yields can be achieved by using biological technologies (resistant seeds varieties for example). Following the rotation system of the Gezira scheme, tenancy allocations create a disincentive by detaching farmers from their originally cultivated lands. Many cases were reported in which a tenant takes other tenant's land or another tenant is brought into his land (Salam, 1978. P49). This "alienation" of the tenant from his land (to use Salam's word) is considered as the main cause of negligence of fertility maintenance and it further leads to less effort exercised by farmers on the land. This and other cases explain that other deterrents to incentive have to be corrected if any price incentive scheme is to be effective.

In contrast to irrigated tenants, the traditional rainfed and mechanized rainfed farmers' tenants have a considerable freedom to decide their land and other resources in response to the changing structure of incentives. Unlike the irrigated sub-sector, in the

rainfed sub-sectors strategies for increasing output mainly depend on area expansion (depending on the availability of rain) and provision of services, research, transport, infrastructure etc,).

All of the arguments raised in the case of producer prices is also applicable to the case of exchange rate adjustments. In addition to that devaluation has another effect of increasing the cost of production making future output even less competitive. This is because all the agricultural sub-sectors, except the traditional subsector, have a high import content of inputs items like fertilizer, sacks and machinery (for example, mechanized rainfed sorghum has an import content of about 57% (Nashashibi, 1980, P64).

It follows from above that we can expect different (but not substantial) results through improving price incentives depending on factors like the flexibility of decision making by farmers in different sub-sectors. The least response is expected to be in the irrigated sub-sector due to the fact that acreage (and output) is determined by administrative decision hence the relation between price on the one hand and the acreage and output on the other hand is broken. Moreover following the arguments of why aggregate elasticity is low in developing countries, and given the current condition facing the economy there are more than one structural constraints needed to be overcome before we can have full effects of price incentive measures. For example the attempt to boost agricultural production through the price and exchange rate policies is followed by a simultaneous reduction in development expenditure in real terms (the level of development spending in real terms in 1985/86 is still below that of 1980/81 level, (see table 7). In Sudan the IMF series of stabilization programmes which started in 1978 had been preceded the World Bank structural adjustment programme. Following the IMF recommendations, the attempts for supply expansion had been preceded by the decline in government spending including spending on agricultural services especially roads, extension and research. According to ILO report (1987, P42), total government expenditure averaged 22% of GDP over the last decade ending 1986 but declining since 1980 by one third. The result is that some of the pre-existing agricultural services are not maintained. In the case of Sudan it seems that there is a conflict between reducing budgetary deficit by restructuring public expenditure and maintaining essential public services to resume the growth rate. Another conflict (which arise from the World Bank conditionality) is that of maintaining resources and avoiding budgetary deficits even with the abolition of export taxes on which the budget depends.

The new Individual Account System introduced by the Bank in the irrigated schemes has not produced the intended changes in the incentive structure. According to Awad, (1987) the Individual Account System is rejected on practical grounds. Returns from other crops (wheat and sorghum) are too low to cover the cost of production, hence the imposition of Land and Water charges will

reduce the cultivation of these crops. Moreover due to the difference of soil and climatic conditions in the various areas of the Gezira scheme and other irrigated schemes, a uniform rate of land and water charges applicable at the moment is not justified on equity ground. The different rates are expected to impose further administrative burdens and will be difficult to pursue in practice (See Shaaeldin, 1987, P386) (8).

The World Bank design of the overall development strategy reflected by the public investment programme needs to be assessed. The Bank preoccupation with the production of cash crops (and hence the development of the irrigated sub-sector) has a harmful effect on food security defined by the local production of food crops. The World Bank definition of food security to be a result of a general increase in farmers income linked with imports from the international markets (World Bank, 1986a) implies this heavy investment in the irrigated sub- sector. This sectoral concentration neglects the existing huge production of food crops in the rainfed sub-sectors and severely underweighted the priority for greater food self-sufficiency in the country. Moreover, the current unsustainable food aid and food imports (related to the shortage in foreign exchange and foreign aids in turn a result of the decline in cash crops and instable foreign policy), underlines our logic for food self-sufficiency by producing food items locally. Many factors such as the expected furure unavailability of grain surplus for imports following the drought in USA and the recent termination of US wheat assistance to Sudan as a result of the failure to repay $12 million debt to US government (El Ayam daily news paper, Feb. the third, 1989), reinforced our doubts about the sustainability of food aids and imports. Finally, the overall outward oriented design of the structural adjustment in agriculture imposes a high risk of the economy exporting primary products. Even with technical rehabilitation and incentive reforms targets for export earnings are not met for reasons connected with the feasibility of the reforms and weak international demand. The overall emphasis on further specialization on primary crops neglects the negative terms of trade effects Sudan is continuously facing. During 1977/78-1983/84 the annual terms of trade effect as a percentage of trade deficits is about 12% (see table 8). The negative terms of trade effect is still reported in recent years. According to the World Bank (1988a) Sudan's terms of trade index was 70 in 1986 as compared to the base year of 1980 (1980=100).

5- Assessment of the Impact of the World Bank Agricultural Policy Package:

What has happened to output of Sudanese agriculture since the beginning of the rehabilitation programmes? Judged by macro indicators of tables 1, 2 and 3, both agricultural performance and total output performance is not satisfactory. According to the World Bank (1988a), the real GDP growth rate declined from 4.1% during 1970's to only 0.3% during the first half of the 1980's. Our calculation of the average annual real growth rate for the

first half of 1980's shows a comparatively low figure (-1.42). The Index of GDP also shows an overall decline (see table 3). Of course the drought of 1981/82-83/84 is partly responsible for the deteriorating agricultural and total output performance in the country.

Closely connected with the behaviour of GDP figures is the agricultural production figures. Although cotton production increased quite rapidly between 1980/81 - 1982/83, but starting 1982/83 it showed a lower growth rate for the rest of the period under study with a marked slow down after 1985/86. Cotton productivity start increasing, but remains stagnant for the rest of the period under study. This trend in cotton production does not match the great emphasis, and the huge investment, in agricultural rehabilitation and improve incentives in irrigated sub-sector (almost all of cotton production is produced in irrigated sub-sector). Other crops showed a declining trend immediately after 1981/82 but slight recovery after 1985/86 (note that the declining trend happened during the drought period, 1981/82-1983/84). Despite technical rehabilitation, productivity declined (very clear of groundnuts, sorghum and millet). The overall picture of the agricultural production Index showed a pronounced fluctuation except during 1985/86-1986/87. According to the Bank of Sudan this jump in the agricultural production Index is due to good rainfall (Bank of Sudan, 1987). We think that part of the increase of the Index has something to do with the sorghum production. Sorghum production increased from 1097 thousands MT in 1984/85 to 3843 in 1985/86 (i.e by 250%), but declined a little bit in 1986/87. This increase is due to both good rainfall and the government policy of producing sufficient sorghum after the drought to provide food security for the country (sorghum is the staple food for the majority of the population and represents more than 60% of cereal consumption). We have observed from the same source (World Bank, 1987) stagnation and (and sometimes a slight increase) in the production area of sorghum since 1971/72 but a tremendous increase (52%) in the production area between 1984/85-1985/86; most of this increase is in the mechanized sub-sector. Part of the increase in sorghum production is related to the increase in the yields despite the drop of the price in 1985/86 as a result of the government policy which declared the banning of exports of sorghum. Despite the remarkable increase in the agricultural production in the year 1985/86, the Index of real GDP showed a slight improvement. The increase in agricultural activities is taken by the falling share of services to GDP in 1985/86 (services share to GDP in 1984/85 is 57%, reduced to 51.7% in 1985/86 - see the World Bank 1987).

The same factor (i.e sorghum production) is responsible for the low index in 1987/88. The decline in sorghum production, despite the improvement in the production of other crops (cotton, groundnuts and sesame), reduced the index in 1987/88. According to DAES (1988), the drop of sorghum production is related to factors like low and uneven distribution of rainfall, pest infestation,

unavailability of engine oil, and low prices in 1986/87 season which may discourage farmers from planting large sorghum areas.

Despite what we have said before on the impact of the World Bank policy package on output and agricultural production, but generally speaking, the task of assessing the impact of the structural adjustment programmes in the Sudan is by no means straightforward (9). Our crude assessment taking the programme against the targets, is proved to be difficult due to the existence of non-programme factors, such as the drought of 1981/82-1983/84, the practical implementation of the World Bank programme in Sudan (i.e the high level of slippage). The difficulties in evaluating the structural adjustment programme is further constrained by the quality and the discrepancy of the statistics.

The difficulty of assessing the structural adjustment in the Sudan is related to the factors which are uncorrelated with the World Bank policy measures. The overlapping of the World Bank and the IMF stabilization programmes , human resource drain to oil exporting countries, the war in the South (10) and the three years of drought (1981/82-1983/84) all have negative effects on the situation of the economy. It is recognized that almost half of the Sudanese population (i.e over 10 million) were affected by the drought of 1981/82-1983/84, including pastoralists, tenants, urban poor, and refugees (Abdel-Ati, 1988). The degree of severity varied between different regions but generally speaking the western and southern part of the country were mostly affected. Cotton, which is an irrigated crop, is less affected by the drought, but the lack of rainfall and the low level of the Blue Nile led to delay in plantation and reduced yields in the irrigated sub-sector. The production of sesame, sorghum, groundnuts, gum arabic and livestock, which are primarily produced in the the rainfed areas are seriously affected (11).

Slippage in the programme implementation is a feature not only characterized the Sudanese experience with the World Bank. On the limited evidence available up to now, the degree of compliance with the World Bank conditions in many countries of sub-saharan Africa is very low (12). The World Bank recognized the limited participation and low quality and credibility of the programmes suggested by developing countries to address structural adjustment despite the Bank analytical and technical support (World Bank, 1985a, P52). The experience shows that the political and social opposition to the World Bank conditions is always underestimated. Moreover, the nature of structural adjustment conditionality, make the degree of compliance very difficult to be monitored within a limited time period. It is usually taking a long time to see whether the recipient government is acting in accordance with the conditions agreed or not.

In Sudan, the high level of slippage in implementation is perhaps partly related to the contents of the structural adjustment programme. Often policies such as privatization, closing down of unprofitable enterprises, exchange rate adjustments, ensuring full cost recovery in irrigated schemes, regular review of crop prices, etc, are very difficult options for the government due to their undesirable social and political effects. The World Bank emphasis on privatization rather than government ownership in irrigated schemes has up to now limited application mainly because of the government policy which seeks to pursue other social objectives in addition to political pressure. The low degree of compliance can partly explain the World Bank speculation that the failure of structural adjustment in Sudan is due to "Insufficient size and late implementation of the agreed policies" (World Bank, 1985a, P4). Other programmes such as agricultural and industrial rehabilitation are, in some cases, constrained by delays and shortfalls of foreign financing. In such a case the implemention is constrained by external factors outside the government control. It is clear from table 5 that only the politically and socially "safe" conditions are implemented fully. These include the announcement of producer prices before harvesting time and the introduction of the Individual Account System. Other policies fall into the category which is constrained by socio-political factors and financing.

The other serious problem encountered in the assessment of the structural adjustment in the Sudan is related to the statistical figures. With regard to this problem, although inherent in many developing countries, some features are specific to Sudan. Our tentative analysis of the production figures is constrained by the poor quality of statistics. Agricultural production figures, for example, is poor and not reliable. Apart from cotton, which is mostly produced by the schemes managed by the states, the estimates of the other crops (which are based on limited surveys) are arbitrary and incomplete. The problem lies in the traditional sub-sector in which there is limited officially recorded data. Moreover the current production and yield data is subject to seasonal adjustment in line with the new informations available. Although this seems to be a step towards improving the quality of the data, but it creates a problem of time lag between the estimated and the actual figures. The other statistical problem is the discrepancy and sometimes the non-comparability of data obtained from different sources, e.g World Bank data, Government published data and other data obtained from International Organizations like the IMF, and the FAO. This explains why we choose to use unified sources, namely the World Bank sources supplemented by other Governmental sources. Our choice of the World Bank data is due to their convenience, sometimes wide coverage (and comparability) and not because they are reliable as compared to the government published data. This issue of data reliability, although important, is difficult to be analysed fully in this paper. To conclude, many factors cast doubt on the

reliability of the officially published statistics (including the World Bank data) and further complicate the assessment of the structural adjustment in the Sudan.

Conclusion:

The World Bank agricultural programme in Sudan has not gone far from the basic recommendations of Berg Report which necessitated the shift towards policy-based lending in 1980's. So far the structural adjustment process in Sudan has not fulfilled expectations- though difficult to say exactly what performance has been and to attribute the share of causation to different factors at work. Even if performance improves somewhat, especially in cotton production and productivity, still problems concerning the design of the World Bank's programme exist. Finally different factors, e.g the high level of slippage, the drought and the statistical problems make the assessment of structural adjustment policies more complex to run in practice.

Footnotes:

(1) The World Bank report of 1981 is the first of a series of reports dealing with African economic crisis. The three other reports (in 1983, 1984 and 1986) do not substantially modify or expand the original contents of the first report.
(2) Feddan is area measurement equal to 0.42 hectar or 1.038 acres.
(3) Cotton was originally the only crop in the scheme. As the result of the increase water availability after the agreement with Egypt over the Nile water, the sharp rise in world price of food crops and the need to reduce the peak labour requirement for cotton picking, the diversification strategy was adopted in early 1970's. Sorghum, wheat and groundnuts were added to the rotation system.
(4) Exchange rate adjustment took place in 1972. The exchange rate was devalued from $2.87 to $2.50, but the old exchange rate was still applied to cotton exports (World Bank, 1982a).
(5) The Individual Account System (IAS) requires the tenant to pay an annual fixed amount of money to the government as a charge for land and water supplied and have a full benefit of his crops.
(6) Land and water charges for other crops in the Gezira scheme (groundnuts, wheat, sorghum and vegetables) increased from LS14, LS18, LS7 and LS25 per feddan in 1981/82 to LS50, LS62, LS50 and LS90 in 1987/88 respectively (Bank of Sudan, 1987). Other crops in other irrigated schemes showed a higher figures as compared to those in the Gezira scheme. The figures for 1987/88 are ls61, ls104, ls61 and ls140 for the same crops respectively.
(7) The new Economic Salvation Programme (ESP) emphasized the broaden of the productive base, regional development with the minimal sacrifise of the objectives of export and GDP growth. A clear shift from previous policies is the emphasis on the development of the rainfed traditional sub-sector.

(8) Awad suggested that the improvement of the existing land and water charge structure towards cotton production depends on the partial application of water and land rental system to non-cotton crops and adjusting the tenants' share of cotton proceeds upward to compensate him for the payments of charges to other crops (For more details see Awad, 1987, PP389-394).
(9) In reality the assessment of the structural adjustment programmes is encountered by methodological problems. Literature on this subject raised three means of assessment (Pre- and after programme evaluation, comparisons of the results with the programme targets and the programme results compared to the absence of the programme or with an alternative programme). None of them is free from criticisms and all methods proved to be difficult to run in practice. For the strengths and weaknesses of alternative ways of measuring the effects of economic policy package see Goldstein, (1986).
(10) The civil war in the south of Sudan estimated to cost the country over one million dollar /day and effectively hindered various projects such as Jongolei canal, oil exploration in the west and the south and mechanized farming in the western Sudan.
(11) The rainfed sub-sectors are producing 60% of total groundnuts, 85% of sorghum and all sesame and gum Arabic production in the country (annual average between 1975/76-1985/86 calculated from World Bank, 1987).
(12) Mosley established that among different developing countries which received structural adjustment by the end of 1986, Ivory Coast and Malawi are among the intermediate group with the compliance degree between 60-90%. Kenya's degree of 38% grouped her among developing countries complied with few Bank's conditions (Mosley, 1987, P9).

List of Abbreviations:

GDP	Gross Domestic Product
ILO	International labour Organization
MT	Metric Ton
TYPIP's	The Three Years Public Investment Programmes.
PPPED 11 & 111	Prospects, Programmes and Policies for Economic Development 11 and 111.
IDA	International Development Association
JAS	Joint Account System.
IAS	Individual Account System.
DRS	Democratic Republic of the Sudan.
IMF	Internatiional Monetary Fund.
LS	Sudanese Pound.
ESP	The Economic Salvation Programme.
DAES	Department of Agricultural Economics and Statistics, Ministry of Agriculture and Natural Resources, Sudan.
FAO	United Nations, Food and Agricultural Organization.
MANR	Ministry of Agriculture and Natural Resources, Sudan.
IBRD	International Bank for Reconstruction and Development, The World Bank.

References:

Abdel-Ati, H, A (1988), "The Process of Famine Causes and Consequences in Sudan", Development and Change, Vol. 19, No. 2, April.

Awad, Mohammed, H (1987), "Agricultural Development in the Gezira Scheme: A Rejoinder", in Shaaeldin, E, (1987),(ed.)- See below.

Bank of Sudan, (1987) Annual Report, Bank of Sudan, Khartoum.

Binswanger, et al (1985) "Estimation of Aggregate Supply Response", World Bank Discussion Paper, Agricultural Research Unit, Washington DC.

Bond, Marian (1983), "Agricultural Response to Price in Sub-saharan African Countries", IMF Staff Papers, 30 (4).

Brown, Richard (1986), "International Response to Sudan's Economic Crisis 1978 to the April 1985 Coup d'Etat", Development & Change , Vol. 17.

Cleaver, Kevin, M, (1985), "The Impact of Price and Exchange Rate Policies on Agriculture in Sub-saharan Africa, World Bank Staff Working Paper NO. 728, The World Bank.

DRS (Democratic Republic of the Sudan), Ministry of Finance and Economic Planning, "Prospects, Programmes and Policies for Economic Development" (I, II and III), Ministry of Finance and Economic Planning, Khartoum.

DRS (Democratic Republic of the Sudan), (1983), Joint Monitoring Committee "Consolidated Report to the Consultative Group Meeting, Dec. 1983, on Implementation of the Economic Recovery Programme in Sudan", Khartoum Nov. 1983.

DAES (Department of Agricultural Economics and Statistics), Ministry of Agriculture and Natural Resources, (1988), "Agricultural Situation and Outlook", Jan. Report.

DAES (Department of Agricultural Economics and Statistics), Ministry of Agriculture and Natural Resources, (1987), "Crop Production Estimates, 1986-87", Issue No. 4 April.

D'Silva, Brian, C (1985), "Sudan: Policy Reforms and Prospects for Agricultural Recovery After the Drought", ERS Staff Report No. AGES 850909, International Economic Division, Economic Research Service, US Department of Agriculture.

El Ayam daily newspaper, third of Feb. 1989, khartoum.

El Hannan, Mahammed, M, (1985), "Production Costs and Profitability of the Major Crops in Rainfed Agriculture in Sudan", Prepared by the author for the World Bank, Department of Agricultural Economics, Khartoum, Oct.

EL Tom, Ali, (1987), "A Feasible Scenario for Agricultural Development Strategies, Perspectives and Policies", Round Table Meeting on Medium and Long Term Agricultural Development Strategies and Policies, Khartoum, March.

FAO (Food and Agricultural Organization, United Nation), (1987), "Production Year Book", Vol. 41, FAO, Rome.

Goldstein, Morris, (1986), The Global Effects of Fund-Supported Adjustment Programs, IMF Occasional Paper, No. 42.

Hansohm, Dirk, (1986), "The 'Success' of the IMF/World Bank Policies in Sudan", in Lawrence, Peter, World Recession and the Food Crisis in Africa, Games Gurrey.

Herdt, R (1970), "A Disaggregated Approach to Aggregate Supply", American Journal of Agricultural Economics, Vol. 52, No.4

Hossain, A & Cummings, J, T (1976), Agricultural Supply Response: Survey of Econometric Evidence, Praeger, New York.

ILO (International Labour Office), (1987), "Employment and Economic Reform: Towards a Strategy for the Sudan", Report of the ILO/JASPA Mission to the Sudan, August/September, Geneva, ILO.

IMF (International Monetary Fund), (1988), Economic Survey,, IMF , June.

Lipton, Michael, (1988), "A Response to Lipton's (June 1987) Review of 'World Development Report 1986'; Lipton's Rejoinder; and Ray's Postcript. Development Policy Review, Vol. 6, No. 2, June.

MANR (Ministry of Agriculture and Natural Resources), (1986), "Agricultural Situation and Outlook", Annual Re[port 1985-86, Khartoum.

Mosley, Paul, (1987), "Conditionality as Bargaining Process: Structural Adjustment Lending, 1980-86, Essays in International Finance, No. 168, Oct.

_____ and Smith, L (1988), "Structural Adjustment and Agricultural Performance in Sub-saharan Africa, 1980-87", Institute of Development Policy and Management, Discussion Paper, No. 15, University of Manchester U.K.

Nashashibi, K (1980), A Supply Framework for Exchange Rate Reform in Developing Countries: The Experience of Sudan", IMF Staff Papers, March.

Salam, Mohammed, A (1978), "Institutional Impediments to the Development of the Sudan Gezira Scheme", Sudan Journal of Development Research, Vol. 2, No. 2.

Shaaeldin, Elfatih , (1987), "The Rist, Hashim and Imam Reports: A Resume", In Shaaeldin, E (ed), (1987), The Evolution of Aggrarian Relations in the Sudan, Ithaca Press, London.

Singh, I, Squire, L and Strauss, J, (1986), " A Survey of Agricultural Household Models: Recent Findings and Policy Implications", World Bank Economic Review, 1 (1).

Streeten, P (1987), What Price Food?, London, Macmillan.

Tounglood, C et al, (1983), "Consumption Effects of Agricultural Policies: Bread Policies in the Sudan", Vol. II "Resource Allocation of the Gezira Scheme: Sensitivity Analysis", Final Report, Prepared for the Wheat Price Study Steering Committee, Ministry of Finance and Economic Planning, Khartoum.

Wohlmuth, Karl, (1987), "Sudan's National Policies on Agriculture, Sudan Economy Research Group, Disscussion Paper, No. 10, University of Bremen, West Germany.

Wilde, J, C de (1984), Agriculture, marketing and Pricing Policies in Sub-saharan Africa, African Study Center and African Studies Association, University of California.

World Bank, (1981), Accelerated Development in Sub-saharan Africa An Agenda for Action, The World Bank, Washington, DC.

_____(1982a), "Sudan: Investing for Economic Stabilization and Structural Change", World Bank, Washington, DC.

_____(1982b), Annual Report, World Bank, Washington, DC.

_____(1985a), "Sudan: Prospects for Rehabilitation of the Sudanese Economy", Report No. 5496-SU, Vol. I and II, World Bank, Washington, DC.

_____(1985b), "Sudan: Pricing Policies and Structural Balances", World Bank, Washington, DC.

_____(1986a), Poverty and Hunger: Issues and Options of Food Security in Developing Countries, The World Bank, Washington, DC.

_____(1986b), World Development Report, Oxford University Press For the World Bank.

_____ (1987), "Sudan: Problems of Economic Adjustment", Report No. 6491-SU Vol. III, Statistical Analysis.

_____ (1988a), World Development Report, Oxford University Press for the World Bank.

_____ (1988b), Annual Report, The World Bank, Washington, DC.

STATISTICAL APPENDIX

Table 1 Sudan: Selected Agricultural Production and Output Indices (1980/81-1987/88) (Vol. of output in 000's Metric tons)

	1980/81	81/82	82/83	83/84	84/85	85/86	86/87	87/88*
Cotton Lint (irrigated)	109	164	207	218	235	257	263	266
annual growth rate	50.5	26.2	5.3	7.8	9.4	2.3	1.5	
Groundnut	712	838	492	413	386	328	379	425
Irrigated	159	278	181	180	257	111	186	215
	(22.3)	(33.2)	(36.8)	(43.6)	(66.6)	(33.8)	(49.1)	(50.6)
Rainfed	553	560	311	233	129	217	193	210
	(77.7)	(66.8)	(63.2)	(56.4)	(33.4)	(66.6)	(36.7)	(49.4)
Annual growth rate	17.7	-41.3	-16.1	-6.5	-15	12.5	12.1	
Sorghum	2068	3272	1938	1806	1097	3843	3277	1307
Irrigated	154	271	233	359	436	699	454	350
	(7.4)	(8.3)	(12)	(19.9)	(39.7)	(18.2)	(13.9)	(26.8)
Mechanized	1214	2150	1185	1084	389	2331	2395	799
	(58.7)	(65.7)	(61.1)	(60)	(35.5)	(60.7)	(73.1)	(61.1)
Traditional	700	851	520	363	272	813	428	158
	(33.8)	(26)	(26.9)	(20.1)	(24.8)	(21.1)	(13.1)	(12.1)
Annual growth rate	58.2	-40.8	-6.8	-39.3	250.3	-14.7	-60	
Sesame	221	242	163	206	133	214	216	233
Mechanized	69	70	48	99	70	110	117	121
	(31.2)	(28.9)	(29.4)	(48.1)	(52.6)	(51.4)	(54.2)	(51.9)
Traditional	152	172	115	107	63	104	99	112
	(68.8)	(71.1)	(70.6)	(51.9)	(47.4)	(48.6)	(54.8)	(48.1)
Annual growth rate	9.5	-32.6	26.4	-35.4	60.9	0.9	7.9	
Millet (Traditional rain-fed)	491	509	341	314	158	479	285	153
Annual growth rate	3.7	-33	-7.9	-49.7	203.2	-40.5	-46.3	
Wheat (Irrigated)	218	142	144	169	79	195	157	184
Annual growth rate	-34.9	1.4	17.4	-53.3	146.8	19.5	17.2	
Sugar Cane (Irrigated)	2400	2671	2996	3612	3949	n.a	n.a	n.a
Annual growth rate	11.3	12.2	20.6	9.3	--	--	--	

Index of Agricultural Output.** (80/81=100)	100	125.4	100.5	104.3	96.6	138.2	119.0	66.8
FAO Crop Production*** Index (1979-81=100)		112.73	94.55	98.57	86.69	116.47	113.27	92.21

* Revised estimates, DAES (1988).
** Own computation covering all agricultural commodities above except sugar cane (1985/86, 1986/87 and 1987/88) for which complete data are not available. The indices are not based on price-weighted quantities (due to the lack of base year prices) instead the indices show simple unweighted calculation relative to the base year.
*** FAO Indices are calculated using Laspeyres formula. Production quantities of each commodity are weighted by 1979-80 average national producer prices and summed for each year. The aggregate for each year is divided by the average aggregate for the base year to obtain the index of that year. FAO indices (unlike ours) are based on production data represented on the basis of calender years. The difference between the FAO figures and our figures may be due to the difference in coverage, weights, time reference of data and the methods of calculation. Nevertheless, the two figures show similar trend, although different magnitudes.
N.B Figures in brackets are the share of each sector in the crop production.

Sources: World Bank (1982a), (1987), DAES (1988) Bank of Sudan, (1987) and FAO (1987).

Yields of Different Crops Under Different Farming Systems
(All yields in Kilograms/ Feddan except for cotton which is Kantar/feddan)

Table 2

Crop	1980/81	81/82	82/83	83/84	84/85	85/86	86/87	78/88*
Cotton (Irrigated)	(2.1)	(3.4)	(4.2)	(4.5)	(4.6)	(3.9)	(4.7)	(4.5)
Groundnuts	(334)	(353)	(264)	(225)	(220)	(315)	(294)	(256)
-Irrigated	799	676	787	729	788	760	798	775
-Rainfed	287	285	191	147	90	242	183	152
Sorghum	(297)	(355)	(256)	(206)	(137)	(316)	(277)	(156)
-Irrigated	307	468	402	487	269	619	457	495
-Mechanized	354	389	275	207	86	318	292	142
-Traditional	232	273	194	129	101	220	153	77
Sesame	(110)	(118)	(82)	(95)	(71)	(82)	(97)	(102)
-Mechanized	141	158	87	117	116	91	127	117
-Traditional	100	108	79	81	50	76	97	102
Millet (Traditional)	(189)	(509)	(341)	(314)	(158)	(479)	(285)	(153)
Wheat	(499)	(432)	(618)	(484)	(687)	(542)	(557)	(533)
Sugar Cane	(27586)	(25438)	(31537)	(31138)	(34339)	n.a	n.a	n.a

* Revised estimates from DAES (1988).
Sources: World Bank (1987), DAES (1988).

GDP Indicators

Table 3

Description	1980/81	81/82	82/83	83/84	84/85	85/86
GDP nominal	5024	6664 (32.6)	8407 (26.2)	9981 (18.7)	13908.7 (39.4)	19611.5 (41)
GDP real	5024	5314.2 (5.8)	4977.5 (-6.3)	4520.4 (-9.2)	4249.5 (-5.9)	4609 (8.5)
Average annual real growth rate				(-1.42)		
Index of real GDP	100	105.8	99.1	89.9	84.6	91.7

Figures inbetween brackets are the annual rate of growth.

Source: Own calculation using figures from the World Bank (1987) Vol. III.

The Major Characteristics of the Agricultural Sub-sectors in Sudan

Table 4

Description	Irrigated	Mechanized Rain-fed	Traditional Rain-fed
Main Production Areas *	Central Region (Gezira, White & Blue Niles & some parts of the Eastern & Northern Provinces.	Situated on the Plains along the Blue Nile and in Southern Kordofan.	All the rest of the country except the Desert and Semi-desert area North of Khartoum.
Area Under Cultivation (Million Feddan)**	2.3	5.0	9.1
Major Crops Produced.	Cotton (LS), Groundnut, Sorghum, Sugar Cane & Wheat.	Sorghum & Sesame	Millet, Sorghum, Sesame, Groundnut & Gum Arabic.
Factors Affecting Agricultural Production.	Area Allocation, Rainfall (Blue Nile Level) & Starting of Rain, Canalization Maintenance & Market Prices.	Fuel & Seeds Availability, Distribution & Starting of Rain & Market Prices.	Distribution & Starting of Rain, Availability of Seeds & Market Prices.
Farmers Dicision Making.	Negligible in land allocation, timing of agricultural is organized by tenants according to the limit set by the the management. Only decision on labour for cotton picking (family or hired) is made by the farmer.	Farmers decide their allocation of land, inputs including labour.	Farmers decide their land and inputs allocations as well as labour inputs.
Input Distribution.	Undertaken by the management (imported inputs and water).	Obtained Commercially except oil which is provided by the government.	Obtained commercially if available
Marketing	Through the government (except wheat).	Through commercial channels.	Through commercial channels.

Input & Output Price Determination.	Government determined (through the the relevant marketing board).	Market determined. Oil and land rents are determined by the government.	Output prices are market determined.

Selected Productivity of: ***			
Cotton (Kantar/fed.)	3.5 (LS/Gezira)	3.1 (MS)	0.9 (SS)
Sesame (Kg/Fed.)	-	119	87
Groundnut (Kg/Fed.)	764	197	-
Sorghum (Kg/fed.)	438	258	172
Millet (Kg/fed.)	-	-	304

* For more details see Fig.1.
** World Bank (1987). The figures represent an annual average calculated from eleven years (1975/76-1985/86).
*** Eight years average (1980/81-1987/88) calculated from table 2. For cotton it is ten years average (1975/76-1985/86) calculated from the World Bank (1987). LS, MS & SS refer to long staple, medium stable and short stable varieties repectively.

Sources: Informations are combined mainly from D'Silva (1985), World Bank (1987) and table 2.

Sudan Matrix of Key Bank Agricultural Policy Measures

Table 5

Policy Objectives	Action Taken	World Bank Recomendation of Further Action
Abolish Joint Account System;	Individual Accounts introduced in 1981/82 season in Gezira & extended in the following years to other irrigated schemes;	Action completed.
Ensure full cost recovery in irrigation;	Some increase in land & water charges over 1981/82-83/84 (12%);	Determine criteria for full cost recovery.
Improve inputs finance delivery in irrigated schemes,	Done on inputs finance by foreign currency;	Restabilsh Sudan to finance its agricultural inputs.
Increase private ownership in irrigated schemes;	Decision taken in 1988 to privatize Blue & White Nile schemes;	Implement decision and develop plan for greater private sector participation.
Rehabilitate the irrigated sub-sector;	Rehabilitation started 1980 in Gezira and extended to Suki, New Halfa and Rahad starting 1981/82 season;	Broaden rehabilitation efforts to other viable schemes.
Announce producer prices before harvest;	Done starting 1981/82 season;	Action completed.
Increase export prices (for cotton, seseme gum Arabic, groundnut etc..);	More liberal price policies introduced;	Continue.
Concentrate on high priority projects;	Postponed port Suakin & the new International Airport; many rehabilitation measures introduced (see above),	Specify sectoral objectives, recost large projects.
Remove export monopolies;	Export ban on sorghum lifted;	Libralize export trade for groundnuts gum Arabic & cotton.
Extend price stabilization of major crops;	Objective criteria used in setting price of cotton, sugar wheat;	Complete review of of feasibility of price stabilization of other crops.
Continue flexible	Official exchange rate	Move to more flexible

exchange rate policy;	& commercial bank rate fixed; commercial bank rate devalued in 1981, 82, 83, 84, 86, & 87;	exchange rate structure , agree on system of periodic devaluation to draw more producers into exports. Move export exchange rate to make crop competitive.
Regular review of prices to ensure link with international prices;	Set up of price committee;	Give committee a secretariat for price decision.
Remove export duties & other taxes on agricultural products;	Export duties were removed from 25 items including millon, caster seeds & onions. 25% of export was calculated at the prevailing market rate of exchange. Sorghum was exempted from 5% development tax;	Continue policy.

Sources: Summarized and modified from the World Bank (1985) and (1987).

Table 6 — The IDA/IBRD Financing Investment in Agricultural Projects by sub-sectors up to 1987. (US$ Million)

Projects	Duration and Date of Approval	Sub-sector	Ammount of Loans*	General Purpose
Gezira rehabilitation	1983/84-89/90 (1983)	Irrigated	$80 ($263)	Rehabilitation
Agricultural. rehabilitation	n.a (1980)	Irrigated	$65 (n.a)	Rehabilitation
Agricultural rehabilitation II	n.a (1983)	Irrigated	$50 (n.a)	Financing agricultural inputs for all irrigated schemes.
Northern Region agricultural rehabilitation	1983/4-88/89 (n.a)	Irrigated	$10.7 ($23.1)	Rehabilitation
White Nile Pump schemes rehabilitation.	1982/3-86/87 (1981)	Irrigated	$35 ($55)	Rehabilitation
Blue Nile Pump schemes rehabilitation	1982/83-86/87 (1981)	Irrigated	$32 ($67)	Rehabilitation and building of infrastructure.
New Halfa Rehabilitation	1981/82-85/86 (1987)	Irrigated	$40 ($105)	Rehabilitation
Rahad irrigation	1982/83-84/85 (n.a)	Irrigated	n.a ($20)	Agricultural irrigation
Agricultural research	n.a (1980)	Irrigated	$22 n.a	Agricultural research extension and training in irrigated sub -sector
Jonglei Canal	1978/79-1985/86 Revised 1988/89**	Irrigated	$33 ($190)	Increase in water availability in the irrigated sub -sector

Agricultural rehabilitation III	n.a (1987)	Irrigated	$85 ($120)	Address the policy and institutional issues, sustainment of irrigated crops during 88/89 season and organization of irrigation system.
Gash Delta rehabilitation	1983/84-86/87	Irrigated	$6 ($11)	Rehabilitation
Southern Region agricultural rehabilitation	1980/81-84/85 (1979)	Traditional rainfed	$15 ($63.4)	Research and infrastructure
Western Sudan agricultural research	1979/80-85/86 (n.a)	Traditional rainfed	$15 ($74)	Increase in agricultural research capabilities on production system.
Agricultural servises (Southern Darfur)	1982/83-85/86 (n.a)	Traditional rainfed	$13 ($26)	Pilot project for crop and livestock development.
Agricultural services (North & South Kordofan)	1982/83-86/87 (1982)	Traditional rainfed	$18 ($35.5)	agricultural inputs, credit availability to smallholders
Livestock and Meat Marketing Corporation (Western Sudan)	1979/80-84/85 (1978)	Traditional rainfed	$25 ($57.9)	Improve transport marketing of livestock by traditional producers.
Agricultural development in Southern Kordofan	n.a (1987)	Traditional rainfed	$19.7 ($39.8)	Address major constraints through the strengthening of agricultural institutions, increased availability of inputs improved technology roads and water supplies.

Mechanized farming III	1979/80-85/86 (1978)	Mechanized rainfed	$16 ($21.5)	Strengthening of mechanized projects (raising productivity of mechanized farming schemes, improve mechanized farming methods and develop infrastructure in the mechanized area).

* The Bank's supported projects are financed in collaboration with bilateral and multilateral sources. The figures inbetween brackets are the estimated total project cost. Part of it was financed by these sources.
** Not completed yet due to the civil war in the South.

Sources: Combined from, DRS, 1983, Bank of Sudan 1986, and World Bank 1982a, 1988b.

Sudan: Expenditure (Real, nominal & Indices) and the Exchange Rate

Table 7

Years Description	1980/81	81/82	82/83	83/84	84/85	85/86
GDP deflator	100	125.4	168.9	220.8	327.3	425.5
Inflation rate		25.4%	35%	31%	48%	30%
Development Expenditure	219	315	414	483	456	638
Real Developmet Expenditure	219	251.2	245.1	218.8	139.3	149.9
Current Expenditure	789	870	1086	1300	2447	3717
Real Current Expenditure	789	693.8	642.9	588.8	319.9	373.9
Index of Real Development Expenditure	100	115.6	112.7	100.6	64.1	69
Index of Real Current Expenditure	100	88.1	81.6	74.8	40.6	47.5
Exchange Rate (US$/LS 100).	158.7	117.4	81.3	63.0	49.8	36.7

Sources: Own calculation from the figures obtained from the World Bank (1987).

Terms of Trade Effect (1977/78-1983/84)
(LS Million)

Table 8:

Years / Description	1977/78	78/79	79/80	80/81	81/82	82/83	83/84
Value of Exports	242	329	476	417	558	926	1392
Value of Imports	473	621	938	1152	1810	2197	2648
Trade Balance	-231	-292	-462	-681	-1252	-1271	-1256
Current GDP	2883	3162	3998	5024	6664	8407	9981
Export Price Index	100.0	119.3	142.8	165.6	188.3	214.1*	243.4*
Import Price Index	100.0	117.9	147.2	169.0	190.6	215.0*	242.5*
Annual Terms of Trade Effects**	0.0	-38.0	-89.5	-62.9	-82.6	-155.2	-154.3
Annual Terms of Trade Effects as % of Trade Deficits	0.0	13	19.4	9.2	6.6	12.2	12.2
Average				(12.1)			
Annual Terms of Trade Effects as % of GDP.	0.0	1.2	2.2	1.3	1.2	1.8	1.5
Average				(1.5)			

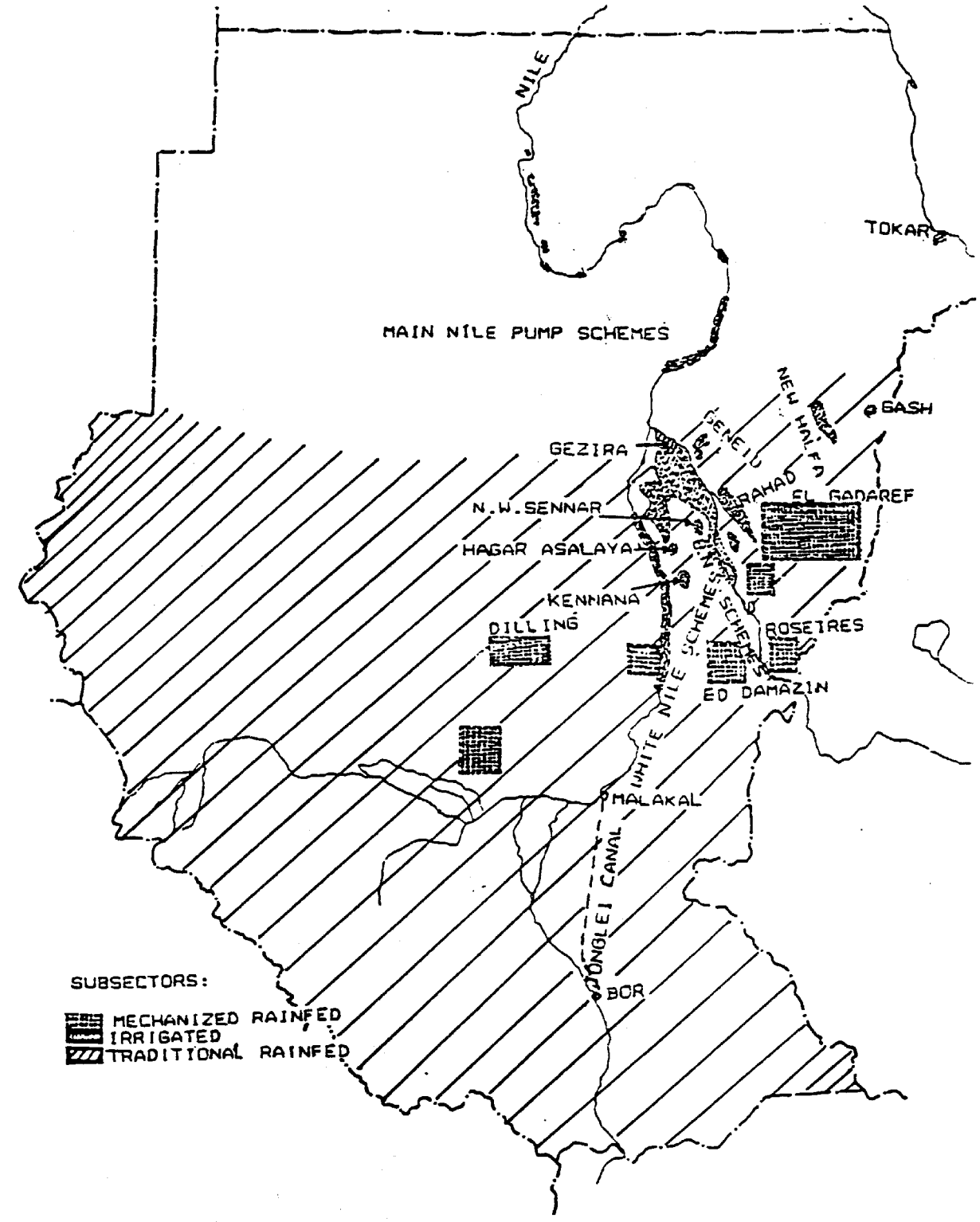
* Estimated figures.
** Terms of trade effect is calculated using the following formula:

$$X^{o}\left[\frac{P_{xi}}{P_{xi-1}} - 1\right] - M^{o}\left[\frac{P_{mi}}{P_{mi-1}} - 1\right].$$

Where, P_{mi}, P_{xi}, P_{mi-1} & P_{xi-1} are import and export price indices at year i and i-1 (base year) respectively.

Sources: own computation from the World bank figures supplemented by the Bank of Sudan Annual Reports' figures.

FIG. 1
SUDAN: LOCATION of AGRICULTURAL SUB-SECTORS



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