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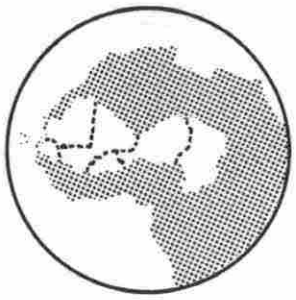

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DEVELOPMENT OF RAINFED AGRICULTURE IN THE GAMBIA

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DEVELOPMENT OF RAINFED AGRICULTURE

IN

THE GAMBIA

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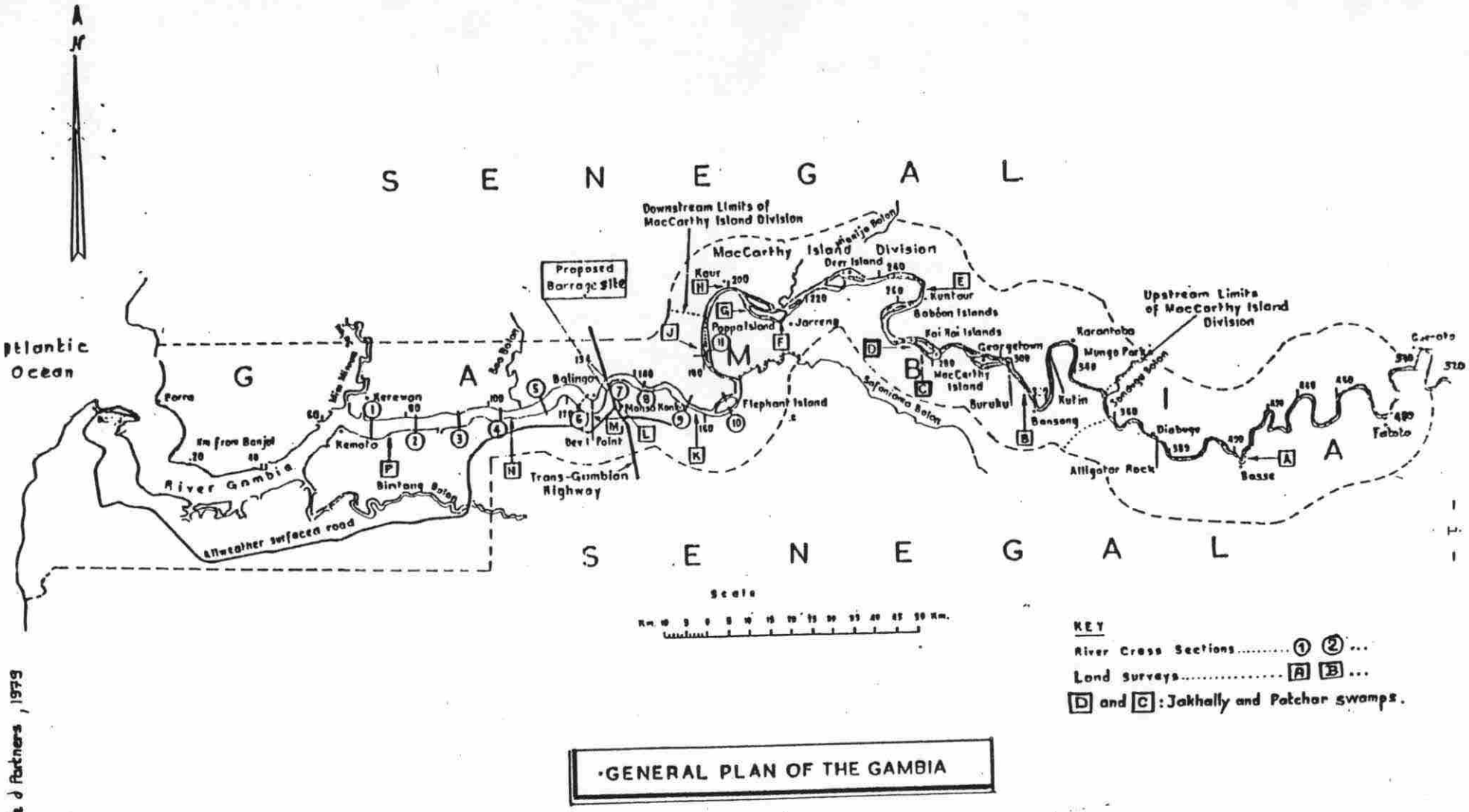

GENERAL PLAN OF THE GAMBIA

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INTRODUCTION

0.1 Objectives of the Programme review

This review and analysis of rainfed agriculture in The Gambia follows closely the detailed outline adopted by the CILSS Council of Ministers in January 1981, 16th Session, dealing with arable crop production.

> This report called for in regard to rainfed agriculture was intended to assist Member countries - in this case The Gambia - to prepare an inventory of possibilities for increased production and a second programme of projects for the period 1982 to 1986, taking full account of experience with past and on-going projects and reviewing associated policies.

While attempting to adhere as far as possible to the detailed outline or Terms of Reference, the Mission, consisting of a Gambian Government official and, a Consultant appointed by the Club du Sahel, in preparing this report have been influenced by a number of specific considerations which also need to be taken into account in its presentation.

First, rainfed and irrigated agriculture in The Gambia cannot be divorced from one another for reasons which are alluded to in this report, and for ease of reference some aspects of the Club du Sahel/CILSS report "Development of Irrigated Agriculture in Gambia", October 1979, have therefore been included. Secondly, the Government of The Gambia had adopted a policy of developing a fully integrated strategy for food and nutrition in furtherance of which it commissioned the preparation of a Food Strategy Report, which was completed in March 1981. Thirdly, the Five Year Plan for Economic and Social Development 1981/82-1985/86, published in 1981 and covering the period designated by the Council of Ministers for second generation projects, gives specific priority to increased agricultural production. These last two publications and the supporting documents referred to in them reveal that there is therefore already in existence a substantial array of programmes and projects in rainfed agriculture, although there is still some uncertainty about the shape and level of funding of some key projects which are heavily dependent upon external support. Since the Development Plan was drafted, the availability of funds to finance recurrent costs has become even more acutely constrained. A key issue, if not the main issue, in fact is whether there are now the financial resources as well as trained manpower and institutional capacity to implement them effectively, bearing in mind the resource demands from irrigation, forestry, fisheries and from other sectors. In reviewing development options, therefore, special reference is made to programmes and projects which are particularly crucial to the achievement of the increased production envisaged in the plan; to their justification and priority, and to the existence of any significant gaps.

In preparing this report it has also been borne in mind that it is Government policy to work towards the greater integration of arable crop and livestock production, although it is not possible under this remit to do more in the case of livestock than to underline the role of animal draught power and the need for optimal use of land for which there is growing competition between crop and livestock husbandry.

0.2 Rainfed Agriculture in the Economy of The Gambia - The Key Role of Groundnuts

The Republic of The Gambia extends like a finger 487 km into the Republic of Senegal with which, following the attempted coup in mid-1981, a Senegambian Confederal structure is gradually to be brought into being. With a surface area of 11,295 km2 and an estimated population of some 650,000 (1983), it is the smallest country on the African continent and one of the most densely populated with 60 inhabitants per km2 of land area.

The Gambia is amongst the 37 low-income food-deficit countries in Africa, with an average per caput income of about D550 (US$240) at 1980/81 market prices and a significant and growing dependence on imports of food, which it is one of the Government's principal objectives to reduce. Possessed of no identified mineral resources or hydro-power potential as a basis for industrial development, and with a very small internal market, the economy and people depend predominantly on agriculture as a source of export earnings and of employment. Details of the origin of the GDP are given in Table 25.

The rainfed groundnut crop is the mainstay of the Gambian economy. Both government revenues and foreign exchange, and the cash incomes of the bulk of the population are dependent upon adequate rainfall and upon world market prices for groundnuts. Each have been subject to severe fluctuations during the period under review - the commencement of the first five year plan (FYP I), extended by one year to cover the years 1975/76 to 1980/81 and the first two years of the current plan (FYP II), 1981/82 to 1985/86(1).

The first five year plan (FYP I) for economic and social development 1975/76-1979/80 (subsequently extended for one year, 1980/81) was launched in July 1975 after the third successful public investment programme between 1963/64 and 1974/75. Conditions in the Gambian economy, which had recovered from the setback caused by the Sahelian droughts of the late sixties and early seventies, were favourable for the launching of a comprehensive national development programme. Purchases of groundnuts by the Gambia Produce Marketing Board (GPMB) had amounted to about 135,000 tons for the two years preceding the Plan, and the export price had doubled since 1972/73. The reserves of the GPMB and the foreign exchange reserves of the country were high.

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(1) The Financial Year, coinciding with the rainfed agricultural calendar, runs from 1st July to 30th June.

The economic situation remained satisfactory during the first two years of the Plan. The world market price for groundnuts had, after a fall in 1975/76, risen 22 per cent in 1976/77 above the level of 1974/75 and production remained high (Table 5). Producer prices had been raised appreciably in both 1975/76 and 1976/77. Agricultural production and groundnut exports fell sharply in 1977/78 as a result of drought though prices rose slightly, and although production recovered somewhat in 1978/79, the benefits were offset by a fall in world market prices. Adverse climatic conditions in 1979/80 caused a drastic fall in groundnut production, accompanied by a further fall in world prices and, while prices recovered in 1980/81, output dropped still further to the lowest level since the end of the war.

To the cumulative effects on the country's terms of trade arising from the escalation of oil prices, shipping costs and the price of most manufactured imports and a series of poor groundnut harvests and/or low prices, the fast growth in the government's development and recurrent expenditures led, from 1977, to a rapid drawing down of foreign exchange reserves and to increasingly severe budgetary and balance-of-payment strains. Between 1974/75 and 1980/81, Government development and recurrent spending quadrupled, while the number of established posts in the public service doubled. By 1979/80, the government's reserves were virtually exhausted and, following the further deficit in 1980/81, it had to call on the IMF for urgent balance of payments support.

Despite a variety of measures to promote increased production, The Gambia has become increasingly dependent during the past five or six years on external funds for development, including the operation of STABEX, and upon food aid to supplement commercial imports of food to meet annual cereal deficits. In this, a secular trend in the substitution of rice, and to a small extent wheat, in place of food crops such as sorghum and millet, is playing an important role. For as long as records exist rice has been the preferred staple diet and consumption, now growing at about 8 per cent per annum, presently accounts for more than half the estimated cereal intake and absorbs about 30 per cent of the export earnings from groundnuts.

For the current Five Year Plan, 1981/82-1985/86, 90 per cent of the development budget is expected to be met from external sources and an increasing amount of recurrent expenditure is now of necessity included in all foreign aid projects. The shortage of funds to support the recurrent budget, upon which the on-going services of government - including those essential to agricultural development - depend, is a chronic problem that has now become acute. In the past financial year (1981/82), it was deemed necessary to cut the recurrent budget without notice by 49 per cent (personnel emoluments excepted). Perversely, while the groundnut harvest for 1982/83 is the best for many years with GPMB purchases provisionally put at 127,000 tons, the world market price has fallen to an unprecedentedly low level in real terms.

0.3 Acknowledgements

This report attempts as far as possible in the time and space available to accurately reflect the views expressed by Gambian officials as well as the contents of official documents available to the Mission. Many of the issues referred to in this report are very complex, however, and full justice to them cannot be done without reference back to the documents cited. This is particularly true of the RDP/ADP project for which the World Bank appraisal is now awaited, and to the Food Strategy Report, as well as the current Five Year Development Plan (FYP II). This report is therefore, inevitably selective in its analysis, some issues being dealt with in more detail than others.

The assistance of all those government officials and aid personnel who provided advice and information is most gratefully acknowledged.

REPUBLIC OF THE GAMBIA/CILSS/CLUB DU SAHEL — Rainfed Agriculture Analysis and Programme Mission - The Gambia (March - April, 1983)

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CHAPTER I

THE EVOLUTION OF RAINFED AGRICULTURE AND THE PRESENT SITUATION

1.1 MAIN FEATURES

1.1.1 Physical and Climatic Characteristics

Physical

The main physical feature of The Gambia is the river, accounting for some 19 per cent of the total area of the country, variously given as 10,500 km2 and 11,295 km2(1) located between latitudes 13° 3 and 13° 5 North and longitudes 16° 48 and 13° 47 West. It consists essentially of a narrow strip on either side of the river from which no part of the country is more than about 25 km distant.

The topography is extremely flat, nowhere higher than 40 to 50 m above mean sea level, the land surface formed from sandstone with some clay layering. The soils are mainly fragile, of low fertility, but responding well to phosphate and nitrogen fertilizer. Neither fossil fuels nor minerals, apart from minor resources of usable clay have been identified and it is unlikely that any remain undetected.

The natural vegetation is Sudano-Guinean savannah woodland modified by fire, shifting cultivation, cutting over for firewood, charcoal (officially banned in 1980), fencing etc. and, more recently by overgrazing. Of the soil types, about 40 per cent are classified as well suited for agriculture, 14 per cent as marginal and 46 per cent as unsuitable, of which the major part, i.e. excluding mangrove and saline swamps, constitutes a reserve for grazing and forestry. Only a small proportion of the land is classified as "suitable and irrigable", i.e. 150,000 ha or 14 per cent (Table 1). It is a moot point how much of this area it would be feasible to supply with water, and at what cost. (The Planning, Programming and Monitoring Unit (PPMU) of the Ministry of Agriculture were using a figure of 78,000 ha in 1981, which illustrates the need for a clearer definition). Using this lower figure, almost all is located upstream of the Yeletenda dam site which will carry the Transgambian highway across the river. Little is known of the availability of groundwater (although a survey is proposed) for local, small scale irrigation, e.g. to provide supplementary water for upland crop production, but any extension of riverain irrigation much beyond the present 2,500 to 3,000 ha will require control of The Gambia River whose gradient is so flat

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(1) The Gambia Food Strategy Report, March 1981, uses the higher figure and the 1979 CILSS/Club du Sahel report on irrigated agriculture the lower one.

that the river basin is seasonally saline from ocean water intrusion as far as 250 river km from its mouth. The various proposals for large regulating dams on the Gambia River are summarised in the 1979 CILSS/Club du Sahel report "Development of Irrigated Agriculture in Gambia".

Land capability, essentially a reflection of the combined effects of climate, soils and topography, has been extensively studied in The Gambia by the Land Resources Division of the UK Overseas Development Administration (ODA). According to Table 2 based upon aerial photographs, only 26 per cent of the land classed as suitable for rainfed crops was under cultivation in 1972 with about twice that amount under fallow. The reduction in fallow periods, which are essential in maintaining soil fertility in traditional shifting cultivation, is recognised as an important issue in The Gambia. The Gambia's relatively flat profile and a general absence of high velocity winds means that, despite generally poor soil structure and low humus content, typical of large areas of the African Savanna, the areas liable to high risk of erosion are limited. Even on gentle slopes, however, where large areas have been cleared, high rainfall intensity relative to infiltration can produce sheet erosion unless conservation is practiced. Soil degradation leading ultimately to erosion, resulting from over-grazing, deforestation, reduction in fallow, or indiscriminate cutting of trees and bush is therefore a hazard.

TABLE 1

Comparison of Potential and Current (1972) Land Use (From LRS 22)

Land use / Soil Group	Areas in ha and percentages of soil group			
	Cultivated	Fallow	Un-cultivated	Non-agricultural
1. Unsuitable	6,655 2%	59,211 17%	279,927 79%	10,221 3%
2. Marginal	5,684 5%	38,913 31%	80,383 64%	1,147 1%
3. Suitable with qualifications	27,018 18%	68,789 47%	48,531 33%	3,335 2%
4. Suitable (rainfed crops)	66,841 26%	148,121 58%	33,751 13%	7,496 3%
5. Suitable and irrigable	10,827 7%	36,402 24%	101,870 67%	2,152 1%
Totals	117,025(1) 11%	351,437 34%	544,462 52%	24,351 20%

TABLE 2

Soil Groups by Division (From LRS 22)

Division / Soil group	Areas in ha (percentage of Divisional total)						
	W.D.	L.R.D.	N.B.D.	M.I.D. North	M.I.D. South	U.R.D. North	U.R.D. South
1. Unsuitable	31,981 18.3	79,795 51.9	81,811 37.0	52,485 35.5	39,389 27.7	34,679 38.7	36,197 33.8
2. Marginal	25,348 14.5	18,225 11.9	14,790 6.7	30,638 20.8	16,312 11.5	13,409 15.0	7,239 6.8
3. Suitable with qualifications	39,117 22.4	21,693 14.1	30,731 13.9	8,681 5.9	23,661 16.6	11,253 12.5	12,278 11.5
4. Suitable rainfed	55,573 31.8	28,626 18.6	80,926 36.6	30,272 20.5	22,013 15.5	13,231 14.8	26,331 24.6
5. Suitable and irrigable	22,767 13.0	5,459 3.5	12,750 5.8	25,529 17.3	40,761 28.7	17,057 19.0	25,037 23.3

In Table 2 the distribution of soil potential land use categories by Administrative Division is shown, and it will be seen that there is considerable variation in the proportion classified as suitable for rainfed crops (even more so in the group suitable and irrigable). When population data on a Divisional basis is added (Table 3) however, it will be seen that the availability of suitable land per caput is much less varied. Considerable changes may well have occurred since 1973, however, which will be revealed when the 1983 population census now being instituted is completed.

TABLE 3

Relationship of Population to Land Quality

Division	Land Area (ha)		Rural Population (1973)	Land Area per capita		
	Unsuitable and Marginal (1 and 2 categories)	Suitable (categories 3, 4, 5)		Unsuitable and Marginal	Suitable	Total
Western	57,328	117,457	90,707	0.63	1.29	1.93
L.R.D.	98,020	55,778	42,652	2.30	1.31	3.60
N.B.D.	96,601	123,777	93,536	1.03	1.32	2.36
M.I.D. North	83,123	64,482	47,376	1.75	1.36	3.12
M.I.D. South	55,701	86,435	53,442	1.04	1.62	2.66
U.R.D. North	48,088	41,541	28,957	1.66	1.43	3.10
U.R.D. South	43,436	63,646	63,109	0.69	1.01	1.70
Totals	482,297	553,116	419,779	1.15	1.32	2.47

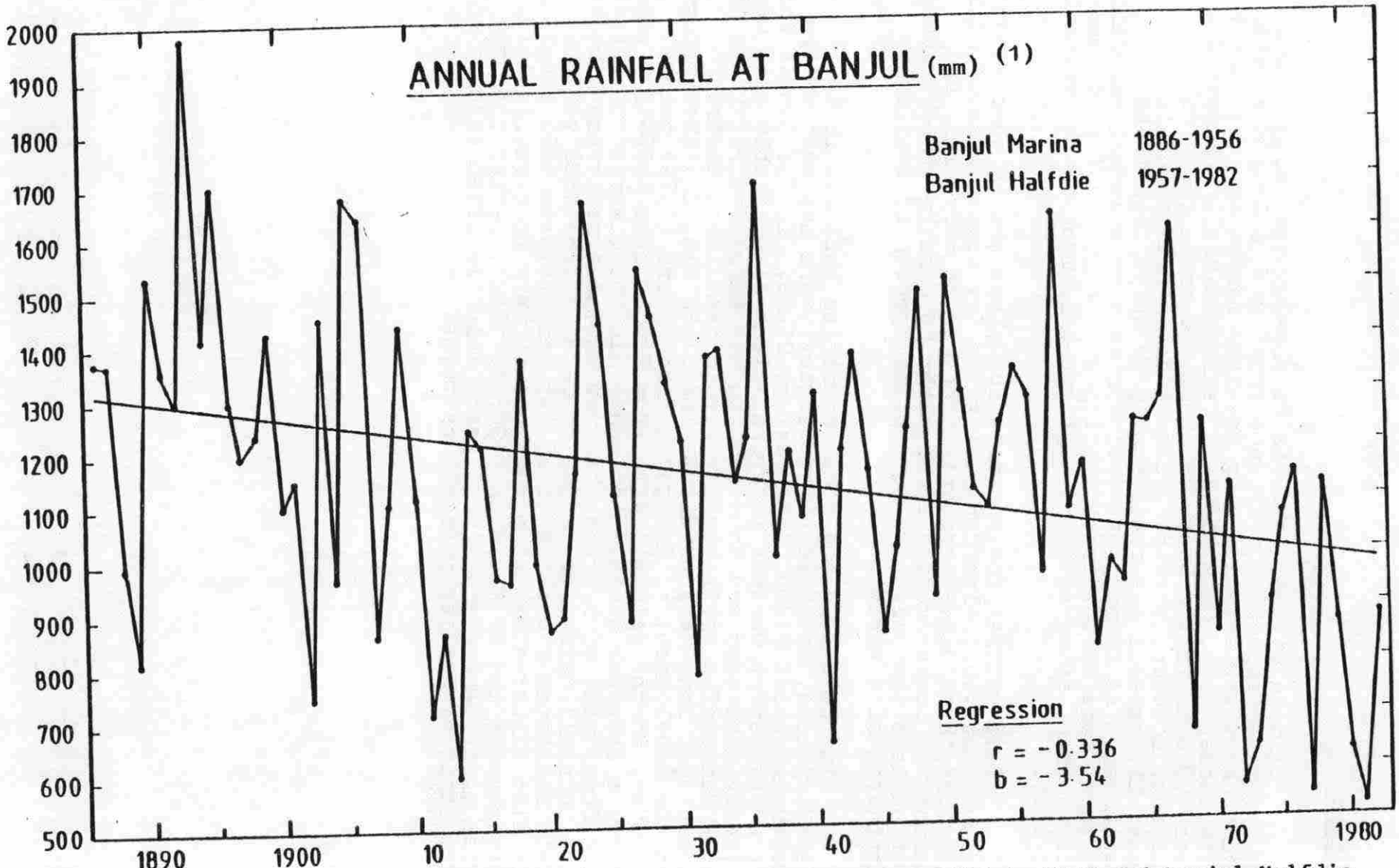
Sources: LRS 22 and 1973 Census.

Climate

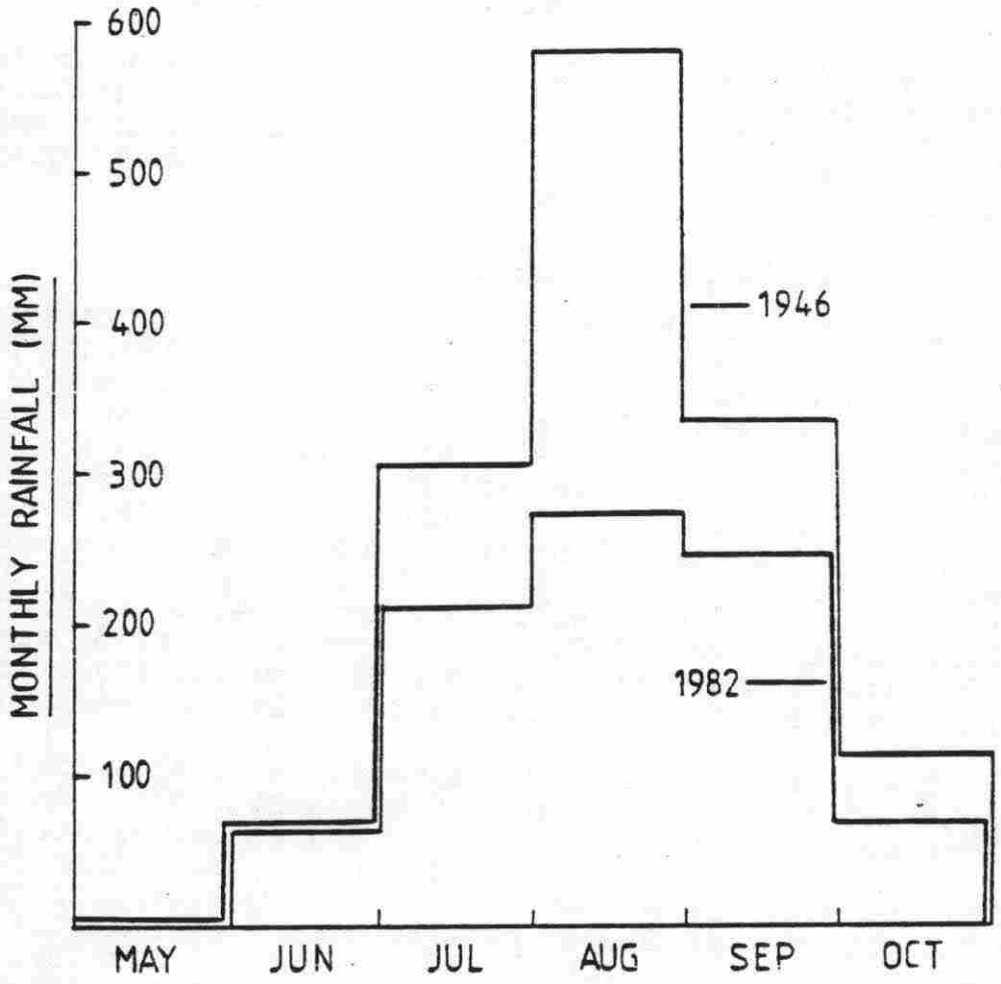
Climate of The Gambia is Sahelo-Guinean and governed by the intertropical convergence zone, with a long dry season and a short wet season during the five months May and June to mid-October with, in a "normal" year a rainfall gradient from over 1,000 mm in the South to about 800 mm in the North, subject, however, to wide fluctuations. Mean rainfall generally exceeds evaporation only in July, August and September. As in many parts of Africa with unimodal rainfall systems, some of the precipitation may be in the form of heavy storms when, as a result of high run-off, much of the rainfall is lost.

Temperatures are adequate for plant growth throughout most of the year, although during the dry season loss of soil moisture through evapotranspiration may be very high, and during the cooler months of November to January temperatures may be less than adequate for optimal growth of available irrigated rice varieties.

In the Gambia and other countries included in the Sahelian zone, detailed climatological work has been undertaken in recent years, not least by CILSS. In The Gambia Food Strategy Report various interpretations of available data were briefly discussed and some caution was expressed regarding the acceptance of a statistically significant trend towards increased, long-term aridity. The CILSS/Club du Sahel report on the Development of Irrigated Agriculture (1979) points, however, to the rainfall data from Banjul from 1886-1977 which shows a decrease of 15.5 per cent. In the diagram on page 12, the Department of Hydromet has now fitted a new trend line to the rainfall data from Banjul to take it from 1886 to 1982. This indicated a decline of 25 per cent between 1886 and 1982. It also illustrates the occurrence of very poor rainfall in seven years out of fourteen (1968 to 1982), rather than the risk of drought every 4 to 5 years which is often assumed on the basis of earlier rainfall patterns.



(1) Banjul Marina 1886 to 1956 and Banjul Halfdie 1957 to 1982. II years overlapping 1943-1956 (less 1947) shows a difference of less than 3%.



COMPUTED MONTHLY RAINFALLS 1946 & 1982

YUNDUM AIRPORT (1)

(1) The data, month by month, was subjected to linear regression. The "computed" values for 1946 and 1982 are taken from the regression equation, not the actual values. The regression equations were used whether or not the correlation was significant.

The preliminary results of further research being undertaken by Dr. Hutchinson of Hydromet on rainfall data (1946-1982) from Yundum, a few kilometres from Banjul, suggests that there has been a marked reduction in rainfall during the peak months, notably in August which is generally crucial for rainfed crops - see the Histogram on page 11. Preliminary analysis of data from other stations, e.g. at Basse, suggests that a similar pattern is affecting other parts of The Gambia(1).

The wide fluctuations in rainfall indicated in the diagram, quite apart from any trend - secular or cyclical - which may exist in the direction of greater aridity, explains why The Gambia's agriculture requires optimal development of both rainfed and irrigated crops.

1.1.2 Population and Employment

According to the latest United Nations estimates (1978) the population of The Gambia grew from 269,000 in 1950 to 524,000 in 1975. From 1960 to 1975 the rate of natural increase was estimated at between 2.2 per cent and 2.4 per cent with net immigration accounting for a further 1.0 per cent in the period 1960-65, falling to 0.7 per cent in 1970-75. (For further details see FYP II, Chapter 6, which also includes a discussion on the need for family planning.) According to the latest United Nations projections (the medium variant, 1978) the population of The Gambia will grow from 524,000 in 1975 to 1,012,000 in the year 2000. The current figure of some 650,000 inhabitants (1983) is derived from interpolation, pending the results of the imminent population census.

The Gambia remains predominantly a rural society, with an adult literacy rate of only 10 per cent (1978), in which the great majority of the population is engaged in agricultural activities, which provide a livelihood for more than 80 per cent of the total inhabitants. About 35 per cent of the gross domestic product and 90 per cent of export earnings (largely from groundnuts) are derived from the agricultural sector (tables 25 and 26). The population is comprised of four main ethnic groups of which the Mandingos account for over 40 per cent, with Fulas, Wolofs and Jolas some 18 per cent, 16 per cent and 10 per cent respectively. The overwhelming religious majority are Moslems and the country, in which there are no great extremes of personal wealth, has a reputation for religious, racial and social tolerance.

As in many other parts of Africa, the past two decades have seen relatively high rates of urbanisation. Even though it has been the Government's declared policy to reduce the disparity in social and infrastructural services between the Banjul, Kombo St Mary triangle, and the rest of the country, considerable disparity still persists and has contributed to attract immigrants, particularly younger men, away from the rural areas

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(1) Hutchinson, P. (forthcoming).

despite the relatively few fulltime urban jobs available. Meanwhile, seasonal labour shortages at peak periods of agricultural activity are met in part by seasonal immigrants or "strange farmers".

There is as yet no commercial forestry in The Gambia, but the rural population relies primarily upon wood as a source of fuel, and efforts are being made since the production of charcoal was banned in 1980 to introduce cheap and efficient stoves. Fishing, artisanal and commercial, provides significant employment and income, although a high proportion of the commercial fishing is carried out by immigrant fishermen from neighbouring countries. The total annual fish production is estimated to be between 16,000 and 35,000 tons, commercial fishing accounting for between 15,000 and 23,000 tons per annum. Apart from associated boat building and small scale trading, few other employment opportunities exist in the rural areas, although it is government policy, through the Department of Community Development, to encourage local enterprise in the informal sector, for men, women and youth.

As in other parts of tropical Africa, the incidence of disease rises significantly in The Gambia with the onset of rains, which coincides with the "hungry season". Infant mortality is still relatively high and life expectancy low, and although malnutrition appears mainly as a threat to vulnerable groups such as small children and lactating mothers, debilitating diseases at the onset of the rains, when maximum effort is needed to cultivate and plant rainfed crops, may substantially effect the working capacity of the agricultural labour force. Only 3 per cent of the rural population have access to safe water as against 97 per cent of urban dwellers.

The distribution of the population by administrative Division is shown in Table 3, based upon the 1973 census. The 1983 census may well reveal significant changes. Statistics for employment exist only for the formal sector which, in 1980, employed about 28,000 workers, or 10 per cent of the total work force, with 7 per cent in the public sector and 3 per cent in the private sector. No details of unemployment or under-employment are available but, in 1981, 12,000 were conservatively estimated to be fully unemployed, mostly in the urban areas (FYP II). Most of the agricultural labour force is considered to be under-employed other than at peak periods of agricultural activity - land preparation, planting, weeding and harvesting, although little data regarding on and off-farm labour utilisation is available. Per capita income in the urban areas (US$550) is estimated to be about four times that in the rural areas, but such estimates may underrate the value of subsistence consumption.

1.1.3 The Agricultural Sector

Some 170,100 hectares of land were estimated to be under crop production in 1977/78. By 1979/80 this estimate had been adjusted downwards to 114,300 (Table 4), with an average of 152,400 for the nine years from 1974/75 to 1981/82. Available data on crop production and yields are summarised in section 1.1.4 but some reservations must be held as to the reliability of the crop sample survey data. For the livestock industry, data are even more inadequate, but it is estimated that there are some 300,000 head of cattle (nearly 0.5 units per head of the human population) of N'Dama, trypanotolerant stock.

About 15 per cent of the population are estimated to own cattle, which are important as a source of draught power, for meat and as a means of maintaining soil fertility, but this is probably an under-estimate. Average milk yields for the N'Dama are low and their potential as a source of milk for human consumption is not significant. The prevalence of Trypanosomiasis inhibits the use of exotic cattle for this purpose, although some cross breeding may eventually prove possible to increase both carcass weight and milk yields while retaining the trypano-tolerance of indigenous stock. Annual offtake at the beginning of FYP I was estimated to be about 20,000 head or between 7 and 8 per cent. For the current plan (FYP II), offtake is assumed to rise to 10 per cent while there will be a 3 per cent per annum increase in the national herd. Under existing systems of animal and grazing management, however, many areas are already overstocked and improved systems of resource management are required if the national herd is to be increased still further.

The sheep and goat populations are estimated at 146,000 and 158,000 respectively, and for FYP II it is assumed that their numbers will remain stable with an annual offtake of 35 per cent. In a predominantly Moslem country, pigs are seldom kept, but in almost all compounds there are sheep, goats and poultry.

Small stock provide a convenient unit for slaughter in rural areas where there are no refrigeration facilities and play a significant part in meeting nutritional requirements. Poultry and eggs are also widely consumed throughout the country and a growth in production of 6 per cent per annum during FYP II is projected.

Horses and donkeys also play a significant role in farm cultivation in addition to providing transportation, especially in the evacuation of farm produce and the supply of inputs. Donkeys, which can be conveniently handled by women are increasing in numbers - although no statistics or estimate of horses or donkeys are available - and their use is being encouraged for this reason. The first five year plan did not provide a well articulated programme for development of the

livestock industry, although it was recognised as being seriously under-exploited. The current five year plan contains a number of measures to remedy this and to achieve greater integration between livestock and animal husbandry, not least through the USAID funded Mixed Farming and Resource Management Project.

The Gambia's fisheries are also considered to be considerably under-exploited, marine fisheries as well as inland fisheries.

The River Gambia with a surface area of some 2,000 km2 is estimated in FYP II to contribute only about 2 per cent to the total production of fish, but its potential has yet to be determined. During FYP I, an experimental programme for the development of inland fish farming was established by the Department of Fisheries, with the support of the Catholic Relief Service (CRS) and Peace Corps volunteers, but despite some promising results the growth of aquaculture is unlikely to play an important part in the rural economy in the foreseeable future.

In the case of both inland and marine fisheries - the latter making a significant contribution to exports, with considerable scope for expansion - the Food Strategy raised the question why so few Gambians take up fishing (e.g. are there social taboos?), as so much of the industry is in the hands of migrants.

The prospects for crop production, livestock husbandry and forestry are closely inter-related. The practice of shifting cultivation and the need for greater arable production and for more grazing land has put great pressure on The Gambia's land resources, particularly its forests. Although the forestry sector's share of the gross domestic product (at producer's value) is estimated to be less than 1 per cent, the value of firewood alone accounts for about 85 per cent of the total energy consumption of the country, amounting to the equivalent of about 320,000 tons of oil annually. In addition to providing fuel and, as yet, a modest contribution (5 per cent) of the country's demand for sawn timber, the preservation and development of forestry resources is seen as an essential element in the protection of the ecosystem and in arresting the process of land degradation which has been taking place gradually over the present century.

The relationship between irrigated and rainfed agriculture is referred to in section 1.4, specifically Table 23.

1.1.4 Main Crops and their Distribution

Despite the establishment of annual sample surveys since 1974/75 a variety of estimates of the area (and of yields and production) of the main crops appears in various publications. The PPMU in collaboration with the Central Statistical

Department (CSD) is now endeavouring to produce an authoritative set of data and, in Table 4 the latest revised figures of the area under principal crops is shown, and in Table 5 their estimated production.

Table 4 shows that groundnuts account for well over half the area under cultivation, but in later years there is a decline in the predominance of groundnut acreage. Between the first three years and the last three years the area in upland rice declined, whereas swamp rice appears to have increased. The seasonal fluctuations for all crops, generally attributed to rainfall, are marked, but this also applies to irrigated rice and, in the poor season of 1979/80 when all other rainfed crops showed a dramatic fall in the area cultivated, upland rice showed an increase over the previous year. In Annex 1 where details of area planted and of area harvested are shown for the 1981/82 season, there are considerable differences between the two sets of figures although this was a good season for all crops. (A shortage of labour for harvesting or weeding may be one explanation but, whatever the cause, this represents a substantial waste of seed and of effort in land preparation).

Estimates of yields per hectare for the years 1974/75 to 1980/81 are shown in Table 6 the data being that provided in the latest revision by the PPMU.

Cereal Crops

Millet and sorghum, with an increasing level of maize production are the most important cereals in terms of area and production. As yet, however, little has been done to improve the yields of millets and sorghum, although these two crops at one time constituted the basic diet of the great majority of the people and still represent, along with cassava and irrigated rice, the main protection against drought in rainfed agriculture. Rice, however, is the preferred staple diet for the majority of the people in which local production is increasingly supplemented by imports (Section 1.4.1).

Rice is grown under a variety of regimes:

- rainfed rice grown in the uplands using free drainage
- rainfed or "Bantafaro" rice grown on low lying hydromorphic soils which are not usually submersed by the river or its tributaries but on which some "streaming" adds to the water supplied by rainfall
- rice grown on freshwater marshland along the upstream two thirds of the river or in marshes further removed from the lower bed of the river and are subject to various degrees of submersion periodically through tides and river floods

TABLE 4

Area under Principal Crops for the Period
1974/75 to 1981/82

('000 ha)

Crop/Year	1974/75	1975/76	1976/77	1977/78	1978/79	1979/80	1980/81	1981/82
Findo	2.7	3.0	2.5	2.4	2.1	0.4	2.1	3.2
Early millet (Suno)	5.9	6.5	4.6	6.4	10.0	1.7	6.0	11.4
Late millet (Sanyo)	16.4	15.8	10.3	13.0	15.3	9.3	11.6	11.6
Sorghum (Basso)	11.4	9.7	10.9	14.6	13.9	11.6	14.3	11.9
Maize	5.4	4.4	4.0	6.2	6.8	5.4	5.9	7.6
Upland rice	7.4	7.5	7.6	7.0	4.0	4.9	1.5	4.1
Swamp rice	3.4	13.6	13.7	12.0	13.0	10.3	17.3	22.4
Irrigated rice	0.5	0.9	1.1	0.8	0.8	1.9	2.9	1.3
Groundnut	104.8	98.8	107.6	105.4	106.2	67.8	68.9	80.7
Cotton	-	0.5	1.0	2.3	1.7	1.0	2.3	2.6
Totals	157.9	160.7	163.3	170.1	173.8	114.3	122.5	156.7

Source: Central Statistics Department (CSD) 1974/75 to 1978/79 (Table by PPMU, 1.4.83)
PPMU 1979/80 to 1981/82.

TABLE 5

FOOD GRAIN PRODUCTION IN GRAIN EQUIVALENT (GE)

GROUNDNUTS AND COTTON PRODUCTION

FOR THE PERIOD 1974/75 TO 1982/83

('000 Metric Tons)

Particulars	1974/75	1975/76	1976/77	1977/78	1978/79	1979/80	1980/81	1981/82	1982/83(*)
Upland cereals	38.6	24.4	26.1	28.2	43.3	24.2	36.6	56.7	62.1
Findo	1.5	1.2	0.9	0.6	1.6	0.2	1.3	2.2	n.a.
Early millet	6.7	3.6	3.0	4.4	9.6	1.6	5.4	14.4	18.3
Late millet	11.7	9.3	8.1	6.4	10.3	7.0	9.9	14.8	13.0
Sorghum	7.9	7.4	9.6	9.8	12.2	8.8	13.7	12.8	15.1
Maize	10.8	4.9	4.5	7.0	9.6	6.6	6.3	12.5	15.7
Paddy	17.3	18.8	18.0	22.8	33.7	29.4	42.7	39.4	34.1
Upland rice	4.0	4.0	2.8	4.2	3.7	2.6	1.8	4.7	4.2
Swamp rice	10.9	10.5	10.5	14.8	25.9	17.5	25.3	27.9	25.0
Irrigated rice	2.4	4.3	4.7	3.8	4.1	9.3	15.6	6.8	4.9
Total cereal production, gross	55.9	45.2	44.1	51.0	77.0	53.6	79.3	96.1	96.2
Cotton	-	0.3	0.8	1.2	0.9	0.9	1.4	2.6	2.4
Groundnut	145.2	141.3	143.2	100.0	133.4	66.9	60.2	108.9	118.9(**)

Source: 1974/75 to 1978/79 revised figures of CSD and PPMU;
1979/80 to 1982/83 annual surveys conducted by the Agricultural Statistic Section of the PPMU. Table computed by the PPMU (23.3.83) and for groundnut and cotton, PPMU (24.11.82)

(*) Provisional figures

(**) The latest estimate for groundnuts production for 1982/83 is 150,000 metric tons

TABLE 6

Estimated Yield for Main Rainfed Crops
(kg/ha)

Years	G'nuts	Cotton (seed)	Maize	Sorghum	Millet (early)	Millet (late)	Rice Upland
1974/75	1,385	-	2,004	697	1,135	710	543
1975/76	1,429	650	1,104	766	561	591	534
1976/77	1,329	735	1,129	883	660	791	373
1977/78	949	500	1,131	672	668	494	387
1978/79	1,256	506	1,396	876	954	671	904
1979/80	986	904	1,228	759	941	752	537
1980/81	874	608	1,068	958	898	853	1,200
1981/82	1,349	1,034	1,645	1,079	1,270	1,271	1,129

Source: PPMU Agricultural Statistics Division
25th November, 1982.

- rice grown in brackish water marshes, subject to tides, which are located close to the estuary and on mangrove lands where desalination through the action of rain is necessary before sowing, and

- rice grown on the river banks in relatively small areas using irrigation water pumped from the river(1).

Between 1974/75 and 1980/81 rice production varied between 18,200 tons (milled) and 23,000 tons (milled). In 1978, 9,900 tons of paddy were produced on the 2,200 hectares of land irrigated by pumping equipment, i.e. an average yield of 4.5 tons per hectare, in general from an annual crop. Attempts to introduce double cropping in the irrigated areas has seldom achieved a cropping intensity greater than 1.1. During FYP I the target of reaching, but also limiting irrigated rice production, so as to contain saline intrusion, to 3,000 hectares was reached. Pending the further irrigation of 400 hectares at Jahally and Pacharr which is considered to be technically feasible prior to the construction of the salinity control barrage at Yeletenda and irrigation development subsequent to it, rice production depends upon the various rainfed and swamp rice systems referred to above. (The Jahally and Pacharr rice

(1) LRS 22, but the RDP/ADP Preparation Report (1979) envolves a further elaboration of "Swamp" and "upland rice".

project includes the improvement of 1,000 hectares of swamp land). Available estimates suggest that at present these systems account for about 90 per cent of total rice production although in severe drought years the contribution of irrigated rice is likely to be higher (Table 23).

Industrial and Export Crops

Apart from oil expressing groundnuts, and a small quantity of palm kernels, cotton grown in the Upper River and McCarthy Island Divisions represents the only industrial crop at present. (A small commercial horticultural and fruit enterprise is currently being established, however). Seed cotton, groundnuts and palm kernels (exported unprocessed) are handled by the Gambia Produce Marketing Board (GPMB), the entire production of the former, averaging 800 tons over the seven years from 1974/75, the first year of the project, to 1980/81, or just over 1,000 tons in the last three years of this period, being exported.

While the bulk of groundnut production is exported as nuts or oil, and represents the most important source of export earnings for the whole economy as indicated in the Introduction, groundnuts are also an important element in the local diet of the whole population. No very reliable statistics of total production or of local consumption are available, whereas the annual deliveries to the GPMB are fully documented. For the current year, however, while purchases are estimated (pending delivery) at 127,000 tons, total production is thought to amount to about 150,000 tons. About half the difference of 23,000 tons probably reflects local consumption, and post harvest loss, the other half seed, although, with cross border trade taking place on an informal basis, depending on relative prices in The Gambia and Senegal, the annual relationship between deliveries and Gambian production may vary by several per cent.

Other crops

Dunsmore (1975) notes that of the fifty annual and perennial crops then produced in The Gambia, only millet, maize, rice and sorghum, cotton, cashew and limes, groundnuts (oilseed and confectionary - the latter in very small quantities), cassava and vegetables are of major significance. The Gambia Food Strategy Report (1981) added that from a nutritional point of view, some minor crops, including indigenous dark leaved vegetables (local spinach) may be important and that a study of the local food markets in urban areas may suggest that the collective value of the various condiments on sale is greater than appears to be the case.

No quantitative data is available on cassava production, but the Food Strategy Report notes the spread of cassava, particularly in the Lower River Division, as a possible response by farmers to market conditions in Senegal and drought

conditions in The Gambia in recent years, but, conversely, that in the same period there had been a marked increase in maize production, a crop less drought tolerant than sorghum and millets and much less so than cassava. At that time, yields of the latter, generally thought to be lower than in other parts of West Africa, were suffering from virus mosaic and mealybug.

No estimates of production are available for horticultural crops but, as already observed, they are widely grown in the rural areas, particularly where supplementary water is available, and around Banjul a significant amount of vegetables, and some fruit, is being sold to hotels serving the tourist industry and to the growing urban population.

1.1.5 Regionalisation of Production

There are no marked divergencies in the range of crops grown in the different administrative Divisions, with the exception of rice and cotton (Section 1.1.4). There are considerable differences, however, in the proportion of land under cultivation (Table 19) and in the area and production of the main crops (Annex 1).

The main distinction is between the upland and riverain areas and, in the case of the latter those which are saline and those which are not. Thus irrigated rice production is centred in MacCarthy Island and Upper River Divisions (see map on page i) where the River Gambia is fresh all year, and where some 2,500 ha of irrigated land was developed between 1966 and 1979 with the assistance of three separate externally funded aid projects. Cotton production is currently confined to the Upper River Division and adjacent parts of the MID, because this area was chosen for the location of an intensively supervised area development project, complete with ginnery, which was financed by the African Development Bank, the first crop being produced in 1975/76. Available records indicate that in this Division the rainfall is slightly lower than average and cotton was conceived of as a relatively drought resistant cash crop with a sufficiently high value/weight ratio to absorb the transport costs from up-river. On the other hand, the planting rains generally begin two weeks earlier in the URD(1). The original cotton targets of acreage and production were not reached in FYP I, but there is currently a proposal to extend the project to more farmers in the two Divisions who wish to take part. (Cotton is included in the proposed ADP - see Section 4.3.3).

As is normally the case with truck crops, horticultural production for market tends to be concentrated adjacent to the urban areas, primarily Banjul, but the production of fruit and vegetables for local consumption is widespread, although there is thought to be considerable scope for expansion, particularly where supplementary water is available.

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(1) Annex 2.

1.1.6 The Evolution of Production

According to Colonial records at the turn of the century, groundnuts were the main source of cash income for the local population; some rice was being grown but even so rice constituted the principal item of import, and locally produced cotton was being woven into cloth of fine quality.

Until the 1974/75 crop season, however, when the annual sample surveys commenced, data on acreage and production of the main crops were not available. Even from this point a confusingly wide range of figures have been issued and utilised for various purposes so that inconsistencies frequently occur between different reports.

The growth in the estimated production of groundnuts, rice, sorghum and millets, seed cotton and maize during the first Five Year Plan as compared with plan targets is shown in Table 7 in accordance with data made available for the Food Strategy. Except in the case of maize, which was adopted by the farmers themselves in response to incentive prices offered by the GPMB, and for which no targets were included in the plan, production in most cases was well below the levels projected. The effects of adverse climatic conditions during the period have already been referred to, and other contributing factors are discussed later in this report.

During FYP I, (1975/76-1980/81) therefore, according to this data, the growth rate in the production of the main crops was generally below that of the population, estimated to be increasing at the rate of 2.8 per cent. However, the PPMU (March/April 1983) has now produced a new set of production data which presents a substantially different scenario for food crops, as shown in Table 5. The production of groundnuts and cotton during FYP I remained well below target, but the revised figures for rice and other foodgrains presents a generally more promising picture of achievement during FYP I, and subsequently. The implications in terms of improved self-sufficiency in foodgrains is discussed in Section 1.4 (See particularly Table 22). The latest estimates on the area under cultivation are shown in Table 4, the decline in total area in the three years 1979/80 to 1981/82 being largely a reflection in the area under groundnuts, the estimated total area in 1981/82 being almost exactly the same as in 1974/75. The area under groundnuts in 1982/83 has undoubtedly recovered, however, in the light of the production estimate of 150,000 tons for this year.

The FYP II projections of agricultural production for the period 1981/82 to 1985/86 are reproduced in Table 8. In these it is assumed that the cropping pattern will remain essentially unchanged and, in order not to project an unduly optimistic scenario, the probability of an erratic weather pattern, normally to be expected in The Gambia over a five year period has been taken into account in the development plan. Groundnut production was projected to increase from 110,000 m.t. at the beginning of the Plan to 135,000 m.t. by 1985/86, an

TABLE 7

Production Targets, First Five Year Plan Compared with Estimated Actual Production

'000 tons

Crop	1974/75		1975/76		1976/77		1977/78		1978/79		1979/80		1980/81
	Plan	Actual	Plan	Actual	Plan	Actual	Plan	Actual	Plan	Actual	Plan	Actual	Actual (2)
Groundnuts (un-decorticated(1)	185	156	137	151	140	142	150	95	165	167	180	82	77
Rice (milled)(3)	20.8	18.2	23.8	23	27.3	21	31.3	18	35.9	23	41	19	26
Sorghum and Millet(3)	47	56	50.2	49	53.7	38	57.4	44	61.4	69	65.5	32	41
Seed Cotton(3)	.27	.22	.45	.29	.75	.76	1.26	1.15	2.1	.85	3.5	.94	1.35
Maize	-	8.9	-	5.8	-	5.6	-	8.7	-	13.3	-	6.6(4)	6.3(4)

Sources: (a) First Five Year Plan
(b) "Brief Review of the Agricultural Sector 1974/75-1979/80" PPMU 1980 (Revised)
(c) Country Economic Memorandum, IBRD, 1980
(d) Cotton Project Memorandum, Ref. AD/CROP.3/(7)-81, January 1981

(1) Plan targets for groundnuts appear to correspond to GPMB purchases; actual production would be higher

(2) Provisional

(3) Production targets 1975/76 to 1978/79 interpolated on basis of fixed annual percentage

(4) Figures for 1979:80 to 1980/81 for maize from PPMU (24th November, 1982)

annual growth rate of 5.3 per cent, and cereal production (including milled rice) at an annual growth rate of 4.6 per cent. The revised estimate of total cereal production (gross) by the PPMU for 1981/82 (23.3.1983) is 96,000 m.t., however, Table 5. Without allowing for the conversion of paddy to milled rice, a growth rate of 4.6 per cent would imply a target of 115,000 m.t. by 1985/86. Basing targets on previous performance in a single year is not sound practice, however.

In summary, the revised figures for the production of cereals by the PPMU (Table 5), indicate that during the last three years (1980/81-1982/83) there has been a substantial increase in the majority of food grains. The growth of cotton is still below expectations, although also showing a marked increase during the past three years. Groundnut production for 1982/83 is above the level of 145,000 tons for the first time since 1974/75.

1.2 THE TECHNOLOGIES USED

1.2.1 Improved Seeds

The provision of improved seeds has long been seen in The Gambia as an important element in the promotion of higher yields. Only in recent years, however, has a concerted effort been made to select and test new varieties for their suitability in Gambian conditions and to develop a local seed multiplication and distribution system under the guidance of a National Seeds Council (NSC) first convened in January 1980.

In the case of early and late millet, farmers are accustomed to using indigenous varieties, long established in the region, and with a considerable amount of cross-border traffic, there has been a good deal of admixture with seed imported in this way from Senegal. Much the same position existed with sorghum until recently. Since 1973 efforts to identify improved varieties of sorghum, millet and maize have been intensified (Section 2.3.1). The current new varieties of millet have not been proved sufficiently disease resistant; the sorghum variety Naga White proved to be unpalatable, and for both crops further research and field testing is required before the replacement of existing seed on a large scale can be undertaken. In the case of maize two high-yielding varieties (NCB and Njeka) are available to farmers as a result of trials carried out at SAPU on cultivars obtained from the West African Maize Testing Programme and the International Institute of Tropical Agriculture (IITA). The USAID supported Gambia Mixed Farming and Resource Management project will now include the issue of the NCB seed as part of a package to farmers taking part in the feed grain production programme.

The groundnut variety grown by the majority of Gambian farmers is Senegal 28-206. As a fairly old stock of the variety, there is a possibility of declining viability and, unless

TABLE 8

PROJECTIONS OF AGRICULTURAL PRODUCTION
1981/82-1985/86

('000 Metric tons)

	1981/82	1982/83	1983/84	1984/85	1985/86	Totals
Groundnuts	110.0	127.0	130.0	132.0	135.0	634.0
of which, available for purchase	93.0	111.0	114.0	115.0	118.0	551.0
Cotton	1.6	2.0	2.5	3.2	4.0	13.3
Cereals						
Sorghum	14.4	14.7	14.9	15.2	15.5	74.7
Millet	18.2	18.5	18.8	19.3	19.9	94.7
Maize	8.2	8.3	8.6	9.0	9.8	43.9
Findo	1.3	1.3	1.3	1.4	1.4	6.7
Rice (paddy)	36.4	36.9	42.6	45.2	48.5	209.6
of which, rainfed rice	24.6	24.8	25.2	25.3	25.6	125.5
irrigated rice	11.8	12.1	17.4	19.9	22.9	84.1
Total cereals (including rice as milled)	65.8	66.8	71.3	74.4	78.8	357.1

Source: From Table 1, Chapter 13 of the Five Year Plan 1981/82-1985/86.

Note: The basic assumptions used in making the above projections are discussed in section 2.1 of Chapter 5 of FYP II the Macro-economic Framework. The specific annual rates of growth used in projecting the area planted under each crop are the following: groundnuts 1%; sorghum, millet and findo 1.5%; maize 2%; intercropped millet 1%; rainfed rice 1%; irrigated rice 2%. The incremental production attributable to the Agricultural Development Project as of 1983/84 has been added to the production thus projected.

planted in time, there is a tendency for this longer (120 day) maturing variety to suffer from Cercospera infection unless the seed is dressed by farmers. A current programme run by the GPMB is for farmers to be given a free bag (50kg of fertiliser) for every two bags of groundnuts deposited as seed in the village store where it can be treated against stored pests, mainly the Bruchid beetle (Caryedon serratus). Farmers traditionally retain their own seed requirements from the previous harvest. During FYP I three separate programmes were in operation for supplying seed to farmers. First the groundnut seed supply scheme run by the Gambia Co-operative Union (GCU) and the GPMB provided about 3,000 tons of uncertified seed per annum to farmers who had not retained enough seed from the previous season. The quality of such seed was not generally better than the farmers own seed. Second, the Seed Multiplication Unit at Sapu, funded largely under the RDP, supplied certified seed of rice and groundnuts to farmers. As a result of various teething troubles, neither the quantity nor the quality of groundnut seed was up to expectations.

Rice seed production at Sapu in general met with fewer difficulties, seed being multiplied for mangrove rice and irrigated and rainfed rice and issued through co-operatives and the rice schemes of the Department of Agriculture and the women's programme. Several new higher yielding, fertiliser responsive, varieties have been bulked/multiplied and are being extended to farmers, although seed with satisfactory tolerance to cold, to which the existing Asian derived varieties are ill adapted, and to saline conditions has yet to be available in sufficient quantities. The capacity to bulk rice seed for a wide range of different ecosystems is more limiting in fact than the isolation of appropriate varieties, and this situation has been compounded by the consumption of much of the released seed by farmers - a problem which can only be overcome through extension.

The following varieties have been introduced: IR 22, Aiwu and Ikong Pao for the irrigated zone; IR 442 for shallow flooded swamp and 3025 for free-draining hydromorphic conditions (all short duration rainfed varieties); IR 28 for cold tolerants, suitable for irrigated conditions; PharCom En a long duration, cold and saline tolerant variety, and Rok 5, a short duration variety for mangrove and deep flooded swamps.

The third programme, based at Basse, involved the multiplication of cotton seed originally imported from Senegal for issue annually to farmers involved in the cotton production project. First multiplication from breeder's seed is supervised by the Upland Agronomy Unit at Sapu.

There is a strongly held view that deficiencies in the quality and quantity of seed available to farmers has been an important factor contributing to the recent decline in groundnut production and that, in the case of all crop improvement programmes, the establishment of an effective seed multiplication and distribution facility is an essential element.

By 1981, the Seed Multiplication Unit (SMU) at Sapu had developed the capacity to produce about 450 tons a year of certified groundnut seed, adequate to produce about 3,000 tons of improved seed from contract growers and allowing for the replacement of farmers' seed every five or six years. Due to inadequate funding, however, the improved seed grown in 1981 by contracting farmers from certified seed could not be purchased by the SMU and, as a result, was marketed along with commercial purchases. To avoid a repetition in 1982 and, in fact, the collapse of the SMU and associated research at Sapu pending commencement of the Agricultural Development Project (ADP) in 1984, a rescue operation was put into effect with bi-lateral aid (Section 4.3.6).

Trials on other groundnut varieties developed in Senegal are being continued but, meanwhile, government is standardizing at the SMU at Sapu on the Senegal 28-206 variety. An outstanding question remains to be settled with regard to Philippine Pink, hitherto produced in small quantities by Gambian farmers and enjoying a premium as a confectionary nut after hand sorting by the GPMB. This 90 day variety, although lower yielding and with lower oil content, has been of value to farmers when planting rains have been late, or first plantings have failed, and in a study commissioned by the World Bank in 1981, it was recommended that government should arrange for the multiplication of a modest amount of this seed at Sapu and for a reserve to be available each year for issue to farmers when required. The logic of such a proposal is persuasive, but to implement it will place an additional burden on the SMU and upon the seed distribution system.

1.2.2 Fertilizers

Table 9 indicates the rapid growth of fertilizer use during the FYP I, in which process the FAO Fertilizer Programme played an important part.

Fertilizer subsidies were also maintained at a high rate, however, as indicated in Table 10.

Indicative estimates by the PPMU and incorporated in the Food Strategy Report ascribe the following incremental groundnut production to the use of single superphosphate (Table 11). Since groundnut production in recent years had fallen well below the average achieved for many years when chemical fertilizers were not in use, it was pointed out that the increment may represent what might otherwise have been an even more serious fall in production. At the prices prevailing during FYP I, the use of phosphate fertilizer on groundnuts was very profitable to farmers. However, at 1981 prices, single superphosphate was subsidised by more than 70 per cent from the nearly exhausted Price Stabilisation Reserves of the GPMB and steps since have been taken to reduce the level of subsidy: SSP being raised to D 160/t, compound (26-14-0) to D 200/t, and Urea (used largely for cotton) to D 250/t, in August 1982.

TABLE 9

Fertilizer Distribution in The Gambia
1973/74-1980/81

(Tons)

Year	Single Superphosphate	Compounds	Urea	Total
1973/74	1,549	344	-	1,893
1974/75	1,777	1,100	-	2,877
1975/76	2,714	1,096	-	3,810
1976/77	3,228	704	-	3,932
1977/78	4,913	1,708	507	7,128
1978/79	5,142	3,118	165	8,425
1979/80	3,463	2,436	16	5,915
1980/81 (Est.)	5,500	4,500	50	10,050

Source: Adapted from "Fertilizer Marketing and Credit Assistance" IFS/GAM/001, Annual Report, August 1980, page 30, Table 2. Data lagged by one year to reflect season of application to the crop.

TABLE 10

Fertilizer Subsidies 1972/73-1980/81

Year	Single Superphosphate prices		Compound Fertilizers(1) prices	
	CIF D/t(2)	farm-gate D/t	CIF D/t(2)	farm-gate D/t
1972/73	137.00	90.00	202.00	110.00
1973/74	159.20	90.00	248.00	110.00
1974/75	357.00	90.00	526.00	110.00
1975/76	284.40	106.00	390.80	134.00
1976/77	260.00	106.00	320.00	134.00
1977/78	247.00	106.00	342.60	134.00
1978/79	229.00	106.00	343.40	134.00
1979/80	266.00	106.00	405.00	134.00
1980/81	249.56	106.00	455.20	134.00

(1) Predominantly 20-20-0 in early years; lately 26-14-0.

(2) CIF prices compiled from GPMB records and do not include the incountry handling and transport costs as well as exclude the distribution margins.

Source: IFS/GAM/00I Terminal Report, FAO, 1982

Consideration is also being given to the question of substituting triple superphosphate for single superphosphate. At the 1981 level of consumption it was calculated that this would represent a saving in foreign exchange of over D1m, apart from easing problems of transport and storage as a result of the reduction in weight and volume (about 60 per cent). Trials have therefore been instituted to examine the residual effects, if any, of such a change.

TABLE 11

Approximate Incremental Groundnut Production
Ascribed to SSP Fertilizer Use 1973/74-1980/81

Season	SSP used (tons) (1)	Approx. ha affected ('000)	Approx. yield increase (kg/ha)	Estimate of associated production increase (tons unshelled)
1973/74	1,549	20	200	4,000
1974/75	1,777	23.0	200	5,000
1975/76	2,714	35.0	200	7,000
1976/77	3,228	46.7	224	10,000
1977/78	4,913	58.2	260	15,000
1978/79	5,142	68.6	443	30,000
1979/80	3,147	41.0	100	4,000
1980/81	5,200	68.0	100	7,000

Source: "Brief review of the performance of the agricultural sector 1974/75 to 1979/80"; revised by personal communication during preparation of the Food Strategy Report (1981)

Table compiled from: FAO Fertilizer Marketing Project from GPMB records for fertilizer distribution; Sample Surveys of Agriculture work sheets for hectares affected and approximate yield increases associated with fertilizer use for years 1976/77-1978/79; estimates of PPMU for the other years, based on the sampled years' ratios, in parentheses. See Table II of RDP-II Preparation Report for basic data on fertiliser response.

(1) Differences between some totals in this column and those in Table 9 reflect some fertilizer being distributed but not applied to the crop.

Current Department of Agriculture recommendations for fertilizer use are shown in Table 12. At present levels of consumption, the nearly two-thirds of the total fertilizer used in the form of single superphosphate is sufficient for only about 40 per cent of the area under groundnuts at the recommended rate of 125 kg/ha. The use of fertilizer on cereals is substantially less, although rice, millet, sorghum and maize have shown high responses to modest applications of nitrogen and potash.

TABLE 12

Current Fertilizer Recommendations(1)

Crop	Recommended Rates (kg/ha)	Remarks
Groundnuts	125 Single Superphosphate	Apply before planting.
Sorghum	250 Compound 26-14-0	Apply half at planting and top-dress the rest after 45 days.
Millets	250 Compound 26-14-0	Apply half at planting and top-dress the rest after 45 days for early millet and 60 days for late millet.
Maize	375 Compound 26-14-0	Apply half at planting and the rest three weeks later.
Irrigated Rice	500 Compound 26-14-0	Apply half as basal, one-quarter at tillering and one-quarter at boot stage.
Rainfed Rice	250 Compound 26-14-0	" " " " "
Cotton	150 8-18-27 50 Urea	Apply at first weeding; Apply at second weeding.

(1) Compiled from the crop extension bulletins of the Department of Agriculture. (IFS/GAP/00 Terminal Report)

1.2.3 The Availability and use of Draught Power

Up-to-date and reliable information on the distribution of draught animals by area cultivated in The Gambia is not available(1). Traditionally, cultivation was undertaken with either a long or short-handled hoe and a substantial amount of hand cultivation still persists. During the past twenty years, however, the introduction of oxen for cultivation has been a central feature of government policy and the use of draught animals is now widespread, particularly for primary cultivation. The regional distribution of cattle in relation to the human population (1973) is shown in Table 13.

TABLE 13

Relationship of Cattle to Human Population

Division	Total Cattle	Total rural population	Cattle per Capita
Western	43,212	90,707	0.48
LRD	22,244	42,652	0.52
NBD	45,518	93,536	0.49
MID	99,684	100,818	0.99
URD	82,532	87,074	0.95
Totals	293,210	414,787	0.71

Sources: Population Census 1973 and Department of Animal Health and Production, Report on Cattle Census in Gambia 1977/78, February 1979, p. 3

From the 1974/75 Agricultural Census, which represents the most comprehensive source of information on a national basis, on the ownership and use of draught animals, Mettrick (1978) carried out the most detailed analysis of the ownership and use of draught animals yet undertaken. He points out, however, amongst a number of caveats, that questions about livestock numbers are frequently answered incorrectly in surveys of this type, particularly by the owners of large herds. Thus the estimated total cattle population emerging

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(1) But See Annex 3 for an analysis of the availability of draught animals and equipment by Division from the 1981/82 Sample Survey Report.

from the census was 199,000 whereas estimates based upon the rinderpest campaign produced the figure of 300,000 which is generally accepted in The Gambia. Because the numbers of horses and donkeys owned by each dabada are much smaller and much harder to disguise, it is assumed that these figures are more reliable. Data on the use of livestock for draught purposes was collected from a sub-sample and may also be more reliable.

Table 14 reproduced from Mettrick's report shows the percentages of all dabadas using oxen, horses and donkeys for cultivating groundnuts, sorghum and millet. Reading vertically, the categories are not exclusive; thus a farmer amongst the 31 per cent using oxen just for ploughing may also use horses or donkeys. Although 65 per cent of dabadas use some form of animal draught, only 33 per cent use oxen for cultivation whereas 13 per cent use horses and 27 per cent donkeys. The Social and Economic Survey Unit's report for 1979 estimates that in the RDP I area covered (1,600 compounds in eight Districts) 78 per cent possessed some sort of draught power which, since some compounds include more than one dabada (defined by Mettrick as a ploughing unit), is not out of line with the results of the 1974/75 Agricultural Census. The Department of Animal Health and Production's Cattle Census of 1979 records a total of only 17,670 work oxen amounting to 6 per cent of the total cattle population, plus 7,236 bullocks from which some additional work oxen could presumably be drawn. Data on the regional distribution of draught animals in the 1974/75 Agricultural Census and the 1979 (DAHP) Cattle Census require a degree of reconciliation that cannot be attempted here and regional data is not, therefore, included. However, Table 15 shows the regional breakdown of animal draught power use in groundnut production based on the 1974/75 Census.

The Agricultural Census data for The Gambia as a whole showed 61 per cent of the dabadas to be without cattle; 44 per cent without cattle, horses or donkeys, and therefore 17 per cent without cattle but with horses and/or donkeys. An analysis of recent data from the 1981/82 sample survey is included in Annex 3. All available information, however, points to a considerable amount of lending or hiring. Some light on the ownership and use of donkeys and horses in conjunction with groundnut seeders and the question of sharing is provided in a survey by the International African Institute in a sample of 107 work units in the Lower River Division(1). There, 48 per cent of the work units sampled owned the animals and equipment in question, but 78 per cent made use of them.

The scope for increasing the cattle population beyond the current estimated level of 300,000 is limited by the carrying capacity of the land. The prospects for spreading the

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(1) Village Food Systems in West Africa. Food Supply: Gambia, IAI London 1981.

TABLE 14

Percentage of Dabadas Using Oxen, Horses and Donkeys for Ploughing, Sowing and Weeding

	Ploughing only	Sowing only	Weeding only	Ploughing and Sowing	Ploughing and Weeding	Sowing and Weeding	Ploughing Sowing and Weeding	Total
GROUNDNUTS								
Oxen	31	1	(*)	1	1	(*)	1	33
Horses	2	5	(*)	3	(*)	2	1	13
Donkeys	1	16	(*)	3	(*)	4	2	27
MILLET								
Oxen	18	(*)	(*)	(*)	1	(*)	(*)	20
Horses	3	1	2	2	(*)	1	(*)	8
Donkeys	1	3	3	1	(*)	2	(*)	10
SORGHUM								
Oxen	10	(*)	(*)	(*)	(*)	(*)	(*)	10
Horses	3	1	1	1	(*)	1	(*)	6
Donkeys	1	3	1	(*)	(*)	1	1	7

(*) Less than 0.5 per cent.

NB Categories reading vertically are not exclusive. However, within crops most mixed categories are negligible, except that 3 per cent use both horses and donkeys for sowing.

Totals are not equal to the sum of items due to rounding errors.

TABLE 15

Percentage of Dabadas Using Animal-Draught for Ploughing, Sowing and Weeding Groundnuts by Region

Region(1)	Ploughing	Sowing	Weeding
	%	%	%
2	50	7	0
3	33	20	0
4	29	57	24
5	20	53	4
6(*)	49	58	20
7	77	10	4
THE GAMBIA	43	35	10

Source: Mettrick op. cit. p. 59

(1) Region 2, Brikama; 3, Mansakonka; 4, Kerewan; 5, Kuntaur; 6, Georgetown and 7, Basse.

ownership and use of draught oxen has thus been seen to depend largely upon redistribution. In the RDP I project undertaken in FYP I, therefore, credit was provided for the purchase of 2,200 pairs of oxen, although Table 16 shows that for the years 1978/79 to 1980/81, only 47 per cent of the disbursement was on target. The RDP I project (incremental benefits assigned to livestock in the Staff Project Report) included a substantial increase by year five of 58 per cent in steers, 3-4 years of age, from which draught oxen could presumably be drawn, although the particular section of the report is concerned with the incremental output of meat. It is by no means clear to what extent cattle for beef and for draught power are in competition, although draught oxen may finally end up as meat. The 1974/75 Agricultural Census (Mettrick, Table 13) reveals an overall ratio of bulls and oxen to total cattle of 22.3 per cent. Data are not available to determine whether the national herd composition is changing to reflect the increasing use of animal draught power and hence to increase the availability of work oxen (including bulls, some of which are also used for draught purposes): nor is it clear that current programmes for live-stock development are adequately co-ordinated to secure the simultaneous achievement of crop and meat production goals.

TABLE 16

Draught Power Inputs RDP I

(A = Actual, E = Estimated target)

Oxen and Implements	1978/79		1979/80		1980/81		Total and %		
	A	E	A	E	A	E	A	E	%
Hoes	667	391	314	844	594	715	1,575	1,950	81
Seeders	1,038	391	294	844	512	715	1,844	1,950	95
Carts (Ox)	272	391	208	844	571	715	1,051	1,950	54
Oxen (head)(*)	491	666	60	1,434	1,020	1,216	1,571	3,316	47

(*) Ox distributions were in fact expressed in pairs, not in units, one being provided on credit on condition that one was bought. This was not strictly adhered to for obvious reasons.

Source: RDP Evaluation, 1980, Key Indicators (Annex 3), reproduced from the Food Strategy Report (1981).

Animal draught power in The Gambia has been developed almost exclusively for upland crops, primarily for groundnuts. Swamp rice, largely produced by women was therefore bypassed. Some experiments have been undertaken but it is as yet unclear if the small N'Dama cattle can be used satisfactorily on the heavier alluvial soils, bearing in mind that an excessive work load may cause a breakdown in trypanosome tolerance. The utilisation of horses and donkeys on such soils is also a doubtful proposition in view of their small hooves.

For nearly thirty years following the introduction of the ox training schools in the early 1950s, the development of animal draught power by Government was seen essentially in terms of oxenisation. Farmers, however, have gradually acquired increasing numbers of horses and donkeys derived from neighbouring Sahelian countries, particularly during drought years, for both field operations (largely sowing and weeding, see Table 14) and for transport. Only very recently has attention been given to this trend in government programmes to provide equipment, although farmers themselves have frequently taken the initiative to secure suitable items from Senegal, e.g. donkey-drawn carts. It was also seen essentially as a means of primary cultivation

and for this purpose was based upon the use of the Emcot ridger for groundnuts, which was rapidly adopted by farmers, and is still widely used. In recent years, however, recognition has been given to the need for an implement package adaptable to other operations, which is not the case with the Emcot ridger. Following a lengthy period of experimentation with a multi-purpose tool frame, the Aplos, which did not prove suitable for Gambian requirements, the Department of Agriculture has now centered its animal drawn package around the Sine hoe multi-purpose toolframe manufactured in Senegal, which has been thoroughly tested. The Five Year Plan (FYP II) for 1981/82-1985/86, in the section dealing with agriculture in the chapter on science and technology (Chapter 10) states that:

> "An appropriate multi-purpose package (utilising animal-draught), suitable for performing the most critical farming operations, has now been introduced by the Agricultural Engineering Unit after research and development lasting several years".

The Food Strategy report, however, drew attention to the failure of government programmes on animal draught power to address the needs of women growing upland rice and other crops, despite the fact that the Siscoma (now Sismar) houe occidental package for rice (seeder with rice seed plates, single mould-board plough and 3-tine weeder) is available in Senegal. This package drawn by two donkeys and operated by women was tested by a voluntary agency (Action Aid) on rainfed rice in 1980 with satisfactory results and extended in the following year. Further research on it is now being carried out by the Agricultural Engineering Unit of the Department of Agriculture.

Only a very small number of privately owned four-wheel tractors are in use in The Gambia - occasionally provided on credit - and little information is available on their utilisation, although it is clear that their owners depend primarily upon contract work if there is to be any hope of amortizing the capital cost. The main ingredient of Government sponsored tractorisation in the country has been upon rice production and, although the programme has been heavily subsidised (and therefore of dubious viability in financial or economic terms) women's rice production has benefitted from it. The power tiller service provided by the Department of Agriculture during FYP I, based upon Sapu, utilising an assortment of equipment inherited from irrigated rice projects in the area supported by Taiwan, the World Bank and China, supplemented by a consignment of tillers and equipment from Korea, was designed to serve the 2,500 ha of irrigated land developed during the course of these projects. To ensure an adequate and timely service, some 144 tillers are estimated to be required, but in 1980 of the 202 tillers in the country only 89 were in working order. Since then, through lack of funds for spare parts and maintenance, the position has worsened. The FYP II document makes no mention of the future of this unit.

The Department of Agriculture also provides a four-wheel tractor ploughing service which in FYP I covered about 2,000 ha per year (2,350 in 1980), mainly of rainfed rice, a service of considerable value to women farmers. In the 1980 season 31 tractors were in working order, but the number has subsequently fallen, once again through the lack of adequate spare parts and maintenance, so that currently only 17 are operational.

Other machinery of importance to farmers are pedal threshers for rice, of which only small numbers are available in The Gambia, and facilities for milling coos at village level, for which recommendations were made in the Food Strategy report.

1.2.4 Land Use Management

No major schemes for the planned utilisation of land for agriculture, forestry or animal production have been undertaken in The Gambia, the only agricultural projects involving land development being the relatively small irrigated rice projects already referred to in MacCarthy Island and Upper River Divisions. (The first attempt in this area was in fact undertaken in the Jahally swamp in 1949 by the then Colonial Development Corporation which set up a commercial scheme known as the Gambia Rice Farm, which was abandoned after 3 years and an expenditure of £600,000).

Similarly, there have been no major programmes in soil conservation, although the banning of charcoal production in 1980 is considered an important element in combatting the decline in forest reserves, and the increased use of fertilizer is seen as the main way of reducing the extension of shifting agriculture into forest areas, which in many cases are marginal for crop production. Such agricultural extension staff as are trained, however, have received some instruction in the basic elements of anti-erosion techniques in farming, e.g. ploughing on the contour, avoidance of undue soil pulverisation, etc. (particularly important where tractors are in use), and are in a position to advise farmers and operators accordingly. The training of a small cadre of graduates in the specialised skills of land resource management was included in one externally aided programme during FYP I, but there is some doubt whether the establishment of a sophisticated unit for land use planning, photo-interpretation, mapping, etc. within the country accords with priorities in a situation where resources are very tightly constrained, and are likely to be so in the forseeable future(1).

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(1) Training to develop an appropriate capacity to utilise data derived in the course of externally supported land resource studies and to promote wider use of conservation planning and practice is included in the USAID funded Soil and Water Management project (Section 4.3.7).

During FYP I, the Forestry Department undertook various extension programmes, e.g. to discourage bush fires and to protect the natural flora and fauna, including the National Tree Planting Programme launched in 1978. In 1980, a pilot village woodlot project was started, and the programme is to be expanded during FYP II.

1.2.5 Plant Protection

The Crop Protection Department (CPD), previously the Crop Protection Service (CPS) of the Department of Agriculture, is responsible for plant protection as well as pest control in stored products and for phytosanitary control (see also Section 2.3.5). Traditional methods of plant protection by farmers include bird scaring and the destruction of nests, the practice of mixed cropping, and the preclusion or destruction of insects, rodents and other pests by physical means. With the advent of chemicals, whose use has grown substantially in recent years, the role of the farmer has been increasingly supplemented by that of government. While farmers play an important part in the identification of pests and the level of infestation justifying action by the CPD, e.g. in spraying, since the introduction of a free service the possibility exists that spraying may be resorted to when not fully justified on economic grounds. Proposals are now under consideration whereby farmers will pay towards the cost of this service which may reduce the amount of chemical spraying but not, it is to be hoped, when it is needed.

Reports by the CPD document the wide range of pests affecting field crops (and stored products), but the development of crop loss assessment is still in its infancy and requires further follow-up as a basis for determining more accurately the economic significance of losses by specific vertibrates, insects, bacteria, fungi, and viruses so as to concentrate control measures in priority areas and to assist in devising effective systems of integrated and more cost-effective control. Adaptive research plays an important part in the activities of the Department, ranging from experiments in bird scaring, baiting and netting (carried out in co-operation with OCLAVAV) to time of planting trials(1).

The spray teams at Divisional level (6 in number in 1980) plus one research team based at Sapu, constitute a major component of crop protection. Vehicles, spraying and dusting equipment, and a variety of chemicals (as well as current training scholarships for senior crop protection personnel) are

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(1) Entomology time-of-planting trials at Sapu on maize (19.6.82) were destroyed by monkeys due to the absence of a night guard. Bush pigs and hippopotami are other mammals which cause severe damage, particularly to rice.

funded primarily through the USAID-sponsored Regional Crop Protection Project. In 1981 (July to November) out of 2,416 ha of all crops surveyed by the CPD field inspectorate, 1,340 ha were treated(1).

The reduction of food losses in stored products - primarily groundnuts and cereals - is the responsibility of a separate section of the CPD. Produce loss assessment has only recently been given more attention so as to identify more precisely the occurrence and characteristics of losses at different stages from field to final destination, including transport, handling and storage. Quality control is particularly important for the main export crop, groundnuts, in which the CPD collaborates with the GPMB in conducting regular sampling, and also in the case of seed. The 1981 report of the Stored Product Section of the CPD recorded 108 inspections during the year with 23 treatments to produce and storage structures, apart from the routine treatment with Actellic dust to trade groundnuts by the GPMB at depots and buying points throughout the country, and treatment of seed nuts in store (a total of nearly 60,000 bags at village stores in 1981).

Both the difficulty, with the existence of a largely open border, and the importance of phytosanitary control is illustrated by the introduction of cassava mealybug (Phenacoccus manihoti) from South America to Africa in 1970, and then from Senegal to The Gambia in 1979 by a farmer who unknowingly imported some infested cuttings. By the end of the season the infestation was reported to have spread to the entire Western Division, despite attempts to control the pest with insecticides. The only solution apparent at present is to uproot the entire crop, burn the leaves, stems and residues and ban the cultivation of cassava for two successive years after which to plant imported disease-free material, multiplied for distribution under strict pest control. The Department's produce inspection work has also increased in volume and importance as a result of the increase in food imports, including food aid.

1.2.6 Impact on Production and Productivity

The impact of improved seeds, available at the right time and used correctly, has been seen as offering, generally, an increase in yields of 10 per cent or more. In the case of groundnuts, the use of improved seed from Sapu is thought to provide a larger increment as the viability of the seed currently in use is suspect. (Farmers customarily plant at the rate of 150 kg/ha instead of 125 kg/ha recommended where better quality seed is in use). The new composite maize introduced from Nigeria is expected to yield at a substantially higher rate, but much of the gain depends on fertilizer use (and/or the greater use of animal residues).

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(1) Contribution of the Field Inspectorate to the CPD Annual Report for 1981/82.

Adequate data is not available to judge the value of new seeds under farmers' conditions, since the majority of experiments assume the use of fertilizer, and it is doubtful if the cost and administrative problems involved in providing new seed could be justified without the use of fertilizer on a substantial proportion of the crop area. The yield response to fertilizer has already been referred to in the preceding section (Table 11 in the case of groundnuts). As was pointed out there, in circumstances where total production is falling, it is doubtful to attribute a specific increase in production to the use of fertilizer, although it certainly contributes to the production and productivity of the particular land upon which it is used. Where there is a problem of stagnating or declining productivity, as is the case in The Gambia now that the pressure on land has drastically reduced the period of fallow, the use of fertilizer in maintaining soil fertility and thus avoiding further falloff in yields and total output, has to be taken into account in the balance sheet. There is also the question of raising the productivity of labour, which may be substantially improved by an increase in yields if the relative prices of fertilizer and farm produce are favourable. This may be particularly important in the case of groundnuts and rice where the labour inputs per hectare are higher (estimated at 114 man-days for the former and 101 for the latter) compared with coos (90 man-days) and somewhat less for maize. The impact of higher yields arising from fertilizer and improved seeds in terms of foreign exchange are clearly important in the case of groundnuts and rice in particular but, as with farmers' incomes, the net increment depends on relative prices - in this case on world markets - as well as on the incremental yield. Detailed calculations are not available but there seems little doubt that even at commercial prices (some fertilizer having been donated under the IFSS), the import bill for fertilizers has been more than covered by foreign exchange earnings on groundnut production attributable to their use and from import savings on rice.

No assessment has been made of the impact of tractorisation in The Gambia. It is generally accepted, however, that tractor ploughing, i.e. land preparation, does not of itself increase yields, unless it enables more timely planting to be carried out. It will generally increase production, moreover, if it enables a larger area to be cultivated. There is some evidence that both these objectives have been achieved to some extent in The Gambia. The cost, however, has been very high. In the case of the power tiller service based on Sapu, the Food Strategy postulated that with the gross margin per cultivated hectare of irrigated rice (4 tons at D463 per ton) rice farmers could well afford to bear a much larger proportion of the cultivation costs per hectare, then calculated at D370 per hectare, against current charges of D37, i.e. a subsidy of about 90 per cent(1). For the country as a whole, however, the value of the rice produced under irrigation should be related to that of imported rice which, c.i.f. Banjul is substantially cheaper, the GPMB being generally able to import "broken" rice at a substantial discount. Since the power tiller service has

(1) A detailed internal report to this effect was subsequently submitted by the PPMU (1981).

been steadily deteriorating over the past four years through the lack of replacement machines, spare parts and maintenance, it should be possible to identify what effect this has had on rice production from the areas served. Unfortunately, no analysis has been carried out and the available indications are inconclusive. Much the same applies to the four-wheel tractor service for upland crops in which tractors and implements are hired on a time basis. Days worked fell from 1,657 in 1980 to 375 in 1981, recovering somewhat to 636 in 1982 (ten new tractors and implements having been received)(1).

For oxenisation, the impact is particularly difficult to determine. Mettrick (1978) in his attempt to evaluate the impact of oxenisation on production recalls that in the mid-1960s it was frequently stated by official sources that oxenisation resulted in a manifold increase in a farm family's income (which could only come from increased production since costs would, if anything, be higher than with hand cultivation), and that even a five-fold increase was not unusual. There was indeed a rapid increase in groundnut sales to the GPMB in the three year period 1963/64 to 1966/67 from 73,267 to 126,385 (accompanied by an even more rapid increase in fertilizer sales), but this rate of growth has not continued subsequently and, even allowing for adverse climatic conditions, there is little doubt that the effects of oxenisation on farm production, both at individual farm level and in aggregate, were greatly overestimated.

At the conclusion of a careful analysis, however, Mettrick concludes that there is little doubt that the oxenisation programme has produced a substantial surplus to the economy of benefits over costs. Even if no allowance is made for the possible consequences on the attractiveness of farming as a means of earning a living had oxenisation not been introduced, there are no grounds whatever for challenging this conclusion(2).

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(1) Third Senior Staff Conference (Paper Vol. 2), 1982.

(2) In view of a suggestion made in the RDP Project Co-ordinating Committee, to explain poor repayment by farmers of the credit package for animal draught oxen and equipment, that the package did not generate sufficient incremental benefit, the PPMU carried out an appraisal in 1981 based on five alternative models. /"The Use of Animal Drawn Implements in Groundnut Cultivation (A Re-Appraisal of the Costs and Benefits Using Farm Models)", 18th December, 1981/. This analysis indicated, in general, that at prevailing prices, incremental benefits had not been sufficient to enable farmers to fully repay their loans due, inter alia, to: poor rainfall conditions, farm sizes too small to allow optimum utilisation of the implements, given available labour; insufficient fertilizer application; under-utilisation of the implements because of poor knowledge of assembly and techniques, and lack of spare parts and repair facilities, as well as late delivery.

In the case of training, the ultimate test of impact is the change in performance, for which measures are not available. However, in the first year of the pilot scheme to transfer ox/farmer training from the MFCs to villages, more than three times as many men completed the courses in 1977 as in the previous year. (Food Strategy, Part I, Annex I. Project A5). Table 17 compares the number of trainees in 1977/78 and 1980/81.

TABLE 17

Farmer Animal Draught Training

	1977/78	1980/81
Number of trainees	1,652	1,687
Pairs of work oxen	1,325	1,010
Number of donkeys	296	517
Number of horses	30	83

Source: Department of Agriculture, 2nd Senior Staff Conference, 1981.

Note: The figures show clearly the increase in utilisation of donkeys and horses, but the programme as a whole was reported to be inhibited by a lack of credit for the purchase of draught animals and equipment.

There is as yet little quantitative data in The Gambia on crop losses, with or without protection, as a basis for determining the impact of the plant protection programme. In the case of locust control, in which The Gambia is involved on a regional basis, protection must be viewed as a form of insurance in which a high proportion of the entire agricultural output in any one year is at risk. The impact of not having an adequate regional locust control programme could therefore be a disaster.

At national level, preventive measures to reduce bird damage of cereal crops are primarily a matter for individual farmers, although the breeding of varieties of sorghum and millet, in particular, that are less susceptible to bird damage plays a part, as well as the various CPD programmes referred to earlier.

Groundnuts generally suffer less than cereal crops from pre-harvest losses due to pests and diseases. There is no doubt, however, that the dressing of seed against cercospera pays for itself many times over. As yet, however, only a small

proportion of the seed planted annually is dressed. Late harvesting and inadequate drying of groundnuts on the vine after harvest can lead to aflotoxin (A. Flavus) contamination (likewise inadequate post-harvest storage). Remedial measures to reduce aflotoxin contamination at field level are generally well known, but a detailed study was undertaken in 1981 to identify appropriate safeguards right through from lifting to export(1).

Their observance is primarily a matter of extension which will require time and further effort, although available evidence suggests that efforts to contain aflotoxin at levels acceptable to overseas markets are generally successful. There is no room for complacency, however, as the events of 1978/79 demonstrate. In that year the groundnut crop intake by the GPMB had been estimated at 140,000 tons, but due to unusual December rains, considerable damage was caused by aflotoxin to stocks stored in the open and the tonnage processed for export was only 119,000 tons. (If groundnuts become re-wetted so that the moisture content exceeds 9 per cent for any length of time, development of A. flavus or other fungi such as Macrophomina phaseoli is likely to occur).

Crop protection for cotton is in a category of its own, for without a rigorous spraying programme, which it is the participating farmers' responsibility to initiate, there is little likelihood that a cotton project would have been established. The impact and justification for pest control of cotton therefore needs to be looked at, in the context of the project as a whole. There is evidence, judging by observations of boll worm damage, that farmers involved are not all as yet convinced of the importance of timely and regular spraying. The impact of crop protection on this crop is therefore variable.

The impact of this and other measures undertaken by the Department of Crop Protection cannot be entirely divorced from those of the extension service of the Department of Agriculture, and the more so as an integrated approach to pest control is developed.

In the case of post-harvest losses, the 1981 report on Grain Storage, Crop Losses and Groundnut Marketing Study already referred to provides an illustration of the role of government and of the farmers themselves in securing their reduction. The survey team's attention was drawn to the "pot", a hermetically sealed earthenware container made of mud mixed with findo (Digitaria exilis) straw and regarded as a "perfect" system for storing grain, one traditionally used by the Fula and Serahuli people in the extreme east of the country. The pot was found to fully protect grain against insect infestation, rodents and fire. Elsewhere, however, evidence of considerable damage by rodents (mainly Rattus rattus) was observed in village and compound stores, largely as a result of faulty construction. Government measures to reduce rodents through

(1) Government of the Gambia, Final Report: Grain Storage, Crop Losses and Groundnut Marketing Study. Landell Mills Associates. June, 1981.

the use of poisoned bait need to be matched by an extension programme to overcome some of the more obvious deficiencies in the design and construction of current storage structures and their impact must be judged by the extent that this is achieved, along with improved hygiene which is easily carried out but at present neglected.

The problems to be faced in securing a general reduction in food storage losses at village and compound level will not be easily overcome, however. Accounts of labour constraints (35 out of 78 compounds sampled) occurred frequently in the study referred to and, in answer to the question why the grain storage "pot" had now been virtually abandoned, the village elders stated that the skills to make it no longer existed, but that even given the skills, it is a labour-consuming task which no-one now seems prepared to undertake.

1.3 THE POTENTIAL FOR INCREASED PRODUCTION

1.3.1 Expanding the Area Under Cultivation

The scope for increased production through expanding the acreage under cultivation is very limited under current levels of technology. Competition between livestock and arable cultivation, plus the need to conserve forests, (a National land-use plan does not exist) has to be taken into account. A shift in the use of grazing lands, either through intensification, e.g. the production of forage, or a greater concentration on draught animals and less on meat, could release some additional land for rainfed agriculture. It must be assumed, however, that the current levels of crop production cannot be maintained without animal draught power and that any substantial increase will require its greater use. The rainfall regime leaves little room for staggering rainfed cropping patterns; therefore seasonal labour peaks will need to be alleviated by additional draught power. Under rainfed agriculture, unless yields can be raised very substantially, which will require greater use of fertilizers as well as good seeds, adequate crop protection and better standards of crop husbandry, the costs of tractorisation are unlikely to be met. The availability of adequate draught power is therefore an essential for the forseeable future, even though the need to maintain them inhibits the extension of arable cropping.

In one recent calculation in The Gambia(1) it was estimated that the total area cropped would need to expand from 199,000 ha to 295,000 ha by the year 2,000 to support the growing population. The existing livestock population already exceeds the safe carrying capacity of the land under prevailing land-use systems, even allowing for the grazing of a high proportion of the as yet unutilised land suited to rainfed agriculture, and to expand the total area cropped by 96,000 ha or 48 per cent, will require an increase in draught power of

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(1) RDP/ADP Preparation Report, Annex 3, Appendix 2, page 5, "Crop and Farm Development", Banjul 1979.

the same order, unless a larger proportion of the rural population can be induced to revert to hand cultivation. This seems unlikely as the trend is in the opposite direction and, despite this, labour constraints are frequently identified. A further reduction in fallow, which a 48 per cent increase in rainfed crop production implies, without a correspondingly large increase in alternative measures for maintaining fertility, along with further deforestation, is unlikely to be acceptable on ecological grounds. Such a substantial increase in the area under cultivation to meet the needs of the growing population does not, therefore, seem practicable.

1.3.2 Intensification

There are clearly various degrees and forms of intensification, i.e. the improvement in productivity per hectare as a result of higher levels of inputs in conjunction with appropriate management. In the case of groundnuts, the 1979 ADP Preparation Report (Annex 3, Appendix 4)(1), making use of the data from the Ministry of Agriculture Sample Surveys of 1976/77-1978/79, and concluding that the estimated rate of fertilizer application during these years must have been less than half the recommended level, with little truly improved seed or effective extension advice, postulated a stage of "semi-improvement" applicable to half the groundnut area in that period. (There are no grounds for thinking that the position has significantly altered since then). For the semi-improved acreage average yields of 1,400 kg/ha were assumed, contrasted with 1,000 kg/ha for the 50 per cent wholly unimproved, giving an average of 1,200 kg/ha.

Table 18(2) shows the assessment of land availability for each Division, based on an elaboration of the data summarised in the Introduction of this Report (Table 2). It will be seen that of the total land area of the country, here calculated at 1,035,700 ha, 474,400 ha or 46 per cent is indicated as suitable for rainfed agriculture (not including the potentially irrigable area). In Table 19(3) the total area of rainfed crop production (including rainfed rice) for 1980/81 is shown, projections in this table being based upon an expansion of upland crop area of 2.1 per cent per annum (tied to growth in the rural population of 2.3 per cent/year, and for the rice cropped area, an increase of 1.0 per cent/year). To this table is added the percentage of the total potential land suited to rainfed agriculture which is estimated to be cropped in each of the years in question. It will be seen that both the Upper River and North Bank Divisions are already utilising over 50 per cent of their cropped land and would, in the year 2000, be using over 75 per cent, assuming that there is no redistribution of population, with an average for the whole country of 62 per cent.

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(1) Preparation Report, Annex 3, "Crop and Farm Development", Banjul 1979.

(2) Appendix 2, page 4 of Annex 3 of the Preparation Report.

(3) Appendix 2, page 5 of Annex 3 of the Preparation Report.

TABLE 18

Land Availability Considerations - I

('000 ha)

		Western	North Bank	Lower River	MacCarthy Island	Upper River	Gambia
a.	Suitable (excluding rice lands	55.5	80.8	28.7	52.3	39.4	256.7
b.	Suitable, hydromorphic (rice lands, excl. irrigable)	22.8	12.8	5.5	22.3	6.7	70.1
c.	Irrigable	0	0	0	43.4	34.4	78.8
d.	Suitable W/qualif.	39.1	30.7	21.7	32.3	23.6	147.4
e.	Marginal for agric.	25.3	14.8	18.4	47.0	20.7	126.2
f.	Unsuitable for agric.	32.0	81.9	79.8	91.9	70.9	356.5
a+b	Suitable without qualif. including rice lands	78.3	93.6	34.2	74.6	46.3	327.0
a+d	Total upland suitable excluding rice lands	94.6	111.5	50.4	84.6	63.0	404.1
a+b+d	Total rainfed suitable including rice area	117.4	124.3	55.9	106.9	69.9	474.4
Grand Total		174.8	221.0	154.1	289.2	196.7	1,035.7

Source: LRS-22 of Land Resources Division of ODM-UK modified for identification of rice soils.

TABLE 19

Land Availability Considerations - II

('000 ha)

	Western	North Bank	Lower River	MacCarthy Island	Upper River	Gambia
Suitable upland without qualif. (a)	55.5	80.8	28.7	52.3	39.4	256.7
Suitable upland including qualif. (a+d)	94.6	111.5	50.4	84.6	63.0	404.1
Total upland cropped (excluding rice) 1980/81	27.8	56.1	17.2	42.4	34.0	178.0
1985/86	30.8	61.9	19.1	47.0	37.9	196.9
2000/01	42.3	84.3	26.2	64.1	51.8	269.0
Suitable rainfed (a+b+d) including rice land	117.4	124.3	55.9	106.9	69.9	474.4
Total rainfed cropped including rice 1980/81	29.9	63.7	21.6	47.4	35.9	199.0
1985/86	33.0	70.0	23.8	52.4	39.9	219.0
2000/01	44.8	93.7	31.7	70.3	54.1	295.0
Percentage cropped 1980/81	25	51	39	45	51	42
of total suitable 1985/86	28	56	43	49	57	47
rainfed area 2000/01	38	75	57	66	77	62

Such an increase in the area cultivated does not seem realistic for the reasons already discussed. However, these calculations underline the importance of increasing output through intensification, i.e. higher yields.

The Preparation Report examines in detail the scope for increased output, through increasing yields, of groundnuts, rice and other cereals, and the yield assumptions (Annex 3, Appendix 4, p. 4) are reproduced in Table 20(1). The general magnitude of the scope for increased output per hectare is open to little doubt, although with erratic rainfall there is a high element of risk in all stages of intensification involving larger use of purchased inputs(2).

The Report includes indices of geographical yield variations for the various Divisions with respect to each of the cereal crops based on "indications" from the 1974/75-1978/79 sample surveys of the Ministry of Agriculture (Table 20 B). The majority of the indices range between 85 and 120 (The Gambia = 100) and are unlikely to be statistically significant. The Upper River Division scores consistently higher for sorghum, millet and maize, whereas the Western Division has by far the lowest score (only 55) for sorghum. The mean indicated yield for the Western Division is also markedly below that of other Divisions - 900 kg/ha compared with the mean of 125 kg/ha. These less favourable yields may be reflected in the fact that the proportion of suitable land for rainfed agriculture estimated as being cropped in 1980/81 was only 25 per cent - well below other Divisions and only half that of the URD (Table 19).

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(1) As a result of further refinements the incremental yield assumptions in the final ADP project may vary to some extent.

(2) In one important respect, intensification, rather than the extension of acreage as a means of increasing national production, involves less rather than more inputs, i.e. in the case of seed. Farmers' current practice involves sowing at the rate of 150 kg/ha of groundnuts (prior to shelling) which, at current yields of 1,100 to 1,200 kg represents between 14 per cent and 15 per cent of the total crop.

TABLE 20

A. Yield Assumptions, Cereals

(kg/ha)

Crop	All Gambia(1)	Unimproved (increase =)	1st yr improved	2nd yr	3rd yr
Sanyo	692	700 (280)	980 (70)	1050 (70)	1120
Suno	683	550 (250)	800 (75)	875 (75)	950
Sorghum	712	770 (330)	1100 (75)	1175 (75)	1250
Maize	1200	1000 (800)	1800 (350)	2150 (350)	2500
Rice:					
SD/RF		850 (350)	1200 (150)	1350 (150)	1500
MD/RF		1000 (500)	1500 (250)	1750 (250)	2000
MS		700 (0)	700 (200)	900 (100)	1000
FWS		1000 (0)	1000 (500)	1500 (200)	1000

B. Indices of Geographical Yield Variation

Division	WD	LRD	NB	MID	URD	All Gambia
Sanyo	92	82	100	110	110	100
Suno	100	87	90	107	120	100
Sorghum	55	105	100	105	115	100
Maize	90	90	107	100	107	100
Rice:						
SD/RF	120	123	180	107	80	100
MD/RF, MS, FW/DF	85	110	100	120	100	100

(1) Indications from Sample Surveys, 1974/75-1978/79.

Conclusion

Without substantially higher yields per hectare and a considerable improvement in agricultural-industrial terms of trade to offset the high costs of mechanical cultivation, the scope for extending the area under cultivation is largely limited by the capacity of the country to support an increasing number of draught animals without increasing the risk of desertification. On the basis of current population projections and employment opportunities outside agriculture, however, the growth in the farming population will clearly involve an extension of cultivation, if only by hand labour, allied with some improvement in the productivity of animal draught power. If this is not accompanied by productivity increases on existing and future arable land, no appreciable improvement in per caput agricultural living standards can be expected. Thus, as the scope for extending the area under cultivation using currently available technology and resource management, without adverse ecological consequences, is relatively limited compared to the very considerable scope that exists of increasing production and productivity through intensification based on raising average yields, it is clear that policy should focus on exploiting these opportunities.

While the technology is available to increase average yields, its delivery to thousands of small farmers, together with necessary extension, represents a very considerable challenge to the various institutions servicing agriculture.

1.4 A STOCKTAKING OF RAINFED AGRICULTURE AND ITS PLACE IN THE NATIONAL ECONOMY

The contribution of rainfed agriculture to the national economy, apart from the provision of employment for about 80 per cent of the population, is considered here from two aspects: the extent to which it is succeeding in the provision of the nation's diet and, subsequently, its contribution to the wealth of the country measured in terms of GDP as well as exports.

1.4.1 Food Production and Consumption

A rough idea of the extent to which crop production is keeping pace with effective demand, but not necessarily with food requirements, is provided by the figures of net imports of cereals (Table 21). In lean years, in particular, generally when the groundnut crop is poor and rural purchasing power reduced along with the yield of other crops, commercial imports of cereals are unlikely to reflect needs, but rather what the people can afford to buy, as well as re-export. However, in recent years, food aid has to be taken into account in this connection.

On the basis of an analysis of the energy requirements of males and females by age groups in The Gambia (Annex 2, Part I of The Gambia Food Strategy) it was calculated that

TABLE 21

Cereal Imports, 1978/79 to 1982/83

	1978-79	1979-80	1980-81	1981-82	1982/83 (2)
	(.....	.... in metric tons ...			.....)
Total imports of cereals (July/June) of which:	63,100	53,800	104,200	91,425	41,085
(a) on commercial basis	44,233	32,827	89,467	83,569	35,000
(b) as food aid(1) of which:	18,867	20,973	14,733	7,856	6,085
(i) bilateral	13,952	12,702	8,489	6,077	3,240
(ii) multilateral	4,915	8,271	6,244	1,779	2,845

Source: WFP, Banjul

(1) Including concessional sales.

(2) Provisional.

170 kg/caput/annum of cereals is required to meet 70 per cent of these energy needs, the remainder being provided by other foods (Food Consumption and Nutrition, Section 4 of the Food Strategy report). The degree of cereal self-sufficiency in Table 22 for the years 1974/75 to 1981/82 is calculated on this basis.

The period covered in Table 22 is a mere nine years which, with erratic rainfall affecting production, is not sufficient to identify any specific trend. The figures suggest, however, that the degree of cereal self-sufficiency has improved over this period. Excluding 1982/83 for which figures are provisional, the average self-sufficiency percentage for the first four years was 48 per cent, and for the next four years, including the poor crop season of 1979/80, it was 67 per cent. As will be seen from Table 5 (Food Grain Production to which cotton and groundnut production figures have been added for comparison), there has been a general tendency for paddy production to contribute an increasing amount to total cereal production, in which swamp rice has played a major part.

TABLE 22

Food Grain Production, Imports and Availability in Grain Equivalent (GE) for the Period 1974/75-1982/83

('000 Metric Tons)

Particulars	1974/75	1975/76	1976/77	1977/78	1978/79	1979/80	1980/81	1981/82	1982/83(1)
1. Total cereal production, gross	55.9	45.2	44.1	51.0	77.0	53.6	79.3	96.1	96.3
2. Actual imports	23.1	44.6	52.3	67.7	63.1	53.8	104.2	91.4	63.4
3. Required imports (row 5 less row 1)	32.0	45.2	48.7	44.5	21.3	47.4	24.6	10.5	11.7
4. Total available cereals, gross	79.0	89.8	96.4	118.7	140.1	107.4	183.5	187.5	159.7
5. Total required cereals, gross (at kg 170/cap./yr.)	87.9	90.4	92.8	95.5	98.3	101.0	103.9	106.6	108.0
6. Population, Jan. thousand	517	532	546	562	578	594	611	627	635
7. Implied availability in kg GE/cap./yr.	152.8	168.8	176.6	211.2	242.4	180.8	300.3	299.0	251.5
8. Required availability in kg GE/cap./yr.	170 (2)	170	170	170	170	170	170	170	170
9. Self sufficiency (% of requirements at 170 kg GE/cap./yr. met by domestic production allowing 10% post harvest losses).	57.2%	45.0%	42.8%	48.1%	70.5%	47.7%	68.7%	81.1%	80.3%

Source: Adaption of a table provided by the PPMU (23.3.1983)

(1) Provisional figures.

(2) Based on calculation in the Food Strategy Report (1981) Part 1, Annex 2 and accepted by FAO as the minimum level of calorie requirements to be met from cereals.

The Gambia has become the largest consumer (measured by production and imports) per head of population of rice amongst the Sahel group: in 1975/77, 85 kg per person/year, compared with 47 kg for Senegal and 19 kg for the Sahel as a whole. Between 1974/75 and 1979/80, about 50 per cent of rice available in the country (production and imports) was imported. In the Food Strategy (Part II, Section 6) an attempt was made to forecast the balance between cereal production and consumption from 1975 through to the year 2000 under different project assumptions, including for rice the Barrage (whose contribution now needs to be rescheduled) and other measures to increase rice production. The earliest date at which it seems at all likely that the structural deficit in rice can be closed will be around the year 2000.

The structural deficit in the case of wheat, for which no real prospects of production exist in The Gambia, other than under pump-fed irrigation in the dry season, is at present very small. It also forms an insignificant proportion of food aid imports, mainly for school feeding, but unless consumption is discouraged it may grow, as in other parts of sub-Saharan Africa, initially in the urban areas and subsequently to an increasing extent throughout the country. It must be noted that in the absence of more direct measurements of food consumption, the use of production estimates plus net imports as a proxy, e.g. for rice consumption, may not be very reliable, as no means exist of monitoring cross border traffic in foodstuffs.

The extent of the progress achieved during FYP I in meeting the various crop production targets is summarised in Table 7, which must now be read in conjunction with the revised figures for production in Table 5.

1.4.2 The Contribution of Irrigated Rice Production

Apart from irrigated rice and a small volume of horticultural produce, no other irrigated crops are grown in The Gambia. The relationship of irrigated rice production to total rice production and to total cereal production is shown in Table 23. Due to government price policy and subsidy programmes (particularly mechanical services) the share of irrigated rice production has increased from about 14 per cent in 1974/75 to a peak of 36.5 per cent in 1980/81 before falling back to 13 per cent in 1982/83. Irrigated rice is very heavily subsidised at over 70 per cent of total production costs and producer prices have recently been about 50 per cent above world market prices. Mechanical cultivation and pumping are the main costs and there is considerable scope for reducing these, although the difficulties which government has encountered in providing such services will not necessarily be easily overcome when the irrigated rice farmers (men and women) are organised into production co-operatives as is currently the intention. Irrigated rice production is generally confined to about 2,500 ha of the 3,000 ha currently available

TABLE 23

Estimates of Harvested Area, Yield and
Production of Irrigated Rice for the Period
1974/75 to 1982/83 Cropping Seasons and
Percentage Share of Total Rice and Cereal Production

Area: Hectares

Yield: MT/ha

Production: Tonnes

Year	Wet Season			Dry Season			Total Wet and Dry Season			Irrigated Rice As % of total rice	Irrigated Rice As % of total cereals
	Area	Yield	Production	Area	Yield	Production	Area	Yield	Production		
1974/75	52.4	3.5	183.4	468.0	4.8	2,246.4	520.4	4.7	2,429.8	14.0	4.4
1975/76	46.8	3.5	163.8	848.8	4.9	4,168.5	895.6	4.8	4,332.3	23.0	9.6
1976/77	446.4	3.1	1,384.8	624.6	5.2	3,272.9	1,071.0	4.4	4,657.7	25.8	10.5
1977/78	62.5	3.5	218.6	706.4	4.1	2,905.9	768.9	4.1	3,124.4	13.7	6.1
1978/79	70.6	4.0	282.6	730.8	5.2	3,829.4	801.4	5.1	4,112.0	12.2	5.3
1979/80	73.1	4.0	292.3	1,842.7	4.9	9,035.5	1,915.8	4.9	9,327.8	31.7	17.4
1980/81	968.7	4.3	4,174.1	1,921.0	5.9	11,402.8	2,889.7	5.4	15,576.9	36.5	19.6
1981/82	333.7	4.2	1,408.1	1,001.7	5.3	5,347.6	1,335.4	5.1	6,755.7	17.3	7.0
1982/83	51.8	4.5	230.6	(1,018.0)	(4.6)	(4,696.0)	(1,069.8)	(4.6)	(4,926.6)	13.0	5.1

Source: Department of Agriculture.

( ): Extrapolated from the time series 1974/75 to 1981/82.

(which could be extended by about 24,000 ha when the barrage is constructed), but data in Table 23 indicates that between 1974/75 and 1981/82 the area under cultivation has varied from 520 ha to 2,900 ha.

Table 23 also indicates that the contribution of irrigated rice to total cereal production has also been subject to marked variation, from 4.4 per cent in 1974/75 to 19.6 per cent in 1980/81.

1.4.3 Contribution of Rainfed Production to the GDP and Exports

A complete disaggregation for the agricultural sector is not available, but it is likely that rainfed agriculture accounts for about 80 per cent of the agricultural component in most years. The available National Accounts data is summarised in Table 24 but the figure for rice includes irrigated as well as rainfed production.

TABLE 24

GDP at Market Prices from Crop Production and Livestock Rearing - 1974/75-1977/78

(D'000)

	1974/75	1975/76	1976/77	1977/78
Groundnuts	38,869	45,914	50,617	34,884
Other crops	18,902	24,573	26,301	27,337
Sub-total	57,771	70,487	76,918	62,221
Livestock	10,265	18,601	22,303	26,042
Total	68,265	89,088	99,221	88,263
All crops as %	85	79	78	70

Source: CSE. Sources and Methods of Estimation of National Income at Current Prices in The Gambia, February 1981. Tables 2.9 and 3.1

The declining percentage in the contribution of rainfed crops relative to livestock rearing may well be an exaggeration. Whereas some data are available upon which to base the value of crop production, in the case of livestock estimates of the growth in livestock numbers and offtakes are little more than guesstimates (except in the case of the official exports of live cattle).

Table 25 shows the contribution of agriculture to the total GDP for the years 1974/75 to 1980/81. As will be seen, there is a marked downward trend in the percentage contribution of agriculture to the GDP at factor cost over this period, although to some extent this is accounted for by the rapid rise in the item for Government services. However, agriculture shows a negative growth rate of 8 per cent over the period.

Table 26 provides details of principal exports for the period 1974/75 to 1980/81 of which, disregarding re-exports, rainfed agriculture provided an average of over 90 per cent, largely accounted for by groundnuts and groundnut products. The importance of the latter as the largest earner of foreign exchange has already been stressed, but during this period their percentage share in total domestic exports fell from 97 per cent to 76 per cent and, largely due to the rapid growth in re-exports, from 95 per cent to 55 per cent of total exports.

TABLE 25

GDP at Producers' Value (factor cost) by Industrial Origin in Constant 1976/77 Prices 1974/75-1980/81

(Million dalasi)

Sectors	1974/75	1975/76	1976/77	1977/78	1978/79	1979/80	1980/81	Annual growth rate (%) 1974/75-1979/80
Agriculture	107.0	102.4	103.8	90.0	112.5	70.6	76.9	-8.0
Industry	8.0	14.3	14.3	12.4	16.2	12.9	13.7	10.0
Electricity and water	1.3	1.4	1.8	1.8	1.3	2.0	0.1	9.0
Construction, mining and quarrying	16.4	16.1	17.2	24.9	26.8	28.8	0.5	11.9
Hotels and restaurants	7.4	7.6	7.1	5.5	10.4	8.2	0.1	2.1
Transport, storage and communications	15.3	18.5	19.8	24.4	26.8	29.8	8.3	14.3
Trade	36.8	44.8	48.5	45.6	53.7	59.0	0.5	9.9
Banking and insurance	7.2	10.9	9.7	10.5	11.1	12.5	12.3	11.7
Real estate and business services	13.7	13.9	14.2	14.5	14.8	15.0	15.3	1.8
Other services	5.9	6.3	6.5	7.1	7.5	7.9	8.3	6.0
Government services	25.8	29.7	37.1	42.9	44.4	48.5	55.6	13.5
Imputed bank charges	-5.2	-6.4	-6.2	-6.4	-7.9	-8.9	-8.7	11.4
GDP at factor cost	239.6	259.5	273.8	273.2	317.6	206.3	287.9	3.6
Indirect taxes minus subsidies	57.0	72.4	73.8	56.4	61.4	55.6	39.9	-0.5
GDP at market prices	296.6	331.9	347.6	329.6	379.0	341.9	327.8	2.9
Agriculture as a % of GDP at factor cost	44.7	39.5	37.9	32.9	35.4	24.7	26.7	

Source: Five Year Plan for Economic and Social Development (FYP II) 1981/82-1985/86.

TABLE 26

Exports by Principal Commodities 1974/75-1980/81

(Million dalasi)

	1974/75	1975/76	1976/77	1977/78 *	1978/79 *	1979/80 *	1980/81 *
Groundnuts, shelled and unshelled	47.0	43.7	52.6	26.2	40.1	35.8	12.6
Groundnut oil, unrefined	26.1	21.8	31.0	27.6	16.7	14.7	14.9
Groundnut meal and cake	7.7	5.8	14.5	9.2	5.9	5.1	3.4
Total groundnut products	80.7	71.4	98.0	63.0	62.8	55.6	30.9
Palm kernels and nuts	0.7	0.4	0.8	1.6	0.8	0.8	0.9
Fish and fish preparations	1.7	2.6	4.8	7.6	3.7	6.6	6.4
Other products	0.5	0.7	1.1	2.2	2.1	1.8	2.7
Total domestic exports	83.4	75.0	104.6	74.4	69.4	64.8	40.9
Groundnut products as a % of total domestic exports	97	95	94	85	90	86	76
Re-exports	1.5	2.3	4.6	13.6	25.0	18.2	15.0
Total exports f.o.b.	84.8	77.4	109.2	88.0	94.3	83.1	55.9
Groundnut products as % of total exports	95	92	90	72	67	67	55

(*) Figures for 1977/78-1980/81 are preliminary.

Source: Five Year Plan for Economic and Social Development (FYP II) 1981/82-1985/86

CHAPTER II

DEVELOPMENT STRUCTURES AND ACTIVITIES

2.1 THE MACHINERY AT NATIONAL LEVEL

In addition to the financial and budgetary control exercised by the Ministry of Finance, The Gambia has a Ministry of Economic Planning and Industrial Development (MEPID) responsible for the formulation of the country's five year development plans and for general co-ordination of development activities, including foreign aid.

Effective 1st January, 1981, the Ministry of Agriculture and Natural Resources was divested of various responsibilities with the result that it is now concerned solely with crop production and protection, and with animal health and production; forestry, fisheries and hydrology, along with water affairs generally, being vested in the Ministry of Water Resources and the Environment. Responsibility for animal husbandry, generally an area of competition between veterinarians and agriculturalists in Africa, is thus divided between two Departments in the same Ministry. The Co-operative Department has also been moved from the Ministry of Agriculture to the Ministry of Local Government and Community Development, and the Gambia Produce Marketing Board (GPMB) to the Ministry of Finance and Trade. Apart from the GPMB, one of the most important institutions in the country, the only other agricultural para-statals are the Livestock Marketing Board (LMB), whose operations are on a much more restricted scale, and the Agricultural Development Bank which is currently being established.

The organisational structure of the Ministry of Agriculture has been under discussion for some three years and some major issues, e.g. the unification of the extension service for crops and animal husbandry, has yet to be settled. With the separation of forestry and fisheries, and of various aspects of hydrology affecting irrigation, the need for co-ordinated planning in the renewable natural resources sector is reflected in the current arrangements whereby the needs of both Ministries concerned are to be catered for by a strengthened Planning Programming and Monitoring Unit (PPMU) located in the Ministry of Agriculture (or in offices nearby). The overall responsibility for inter-Ministry co-ordination, as with inter-sectoral co-ordination, continues to rest with MEPID.

The present organisation of the Ministry of Agriculture is outlined in the organogram on page 60 . As will be seen there are no less than 12 Departments and Sections reporting directly to the Permanent Secretary.

ORGANIGRAM

(Graph Not Received By Date of Publication)

The Ministry of Agriculture is represented at Divisional level by an Agricultural Officer, a Veterinary Officer and a Crop Protection Officer. The administrative head of each Division is the Commissioner, but amongst the various proposals for Ministry of Agriculture reorganisation is that the senior professional officer should be designated as the co-ordinator of the activities of the three Departments at Divisional level, subject to the general co-ordination of inter-Ministry development activities by the Divisional Commissioner, whose role it is intended to strengthen during the current five year plan. This proposal has not yet been taken up, however.

The Divisions are made up of thirty-five Districts ("Chieftaincies"), with a District Chief or Seyfo and at village level an Alikalo or Headman. In the Agriculture Department which is primarily responsible for crop production, each District is manned by an Agricultural Assistant, normally located at a Mixed Farming Centre - the District extension headquarters - with Agricultural Demonstrators (ADs) or in some cases AAs providing the contact extension workers at village level. The extension service works closely with the District Chiefs and village heads.

The GPMB is one of the most important institutions in The Gambia with a Board and an Advisory Committee, appointed under the provisions of the Gambia Produce Marketing Act of 1973, which has been in existence for 33 years. With prior approval of the Cabinet, it is empowered to fix producer prices for oil expressing groundnuts (unshelled) for Philippine Pink confectionary nuts, palm kernels, paddy rice, cotton (Grade A and B) for limes and for maize, for which it is essentially the residual buyer and the sole market for crops destined for export.

The GPMB is also the sole importer of commercial seeds and it also handles all imported fertilizers. It operates processing plants for groundnuts, rice and cotton as well as a river transportation system through a wholly-owned subsidiary, the Gambia River Transport Co. Ltd (GRT). In the past it operated a price stabilization fund out of its reserves, which was mainly derived from surpluses on groundnut marketing, but which was also used for other purposes, e.g. to provide fertilizer subsidies, meet losses on other crops where "incentive" prices had been offered to producers and, occasionally, to make loans to the Government which were not invariably used for agricultural purposes. In recent years, the margin between producer prices for groundnuts and market realisation has narrowed (Table 27) and the Board's reserves are now at a very low level. The Board also acts as the collector for the Government export tax on groundnuts, and the Food Strategy report, while recognising the need for an export tax of up to 10 per cent, recommended that the price stabilization reserve should be re-established as soon as practicable and, as the property of producers, protected by law from diversion to any other purpose.

TABLE 27

COST-PRICE STRUCTURE OF GROUNDNUTS (UNDECORTICATED EQUIVALENT)

(D/ton)

	1972/73	1973/74	1974/75	1975/76	1976/77	1977/78	1978/79	1979/80(2)
1. FOB price	323.51	597.07	623.36	535.64	823.86	839.82	737.44	612
2. Processing/ Marketing	12.50	14.39	19.85	29.50	38.89	50.91	37.04	150
3. Primary Collection/ Handling	54.26	54.27	62.30	74.26	93.13	116.73	111.18	
4. Farm-gate value	256.75	528.41	541.21	431.88	691.84	672.18	589.22	462
5. Producer Price(1)	197.81	228.49	309.78	370.03	414.84	414.44	432.94	429
6. Producer price as per cent farm-gate value	77	43	57	86	60	62	73	93

Source: PPMU/Food Strategy Report (1981).

(1) Includes the value of fertilizer subsidy.

(2) Provisional.

Simple average over 8 years of producer price as percentage of farm-gate value = 69 per cent

2.2 PRODUCERS' ORGANISATIONS

The organisational structure of the rural community in food production and consumption, including input supply and utilization and marketing, is a reflection of traditional institutions as well as those introduced by successive government programmes.

2.2.1 Traditional Institutions

The land tenure system is complex but within any village area the individual responsible for the original clearing of a parcel of land will have rights to it which can be passed on to his descendents and women may also have customary rights to land in rice growing areas which they can pass on to their daughters. The first to settle in a village have senior status and the senior male amongst the compounds of the founding families will normally succeed as the village head and, with the elders of the founding lineages, exercise responsibility for the use of village resources, including the opening up of new lands. The male head of the compound, which is essentially a residential, extended family unit, will also have a greater say on such matters than other members whom he represents at village meetings(1).

There are some differences within the various ethnic groups, but, in general, the dabada (a Mandinka word) of which there may be more than one in a compound, is the basic extended family farming unit for the production of food, but within it there may be a number of sinkiros (Mandinka again) or cooking units which take turn to provide the daily meals and to which both men and women contribute food and to which those in employment contribute money. Groundnuts, maize, sorghum and millets are mainly cultivated by men and lowland rice by women, who may earn and retain cash income from such crops, as well as contributing from them to the sinkiro. Amongst all ethnic groups, men and women are expected to cultivate a crop for consumption by the household unit, but they also have the right to cultivate a personal crop for their own use.

While special attention therefore needs to be given to the fact that women play a particularly important part in rice farming and that both men and women may have individual plots, the dabada is the general unit to which agricultural extension is most conveniently directed and through which credit and inputs can be most easily provided. In 1981 they numbered about 54,000, but their number is not static; new dabadas are formed as families expand(2).

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(1) The brief and much simplified portrayal in this section is based primarily on Dey (1982) and local discussion in The Gambia.

(2) The RDP/ADP preparation reports use a lower figure, and some estimates are as low as 42,000.

Mention also needs to be made of the kafo, a traditional system whereby different age groups, male and female, undertook work on a communal basis, e.g. for village improvements, land clearing, weeding and harvesting, sometimes on communal land but also, in return for food and entertainment, on the land of a particular individual or dabada. It is government policy to revive kafo work on community projects.

2.2.2 Officially Sponsored Institutions

These consist of the Co-operatives, the Livestock Owners Associations (LOAs) and the Young Farmers Clubs (YFCs), of which the former is the most important. The LOAs are informally constituted, although it is the intention that they should be registered and more fully utilized in various aspects of livestock development which are currently being established.

YFCs are of two types, those which are open to all between the age of nine and thirty-five, and those which are closed, their membership being restricted to scholars various schools and colleges. Designed as voluntary youth organisations to foster agriculture and related rural development activities which, in the past have included livestock, fisheries, farming, gardening and bee-keeping, the work of promotion and monitoring by the Department of Agriculture has lapsed, largely due to lack of transport, and there is no up to date information on their numbers or activities. According to one source there are 200 clubs with 2,500 members; according to another 80 clubs with 4,000 members(1).

2.2.3 The Co-operatives

The first societies were registered in 1955 and there are currently 62 primary societies involved in input supply, marketing and credit, with an apex organisation The Gambia Co-operative Union (GCU), but under the present five year plan it is Government's intention to reorganize them into 35 District societies, as well as strengthening the GCU itself. There are also a number of informal (unregistered) co-operative groups formed by women rice farmers whose requirements, e.g. for credit, inputs etc. need to be catered for.

The farmers co-operatives are of great importance in rainfed agriculture, especially in relation to groundnut production and marketing, purchasing in recent years some 60 per cent of marketing groundnut production on behalf of the GPMB. They have become burdened with accumulation of debt during the FYP I and subsequently, as a result of the non-repayment of credit, and the proposal of some years standing that they should have a monopoly on groundnut buying (as agents for the GPMB) has not yet been implemented. It is the intention that this proposal should be reviewed during the current plan in

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(1) Department of Agriculture. Senior Staff Conference, 1982.

the light of improvements in the managerial and operational capacity of the Union and its member societies. (The proposed amalgamation of primary societies may itself occasion some disruption which it will take several years to settle.)

The development of the co-operative marketing societies in accordance with the principles of voluntary membership and mutuality of interest has been consistently pursued in The Gambia prior to and since independence. But the self-governing principle, subject only to the regulations of the Co-operative Laws, has been increasingly affected by the extent to which the Union and the member societies have become the agents of Government, particularly in the distribution of inputs and credit during the RDP I (Sections 2.3.5 and 2.3.6).

Arguably overburdened in relation to available managerial and accounting skills and experience, societies which have failed to meet the demand made of them have become increasingly subject to and dependent upon government for their continued existence. The GCU has been under compulsory government management since 1974.

TABLE 28

FERTILIZER DISTRIBUTION BY CO-OPERATIVES(1)

Year	SSP	Compounds	Percent of Total(2)
1975/76	998	-	26
1976/77	1 277	-	32
1977/78	2 724	-	38
1978/79	3 115	-	37
1979/80	2 372	-	40
1980/81	4 476	585	48
1981/82	5 468	1 784	56

(1) During Co-operatives' financial year July - June.

(2) Per cent of total quantity distributed during GPMB's financial year October - September.
Source: IFS/GAM/001 Terminal Report

Table 28 provides information on the quantities of fertilizer handled by Co-operatives during the last plan, in addition to which they played a major part in distributing seeds and farm implements. Tables 29 and 30 provide a summary

of the situation in regard to subsistence and production credit issued through the co-operatives which present a very serious and as yet unresolved problem to the co-operatives and to the country as a whole.

TABLE 29

CO-OPERATIVE UNION SUBSISTENCE CREDIT 1956/83

(D'000)

Year	Amount Issued by GCU	Amount Recovered	% of recovery	Cumulative amount not recovered
1956/70	10,783	10,423	96.7	360
1970/71	1,356	1,266	93.4	450
1971/72	1,648	1,528	92.7	570
1972/73	2,839	2,264	79.8	1,145
1973/74	2,697	2,447	90.7	1,395
1974/75	4,016	3,698	92.1	1,713
1975/76	5,137	4,681	91.2	2,169
1976/77	5,765	5,453	94.6	2,481
1977/78	5,954	5,054	84.9	3,381
1978/79	4,551	4,241	93.1	3,691
1979/80	6,494	2,608	40.1	7,576
1980/81	6,155	2,313	37.6	11,418
1981/82	1,427	1,195	83.8	11,650
1982/83	3,439	2,963	86.2	12,125

Source: 1956/70 - 1979/80, report on Review of Credit Operations of GCU, January/February 1981, page 62. 1980/81 - 1982/83, details supplied by GCU.

(1) D360,000 written off in 1973.
50 per cent Farmer credit repayment waived by Government due to drought condition: D2.98m re-imbursed in June, 1978.

(2) According to the GCU (Verbal Communication) total accumulated GCU debt to the GCDB currently (April, 1983) amounts to D23.5 million, including subsistence credit (D12.1m), and production credit. The total in Tables 29 and 30 (D12,125 and D12,215) amounts however to D24.3 million, plus medium term credit outstanding of D3.7 million. It is not as yet clear if the outstanding subsistence credit will be written off or the debt transferred to a "frozen" account.

TABLE 30

PRODUCTION CREDIT ISSUED THROUGH THE GCU
AND PERCENTAGE RECOVERED 1956/57 - 1981/82(1)
('000 dalasi)

Category	Seasonal			Medium Term		
	Issue	Recovery	Outstanding	Issue	Recovery	Outstanding
Coop.-(ex.RDP)						
Seed	10,819.0	1,390.0	9,449.0	-	-	-
%		12.7%				
Fert.	2,141.0	306.0	1,835.0	-	-	-
%		14.3%				
RDP total	1,336.0	404.0	931.0	4,063.0	401.0	3,662.0
		30.3%			10.0%	
Grand totals	14,295.0	2,081.0	12,215.0	4,063.0	401.0	3,662.0
		14.6%			10.0%	

Source: GCU (April, 1983)

(1) No production credit issued in 1982/83

2.3 SERVICES TO AGRICULTURE

The institutions serving to increase production ("upstream") and, subsequently, to facilitate producer marketing and processing ("downstream") are not neatly divided. Thus, the co-operatives and the GPMB are involved in the provision of inputs as well as in marketing (Section 2.2.3), and training is required at various points in the production-marketing chain, both for farmers and for co-operative and government personnel. Credit, again, is required for production and to finance crop purchase, and amongst the research priorities receiving or still awaiting attention, some relate primarily to production while others are concerned with production-consumption relationships as well as with predominantly marketing and processing issues.

2.3.1 Research

Agronomic research is based at two main stations, Sapu, which also accommodates the Seed Multiplication Unit (SMU) referred to in Section 1.2.1, and Yundum. The former carries

out trials on groundnuts, sorghum, millets, rice and maize, as well as on new crops such as cowpeas. Yundum, originally the main research centre but not climatically representative of a large part of the country, covers the same crops with the exception of rice. A substation at Jenoi conducts research on rice under mangrove conditions.

There is a dearth of basic farm management information in The Gambia, although from past or on-going work by the PPMU, the RDP I, the Mixed Farming Project and that of various individual researchers some valuable insights into the country's complex farming patterns has been provided. There is a clear need for more farm-management and farming systems research, however, and various externally funded programmes are currently making some provision in this regard, e.g. the posting of a farm-management economist to Sapu.

Experienced and appropriately trained high-level Gambian manpower for research is very scarce, however, and unless adequate provision for overseas/third country training to PhD level for selected high-calibre personnel is made the present unsatisfactory dependence upon inputs of research on a relatively short-term basis under various specific, externally funded projects is likely to continue indefinitely. Over the past few years research has suffered considerably from the serious recurrent cost problem, which is now endemic, so that the government's ability to offer suitable careers and appropriate research facilities to attract and retain the services of able and highly qualified research personnel without long-term external funding arrangements is in doubt.

Agricultural machinery research, in which research into animal draft power is a major element, is centered at Yundum, conveniently near Abuko where the Mixed Farming Project is located and where, in collaboration with the Department of Animal Health and Production, research into various aspects of livestock husbandry is now being given more attention. The base for achieving government policy for a greater integration between crop and livestock production is as yet very narrow, however.

In such a small country, the emphasis in most fields is appropriately based upon adaptive research. Regional collaboration, particularly with Senegal, and with institutions such as WARDA for rice and with IITA for other crops (ILCA and ILRAD for livestock) is therefore very important. This also applies to the regional research on climatology.

A further improvement in the service for agricultural statistics which has taken place over the past six or seven years is also necessary as a guide to research priorities and levels of adoption, as it is for planning, and the essential strengthening of this service is included in a FAO designed project now in the pipeline (Section 4.3.10).

Machinery for co-ordinating various aspects of related research in the agricultural sector and for identifying priorities exists in the form of an Agricultural Research Advisory Board (ARAB), but the Food Strategy report concluded that it had not succeeded in performing these functions effectively and noted that it had met only very occasionally during FYP I. (It has done so since this report, however.) In the Department of Agriculture alone, a list of twelve areas of research priority for agronomy were identified in the 1981 Senior Staff Conference, and in the following year's conference the needs for further upland and rice crops research over the FYP II were further elaborated along with an extensive programme of R & D in agricultural engineering, including farm storage which, as with many aspects of research in crop production, needs to be more closely co-ordinated with research on crop protection carried out under the Department of Crop Protection. (The latter was previously a service under the Department of Agriculture.) Since the work on animal husbandry research within the DAHP also needs to be taken into account, the task before the ARAB is a very difficult one.

2.3.2 Extension

Agricultural extension is an essential link between research and the farming community, and vice versa, less than 10 per cent of whom as yet enjoy the benefits of literacy. Agricultural extension is mainly provided through the Department of Agriculture under the supervision of an Assistant Director Extension and Training, but some extension is also provided in animal health by the DAPH.

The extension services are heavily dependent upon the provision of appropriate research, adequately tested at field level from a technical and socio-economic viewpoint, and in many respects research is still deficient. However, for groundnuts and rice, reasonably satisfactory "packages" have been developed as a basis for increasing yields which, taking the general run of seasons into account, are calculated to result in a significant increase in gross margins and hence in farm incomes. For sorghum and millet, the benefits of an extension programme are less certain, in part because the market for such products is less developed, and this may also apply to maize although in all three cases their use as animal feeds has to be taken into account. While some increase in production of these crops may be utilized for auto-consumption by producers - more so if the availability of coos mills is improved - the development of a satisfactory market is necessary for surpluses if farmers are to recoup the cost of purchased inputs such as fertilizers. Substantial increases in output for all these crops has been demonstrated in the case of fertilizer. In recommending the introduction of a package of improved inputs, however, allowance has to be made for the very varied labour resources available to different dabadas and individuals, and to the relative lack of capital amongst the majority of rural producers. (Capital formation and savings have not, as yet, been the subject of specific investigation.) Research recommendations therefore need to be adapted to the resources of individual

production units - a major task for the extension service - if, when one or more poor season intervenes, the producer is not to be left with an inadequate margin from which to repay credit for purchased inputs (Section 4.3.3).

Reference is not infrequently made to the relatively high ratio of extension workers to farming "units" in The Gambia, e.g. in the second development plan (p. 145), and to the need to improve their quality and performance. Many of the existing staff are inadequately trained and there is no doubt about the need to remedy this and to increase effectiveness generally. The actual ratio often quoted of 1 extension worker to 300 farming units needs some qualification, however. First, the number of dabadas does not fully represent the number of units of land under cultivation, or the individuals farming them, who may be in need of advice from extension workers. Further, a significant proportion of the personnel assumed to be engaged in extension are in fact assigned to other duties. Out of the total strength of 620 (1981), which includes only sixteen at graduate level or above, a number were assigned to various Research and Specialist Services units, e.g. agronomy, seed multiplication, horticulture, soil and water management etc., and at the farmer contact level a hundred field staff were engaged in the ox-cultivation training programme. The strength (1981) of the extension service in relation to the farming community may be expressed in the following ways: 1:300 dabadas; 1:153 compounds; 1:6 villages or 1:1300 "Farmers"(1).

Current proposals to increase the effectiveness of the extension service include the introduction of a modified version of the World Bank T & V system and an expansion of radio broadcasting. With a ratio of one village extension worker to six villages on average, greater use of group extension methods will clearly be necessary.

A reasonably well equipped Extension Aids Unit was established during RDP I, which is designed to serve all Departments of the Ministry of Agriculture, and its services in support of extension will be fully utilised in the ADP.

2.3.3 Training

The training of farmers (as well as the training of women in other fields such as home economics, child care, etc.) needs to be distinguished from the training of government and co-operative personnel. Farmer training in The Gambia is fairly rudimentary, although the ox-training centres developed in the 1950's made a major contribution to the spread of animal-draught cultivation, and since they have been incorporated in the Mixed Farming Centres, twenty-five in number, have continued to provide a valuable service.

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(1) Based, according to the 1981 Senior Staff Conference report (Vol. II), on 1,800 villages, 45,755 compounds, 54,000 dabadas, 70,000 "farm families" and 400,000 rural people.

The wider aims of the Mixed Farming Centres as focal points for extension, training and, through the co-operative marketing societies, for the provision of inputs, have yet to be fully realised. Largely as a result of the lack of funds, little has been done to develop farmer training facilities beyond the ox-ploughing programme. It was therefore decided as long ago as 1977 that it would be more economical to undertake farmer training at village level and in Table 17 details are given of the numbers of farmers who received training. The 1981 annual report of the training section of the Crop Protection Service (now the C.P. Department) records that farmer training sessions were conducted in each Division on pest recognition and crop protection techniques which were attended by a total of 1,500 farmers.

The lack of a clear definition of farmer (and staff) training requirements in conjunction with specific development programmes, e.g. the RDP I, has been noted. With the move towards a more carefully programmed system of extension, based on the village, it is now a moot point if farmer training at special centres, rather than in the villages, would be appropriate even if funds were to be available. Even where courses lasting for several days are involved, the possibility of utilizing school buildings during holiday periods is an alternative to the establishment and maintenance of special facilities which may well be under-utilized. In the Gambian context farmer training is most appropriately considered as an integral part of, if not synonymous with, extension.

The allocation and training of public sector personnel is somewhat haphazard, and there is a need for a more thorough examination of manpower requirements, related to both needs and to a realistic assessment of the prospects for their effective utilisation, particularly in agriculture and related fields.

The Ministry of Agriculture is responsible for its own in-service training needs. Induction and formal in-service training is normally carried out at the Brikama College of Agriculture which has been closed since 1981, but which may re-open in 1984. However, the prospects of employing newly trained staff are largely limited, on financial grounds, to the provision of replacements arising from natural wastage and, in some categories, to the possibility of early retirement. The main scope for improvement therefore lies in the upgrading of existing staff. In the extension service, the need for in-service training as an element of the T & V system is recognised, but for all categories of agricultural staff, the greater use of Brikama College for more formal training of those with appropriate educational qualifications and proven motivation and ability is likely to be necessary if the proportion of qualified personnel is to be increased. Facilities for in-service training also exist at the Jenoi training centre developed under RDP I. In-service training for senior specialist staff, e.g. in crop protection, seed multiplication etc. is generally provided by short courses or attachments in other countries.

The training of co-operative Inspectors, and of co-operative society employees - managers, accountants/book-keepers, storekeepers and produce handling personnel - as well as co-operative members, the responsibility of the Co-operative Department, is recognised as of vital importance to agricultural development. Insufficient attention was paid to it during the RDP and in the preparation of the next phase, the ADP, considerably more emphasis on co-operative training has therefore been recommended. To this end an ILO project for the Strengthening of Co-operative Education, Training and Management has been in operation since 1981, and a USAID/CLUSA project is also providing member education and a literacy and numeracy training programme.

2.3.4 The Provision of Inputs

Limited supplies of inputs such as tools machinery are available from commercial undertakings in Banjul and, in the case of fertilizers, a recent FAO project was undertaken on a pilot basis to encourage the distribution of supplies through small private traders in the rural areas. Private traders and farmers have also imported a variety of agricultural implements, mostly animal drawn, from Senegal. (Some idea of the distribution of agricultural implements in 1981/82 is shown in Annex 3.) Apart from these exceptions, the main source of inputs supply in recent years was that developed under the RDP I, which it is proposed to expand under the ADP according to the preparatory documents (Section 4.3.3). Bulk orders of fertilizer handled by the GPMB and of implements ordered under established tender procedures were then distributed to farmers by the co-operatives under the direction of the project management. Credit for their purchase by participating farmers, and for the purchase of one of the two oxen to be secured as part of the input package laid down in the project, was issued through the GCU.

The RDP I has been exhaustively evaluated and it is neither possible nor necessary to go into the details here of the institutional and other problems encountered. In brief, however, it was found that an "all or nothing" package did not reflect the needs of many farmers, some of whom had equipment of their own, and that the allocation of ox-carts was excessive. In the event, therefore, the package was administered with a considerable degree of flexibility in subsequent seasons. The numbers of oxen and equipment distributed throughout RDP I are shown in Table 16. The ox-carts represented a very costly item for many farmers (the possibility of local fabrication using old car axles, wheels and tyres has yet to be thoroughly explored), and no provision was made for horse or donkey drawn equipment. The repayment of credit issued for the purchase of oxen, implements and fertilizer under the project proved unsatisfactory (only in part due to adverse weather conditions affecting capacity to repay) and substantial arrears still remain to be collected (Section 1.2.6).

Farmers frequently face problems over the procurement of spare parts, particularly for mechanically powered equipment, and it is important that importers and distributors should be required to stock adequate spare parts as has been laid down in the various guidelines prepared by UNIDO and FAO. For the simpler items of agricultural equipment, including animal draught implements, the main source of local manufacture is in Senegal and other parts of West Africa and, at a recent meeting (First Regional Consultation on the Agricultural Machinery Industry, Addis Ababa, 5-9 April, 1982) various West African delegates, including that of The Gambia, proposed regional collaboration in the manufacture of equipment and in associated R & D and training. (The Food Strategy indicated this as one of the areas for closer collaboration with Senegal.) This proposal has yet to be followed up.

The machinery for the production and distribution of seeds has already been described in Section 1.2.1.

2.3.5 Marketing and Storage

As will already be clear, the GPMB is the most important marketing (and processing) agency for rainfed crops - in fact for all crops - and it also plays a key role in the marketing of fertilizers. Government policy, however, while encouraging the co-operative movement which is responsible for well over half the primary marketing function, largely on an agency basis, has not followed the pattern in many African countries of prohibiting or at least discouraging private traders in agricultural marketing and supply. Licenced private traders are therefore permitted to act as agents for the GPMB at primary level and mention has already been made of the FAO pilot scheme to promote the efficient distribution of fertilizer through private dealers, including necessary stocking and storage.

Some private sector road and river transport also exists but it is quite inadequate to meet the demand for produce evacuation and seed and fertilizer distribution during peak periods, but it does assist in feeder transport to and from seccos. The provision of animal drawn carts (see under input supplies) is also intended to enable farmers to meet more on and off-farm needs for transport. In these circumstances, the GPMB plays a major role in both road and river transport (the latter through its river transport subsidiary), and arrangements have recently been made for the provision of a substantial number of new road vehicles.

Little detailed information is available about costs, including transport, handling, storage and processing, in the marketing chain which constitute the "margin" provided to the various institutions involved and which have to be taken into account in determining producer prices each year. The Food Strategy report recommended that these should be independently monitored as an important element in the annual price review. This has not yet been taken up, but it can be expected that the restructured PPMU for which support is currently being

negotiated with FAO, and to which other donors may well contribute, will have the capacity to research into these and other aspects of marketing. During FYP I, for example, it was noted that the co-operative societies at one time were not allowed a sufficient margin on fertilizer distribution, thus contributing to their other financial problems and acting as a disincentive to its distribution to farmers. The GCU claimed similar problems in hiring transport. Unless marketing costs at all levels are subject to objective analysis it is difficult to allocate appropriate margins or to identify areas for achieving greater cost-effectiveness which it is in the interests of farmers and the country as a whole to secure.

Storage occurs at household/compound, village, secco and main store level both for crops intended for market or local consumption and for seed, although it is government policy to encourage the storage of seed in village stores under the supervision of the Department of Agriculture rather than at household level. During FYP I a further category of storage was developed with voluntary agency participation at village level on a pilot basis, funds being provided on a revolving basis to enable local people to buy surplus cereals at harvest for resale during the "hungry season" (generally coinciding with the advent of the rains), thus obviating transport and other costs apart from storage and unavoidable losses. Their expansion, as a form of local "food security" is looked upon with favour by Government.

The question of establishing a strategic food reserve at national level - a food security scheme - was explored by an FAO mission in May 1981(1). It assessed existing storage capacity as: cereal banks (by 1982) 1,700 tons, with a possible demand three times greater; on farm storage within compounds, a minimum of 390,000 m^3, and GPMB and Ministry of Local Government storage (the latter used primarily for food aid) 36,000 tons, excluding the very large facilities for groundnut storage. Allowing for up to 15,000 tons of storage capacity for other purposes the mission concluded that there were approximately 23,000 tons of warehouse capacity for long-term (strategic reserve) storage.

After careful consideration of normal food consumption, lead times for the supply and distribution of imported stocks and food needs during these lead times, together with other relevant factors, the mission's report recommended a foodgrain security stock of 8,500 tons for which 4,500 tons of new storage capacity should be constructed before 1985/86, use to be made meanwhile of surplus warehouse capacity controlled by the Ministry of Local Government (part of the 23,000 tons capacity available for long-term storage).

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(1) FAO. "Assistance in the Formulation of a National Food Plan Food Security Scheme for The Gambia" (TCP/GAM/0103 Ma), September 1981.

The Gambia is thus relatively well provided with main/depot storage but, as indicated in the previous section on plant and stored products protection and its impact, there is a great need to improve storage at household and village level (also stressed in the FAO report above) so as to reduce food-grain and groundnut losses in store.

It may be concluded that the marketing facilities, required as an incentive to increased production by Gambian farmers, are relatively well developed with 68 buying points (seccos) within reasonable access offering prompt payment for produce, although there is a need to improve storage in most cases and to reconstruct and upgrade one per District. Until recently a guaranteed market was not offered by the GPMB for sorghum and millet, but it now does so and producers now have an official market for groundnuts, cotton, palm kernels and the main cereals, in addition to which there is a not inconsiderable local market for food crops where, at times, they can take advantage of higher prices.

2.3.6. Agricultural Credit

Two types of credit for agricultural producers have been available in The Gambia: "subsistence" credit issued by the co-operatives to meet the needs of farm families during the "hungry season", and production credit (in kind) for agricultural inputs such as were issued under the RDP I, also distributed through the co-operatives. The distinction is not as clear as it might appear, because, although there is little information available on the use of subsistence credit, and much of it is probably spent on food, i.e. consumption, some of it may be used to buy seed locally or to pay off debts for such purchases or for hired labour and other obligations, some of them of direct socio-economic significance to farming activities. Production credit, in turn, may also be a substitution for some part of the investment otherwise met by the farming family, thereby releasing additional funds for consumption. Little is known of the operations of informal rural financial markets and, therefore, of the extent to which "formal" credit is supplemented by loans from lineage groups, moneylenders and traders. Official credit has taken the form of seasonal loans, mainly for fertilizers (or in some cases seed), or medium-term loans for implements and machinery. As yet no loans have been issued for the hiring of labour or draught animals, although this is a significant element of costs according to available farm management data.

The GCU began issuing subsistence credit through the primary societies as long ago as 1956, with relatively high rates of recovery until 1979/80, when only 40.1 per cent was repaid. For the previous twenty years there were only two years when the GCU overdraft repayment was less than 90 per cent, the overall repayment between 1956 and 1980 being 86.3 per cent (Table 29). A pilot production credit scheme to provide seeds and fertilizer was also started in 1976 with a total value of

D132,800 made available in kind to 2,142 co-operative members in three societies, plus D217,900 of medium-term loans in kind for animal drawn implements to 545 members of two of the three societies in the following year. (It will be borne in mind that since 1974 the GCU has been under government control.) In 1978 this credit scheme was expanded but average repayments were poor, even for the seasonal loans for seed and fertilizer, amounting to 47.1 per cent and 62.2 per cent respectively (weighted average: 49.2 per cent).

For FYP I, government proposed to make available D10 million, from its own resources and those of the GPMB for short and medium term loans to be issued through the Gambia Commercial and Development Bank (GCDB), established in 1972, the share capital owned by the Government, 52 per cent, and the balance by the GCU and GPMB. With the introduction of the RDP I project (augmented by EEC funds disbursed through the project) the GCDB was mainly concerned, by 1980, with the issue of medium term loans to individuals for mechanisation, mixed farming, horticultural, fishing and poultry enterprises (including loans from an EEC revolving fund for artisanal fishermen). The Food Strategy team (1981) expressed the view that the GCDB lending procedures for agricultural loans should be tightened up. For the past year it has not made any new loans for agricultural purposes and currently has about 170 agricultural loans outstanding, totalling some D7 million, mainly to larger farmers and secured by personal guarantees.

The expatriate commercial banks are not involved in credit for agricultural production but are a major source of short-term credit to licensed buying agents of the GPMB for crop purchase. By the end of FYP I and of the RDP I, the GCU can be seen, therefore, to emerge as the main vehicle for agricultural credit for disbursement through the primary societies and, if its financial problems can be resolved, it almost certainly represents the most suitable channel for the next phase, the ADP. (The position of the Agricultural Development Bank, which it was decided to establish in 1981, and which will presumably take over the agricultural lending functions of the GCDB is not yet entirely clear.)

Summary

The generally unsuccessful history of official credit in The Gambia is complex and it may be worthwhile to try to summarise the position reached with the GCU and the member societies and from which they need to be rescued - and rescued in such a way that history does not repeat itself.

As already observed, repayment rates for subsistence credit for the earlier years were relatively good, the assumption being that the recipients valued it highly enough not to prejudice their access to it in subsequent years by defaulting.

With the simultaneous issue of production credit - which in the case of the RDP I package amounted to a large sum - some farmers were probably overwhelmed by the level of repayments required. It had been intended to phase out subsistence credit during FYP I but this was not done, and it continued through 1982/83. Several poor seasons undoubtedly reduced farmers' capacity to repay loans, but as a result of the write-off of subsistence credit on several occasions (in one case affecting farmers who had already paid) some confusion arose about the obligation to repay loans, thus undermining credit morality generally.

The Food Strategy report, drawing upon a considerable amount of work done in conjunction with an FYP II preparatory committee in the Ministry of Agriculture (then the MANR), recommended that a final write-off of all outstanding subsistence credit be made. This should be accompanied by a nationwide campaign to explain that no further subsistence credit would be issued; that outstanding loans for production credit must be repaid as a condition for any further credit, but that a Credit Insurance Fund would be established, to which borrowers would contribute, so as to offset a proportion of loans due in years where serious crop failure occurred through poor rainfall.

In a recent radio broadcast (1983), the decision to write-off all outstanding subsistence credit was announced (subsequently clarified to confirm that this only applied to subsistence credit), but the question of providing some form of credit insurance has yet to be followed up (Section 4.3.11).

2.4 THE ALLOCATION OF FINANCIAL RESOURCES

2.4.1 National Expenditure

A detailed analysis of actual annual expenditure to rainfed agriculture under the Development (capital) and Recurrent budgets is beyond the scope of this report and no suitable breakdown exists which can be utilized, other than from an item by item study of the Annual Estimates. Even there, significant items in the Recurrent budget such as transport and travelling cannot be allocated to specific departments and activities within the Ministry without access to the accounts themselves. In the Development budget, because of the high proportion of aid-funded projects, a substantial amount of recurrent expenditure, i.e. non-capital items are included such as salaries, wages and vehicle running costs. An allocation to crops which excludes expenditure on essential infrastructure such as the co-operatives is also an incomplete portrayal of the resources devoted to promoting increased production. For 1976/77, however, the official Estimates of Development Expenditure do include a summary with a disaggregation under Food Crops and Commercial Crops (not including research) which is shown in Table 31.

TABLE 31

DEVELOPMENT FUND ALLOCATIONS TO FOOD & COMMERCIAL CROPS

1974/75 - 1976/77

('000)

	1974/75 (Actual)	1975/76 (Revised Est)	1976/77 (Revised)	Balance to complete
Food crops	854	1,085	4,489	8,260
Commercial crops	-	1,010	3,500	4,719
Total Agric & NR	1,383	3,682	15,822	19,168

Source: Estimates of Recurrent Revenue and Expenditure with the Five Year Development Plan 1975/76 - 1979/80, Government Printer, Banjul, July 1976.

This series was not repeated in subsequent official Estimates, i.e. for the years 1977/78 to 1980/81, and is therefore of limited value.

Table 32 provides details of the Development and Recurrent allocations to Agriculture and Natural Resources as a whole in relation to total national expenditure and, in the case of Development expenditure, the proportion funded from domestic sources. It will be seen that 1977/78 was atypical both in regard to the level of expenditure on Agriculture and NR and in the proportion (28 per cent) allocated to this sector. While the average during FYP I was 16 per cent, [the estimates (unrevised) for 1981/82 included], show a substantially lower proportionate expenditure. For the Recurrent budget, with the exception of 1981/82 (a revised estimate) the proportionate allocation to Agriculture and NR is marginally higher than in the first three years of the Plan (FYP I). Compared with the Development budget, the year to year changes in the Recurrent budget are much less marked and, as the last row of Table 32 indicates, there are, therefore, wild variations in annual relationships between Recurrent and Development expenditure in Agriculture and Natural Resources. Too much should not be read into these relationships, however, because of the inclusion - already referred to - of substantial amounts of recurrent costs in many externally funded development projects. A constant concern in the technical Departments has been expressed, however, that whereas such projects are adequately provided with funds for such items as vehicle maintenance and running costs (and replacements), any service not included in, or supported by, an externally funded project in the Development budget is starved of operating funds.

2.4.2 External Financing

The proportion of total development expenditure provided from domestic financing is also shown in Table 32, which reflects the heavy dependence upon external funding, particularly since 1979/80. Table 33 records the total of official development assistance (ODA) to The Gambia from 1975 - 1981. A breakdown by year and sectoral and sub-sectoral allocation is not readily available. Details are available, however, of the sub-sectoral allocations of the total aid committed ($351 million) for the entire period, 1975 - 1981(1). Of this Agriculture was scheduled to receive $50.8 million (14 per cent of the total), but no allocation for rainfed crops is shown in the source under the relevant item (cultures pluviales), although a major part of the $29.2 under "agricultural production, unspecified" is undoubtedly attributable to rainfed agriculture, as well as of the sub-item Plant Protection ($0.1 million) and the much larger sub-item Integrated Rural Development ($12.1 million). The statistical problems of classifying expenditure on agricultural/rural development are notorious and under the category of non-project aid technical assistance in the CILSS report referred to, amounting to $25.8 million, a substantial part is probably also attributable to rainfed agriculture.

One tentative conclusion that does emerge from this brief review of the financial data is that despite the relatively high level (in per caput terms) of aid, and its substantial growth since 1975, there does not appear to have been a corresponding increase in the level of investment in the agricultural sector.

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(1) Official Development Assistance to CILSS Member countries from 1975 to 1981, CILSS/OECD/Club du Sahel, November, 1982.

TABLE 32

DEVELOPMENT & RECURRENT EXPENDITURE 1975/76 - 1980/81

Development Expenditure	1975/76 Actual	1976/77 Actual	1977/78 Actual	1978/79 Actual	1979/80 (Preliminary) Estimates	1980/81 (Revised) Estimates	Total FYP 1	1981/82 (Estimates)
Agriculture & N.R.	1,857	5,603	19,091	8,871	7,320	4,168(1)	49,910	7,326
Total Develop. Exp.	11,302	32,607	68,767	52,984	65,235	79,634	310,531	70,819
& Agric. & N.R. as a per cent	(16%)	(17%)	(28%)	(17%)	(11%)	(5%)	(16%)	(10%)
Domestic Financing as per cent of total develop. exp.	40%	76%	39%	31%	33%	-4%	29%	3%
Recurrent Expenditure	(Actual)	(Actual)	(Actual)	(Actual)	(Actual)	(Actual)		(Revised Estimates)
Agrigulture & N.R.	4,833	7,975	9,622	11,557	14,999	13,261	62,247(2)	9,777
Total Recurrent	44,047	60,219	73,275	72,485	91,251	91,698	432,975(2)	134,408
& Agric. & N.R. as a per cent	(11%)	(13%)	(13%)	(16%)	(16%)	(14%)	(14%)	(7%)
Recurrent Expenditure as a per cent of Development Expenditure in Agric. N.R.	260%	142%	50%	130%	205%	318%	133%	125%

Source: Central Bank of The Gambia Bulletin, Quantity 2, April - June 1982 Tables 12, 13A & B.

(1) Note that the "revised estimates" in Table 13 B. for 1980/81 for Agriculture & Natural Resources show a higher figure, i.e. D6,868('000).

(2) Addition from rounded figures may result in minor errors in these totals.

TABLE 33

OFFICIAL DEVELOPMENT ASSISTANCE TO THE GAMBIA, 1975 - 1981

COMMITMENTS IN '000 US $

YEAR	1975	1976	1977	1978	1979	1980	1981
OECD Countries, bilateral aid	7,848	16,800	8,593	19,538	31,517	33,237	32,033
Multilateral Aid	2,142	9,678	3,090	15,363	19,325	33,292	15,068
UN Family Agencies	2,460	1,388	758	3,305	5,308	5,034	3,883
OPEC Countries and Financial Institutions	-	5,396	26,399	2,598	6,956	26,956	13,068
Total Aid	12,450	33,262	38,840	40,804	63,106	98,519	64,052

Source: CILSS. Official Development Assistance to CILSS MEMBER COUNTRIES from 1975 - 1981, Vol. 1, November 1982

CHAPTER III

POLICIES, PROGRAMMES AND BARRIERS IN THE DEVELOPMENT OF RAINFED AGRICULTURE

3.1 AGRICULTURAL POLICY

3.1.1 Introduction

The main direction of government policy towards agriculture in the past has been to increase the output for sale of groundnuts, thereby increasing farm incomes, stimulating the cash economy and providing essential revenue to government for general administration and development. At the same time, the rural population was expected to become as self-sufficient in food as possible and to provide the basic food requirements of a limited urban population which, until recently, with the exception of rice, it was largely successful in doing.

By the time of the first five year plan, however, a broader view of rural development had begun to emerge - a less "extractive" view - in which the ability and willingness of farm families to increase output from the land was seen in the context of improved access to social services as well as additional infrastructure and technical support to raise labour productivity and the general quality of rural life. The vulnerability of an economy so dependent upon groundnuts also gave rise to renewed efforts at crop diversification - essentially seen as additional rather than substitutive - hence the cotton project, increased horticultural activity and a consultancy to explore the prospects for increasing oil palm production, which concluded that The Gambia was at a comparative disadvantage in relation to other producers and that the market was not favourable. In food crop diversification, the latest addition is maize.

The Gambia is a nation of small farmers and it is towards increasing their production and productivity that action has been directed, whether or not it was in each case optimally conceived or implemented. Apart from two unsuccessful colonial ventures in the 1940s (the abortive poultry project and the Gambia Rice Farm), no attempts have been made to set up "state farms" or other large-scale production units such as have diverted attention and resources in other countries away from the small farmer.

In the FYP I, the allocation of resources to agriculture arguably did not reflect fully its importance to the economy or the priority ostensibly given to it in national policy statements. It is a moot point, however, whether the public sector institutions could have absorbed more development funds since many key components - research, extension, input supply, credit and marketing - required a longer period of strengthening with adequate capital and recurrent costs financing together with appropriate manpower development, before they could effectively take on much more. The establishment of a planning unit in the MANR, for example, which was conceived in 1974, did not start to come into existence until 1976 and it was four years more before

it could be regarded as having its basic complement of personnel. The RDP I also suffered from the lack of attention to the need and the time required to build up essential servicing infrastructure in the co-operatives, whose capacity was over-estimated.

By the end of FYP I, the apparent failure of food production to keep pace with the rising population and the attendant risk of increasing malnutrition, prompted government to adopt the World Food Council's lead in commissioning a national food strategy supported by ODA and augmented by FAO. This drew attention to the need for adjustment in a number of policies, institutions and specific programmes in order to achieve more consistent and fully integrated support for domestic food production and consumption. Some have been pursued, others may be over the course of time; meanwhile in a worsening economic situation, what government can do is increasingly dependent upon what donors are prepared to do. The difficulties of designing and implementing a consistent, integrated and optimally effective strategy for food and agriculture is therefore complicated by uncertainties over external funding, often in the form of relatively small projects which must somehow be fitted into what essentially needs to be a long-term programme (section 2.4).

3.1.2 Policy Reforms

As a result of poor performance during the first development plan, during which there were five years of continuous decline in real GDP, Government, faced with mounting economic and financial difficulties, sought assistance from the IMF and, in November 1979, reached agreement with the Fund of financial support for 1979/80. Although The Gambia implemented the measures called for in this agreement, the position continued to deteriorate in 1980/81 due largely to depressed agricultural production. A second agreement was therefore concluded for a twelve month period from February 1982, and again the Government implemented all measures called for, including an increase in the consumer price of rice and in the producer prices for rice and groundnuts. The economy performed better in 1981/82 than anticipated with an estimated 25 per cent increase in agricultural production due to favourable weather and an 11 per cent increase in real GDP. (The terms of trade continued to deteriorate for The Gambia's exports, however).

Policy reforms in agriculture are being further pursued. Development expenditure in the current development plan (FYP II) for agriculture and natural resources is due to rise from 16 - 17 per cent in FYP I to 27.4 per cent. A policy of paying producers a higher proportion of the market value of their produce is also being implemented and groundnut prices were raised by 8.7 per cent in 1981/82 and 4 per cent for 1982/83. Producer prices for rice were also raised in 1981/82. Unfortunately, the collapse of world market prices for groundnuts now means that the GPMB is paying producers for the current crop at something like D150 a ton more than it receives, net of costs, on the export

market(1). Despite a decline in the value of the dalasi against the US dollar by about 10 per cent over the past twelve months, thus increasing the local currency value of groundnut exports but increasing the price of imported rice and agricultural inputs, the dalasi is still arguably over-valued against most international currencies and further adjustment may be necessary.

Other policy reforms include a reduction of fertilizer subsidies and of subsidies on irrigated rice production as well as the phasing out of subsistence credit. There is no evidence as yet of a firm policy towards the collection of outstanding production credit, particularly from the wealthier members of the community with relatively large loans from the GCDB, which are "secured".

3.2 SOME PAST PROGRAMMES EXAMINED

Part I of the Food Strategy (March 1981) was devoted to an evaluation of food and nutrition during FYP I and in Part I, Annex I, reproduced in The Gambia in limited numbers (one hundred) for use within the country and amongst aid personnel, a total of 53 project summaries was included. Of these 34 relate to rainfed agriculture, either exclusively or in part. The categories covered represent Extension and Training (4), Field Crops (13), Horticulture and Fruit (3), Infrastructure (2), Multi-purpose (7) and Storage and Marketing (5). In each case an attempt was made to summarise the impact objectively, even though in many cases either sufficient time had not elapsed or data were inadequate for satisfactory evaluation. It was the intention that this collection of project summaries should be kept up to date, both to make revisions in the light of subsequent progress and to add new projects. This task would have fallen to the PPMU, but a long hiatus followed the first FAO project for manpower assistance to the PPMU which, since the end of 1981, has been operating with a skeleton staff pending final arrangements for a new project to strengthen it.

3.2.1 The PPMU

As the title PPMU (Planning, Programming and Monitoring Unit) implies, monitoring and evaluation is considered important and the first PPMU support project was itself evaluated by a joint UN/FAO/Gambian Government team in early 1981. The evaluation was strongly critical of the lack of Gambian personnel in the Unit and, despite its short life, of the lack of progress in institution building(2). It recommended corrective action in these and other respects as a prerequisite for further UNDP/FAO support.

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(1) With a fall in world groundnut market prices of 40 per cent (from $468/ton (FCB unshelled) in 1981/82 to $282/ton in 1982/83, it is unlikely that available STABEX funds will provide compensation for more than a very small proportion of the export losses on a crop of some 127,000 M/tons.

(2) These findings, and the genesis and future of the PPMU, were discussed in detail in Annex 7, Part III of the Food Strategy, 1981.

(An in-service staff training course is currently being run by FAO in Banjul). The importance of a much strengthened PPMU was fully recognised which, taking account of the move of the Forestry and Fisheries Departments, was to be established to serve both the Ministry of Agriculture and that of Water Resources and the Environment. The FAO plan of operations, however, instead of maintaining the integrated structure and staffing of the unit necessary to provide the full range of services required, in which UNDP/FAO resources could be supplemented with a minimum of delay by other donors, was subjected to a series of time-consuming scaling-down exercises in accordance with downward readjustments in the availability of UNDP funds. The danger of allowing support for a key institution to become too dependent upon the resources of one donor, whether multi-lateral or bi-lateral, had already been noted (twice in relation to the PPMU), but it appears to have been disregarded as a result of inflated expectations of UNDP support(1). Although supplementary assistance to the PPMU is now expected from the World Bank and USAID, support in the important field of agricultural marketing (economic and institutional aspects), as well as in agricultural statistics, is still required. It is hoped that both these gaps will be speedily filled. (See Section 4.3).

3.2.2 RDP I

The Rural Development Project (frequently referred to as RDP I because it was envisaged that there would be a second phase, RDP II, whereas at an early stage in the preparation of the second phase it was considered more appropriate to concentrate on agriculture per se, e.g. it would not include such aspects as feeder roads) was the most important included under the umbrella of CILSS "first generation" projects.

This project has been intensively evaluated, and as a result of various accounting and procedural irregularities, it was also the subject of a formal Commission of Enquiry. It should not be regarded as anything approaching a total failure although it did fail by far to achieve the rate of return anticipated for a number of reasons, which can only be summarised here, but from which lessons for future projects can be, and probably have been, learned:

- The project was too ambitious in relation to the management skills and experience available to it;
- Problems of accounting and of financial control were under-estimated;
- Project management and field implementation were too divorced from the existing command structure of the MANR and its technical Departments which therefore became disinterested if not actively disenchanted;

(1) Eicher makes the same point in reference to agricultural research in developing countries. Eicher, C.K. "Facing up to Africa's Food Crisis", Foreign Affairs, Fall, 1982.

- The technology package for farmers was too rigid in concept, too costly for some, and implied a non-existent degree of homogeneity; it also failed to recognise the role of women in rice farming;

- The burden imposed on the Co-operative movement, especially the GCU but also on member societies was too great and the project was not equipped to provide support to what was in fact an essential element of infrastructure;

- Similar problems existed in the extension service;

- Project monitoring and evaluation was not sufficiently developed to identify and analyse problems expeditiously;

- Too high a proportion of the funds were spent on infrastructure such as buildings, for which costs were far higher than anticipated (and probably unnecessarily so).

3.2.3 Other Projects

The internal, i.e. unpublished, CILSS report on the Status of First Generation Projects as of 12th January 1980(1) under dryland farming lists six projects, the first and second being, respectively, the RDP I (Integrated Rural Development of the Western part of the country), which has already been referred to, and the RDP II (now the ADP) which is more appropriately regarded as a second generation project to be dealt with in Section 4.3.3. The third, Strengthening of the Planning Unit of the Ministry of Agriculture (the PPMU) is also now entering a second cycle and will be referred to again in Section 4.3.10. Of the remaining projects:

Establishment of a Horticultural Fund for the Development of Horticultural Crops in Villages;

Re-organisation and Strengthening of the Extension Service;

Financing of Cereal Storage in Villages

only the last had secured a firm commitment of funds (Type 1) in the form of food assistance amounting to US$0.85m. This useful project which was implemented should be seen in the context of the general need for improved storage at village level (Section 2.3.5). In reviewing The Gambian scene, the point needs to be stressed, however, that with the exception of rice for which there is a structural and chronic deficit, the use of food aid for development should take full account of current food availability in the country if it is to avoid the risk of depressing local production - and the consumption of local products. As will be seen from Table 22, during the period 1980/81

(1) Supplied by the National CILSS Co-ordinator, The Gambia.

food aid was arriving at a time when food availability in terms of grain equivalents was at a high level, largely as a result, however, of commercial imports which may have been re-exported (Table 21)(1).

The project (US$250,000) for the establishment of a horticultural fund did not receive donor support. A fund of this magnitude would be justified only if securing an appropriate impact in a large number of villages, inevitably accompanied by problems of effective administration. Since the promotion of horticulture is to be given higher priority in FYP II, the inclusion of a more modest project to establish the feasibility of a revolving fund (possibly operated by a voluntary agency) might be appropriate as a second generation CILSS project. In the light of previous experience with credit, however, and the volume of credit that may be involved in the ADP (in which, in the light of previous experience, cash payment for inputs is however to be encouraged), additional credit projects need to be viewed with caution. Apart from the provision of water for irrigation, which is costly to install (and difficult to maintain), the capital requirements for village horticulture are relatively small, and, if local people are to be able to afford to eat the fruit and vegetables they produce, the costs of production in the form of purchased inputs should be kept as low as possible. It is difficult, in all, to understand how a project on this scale came to be submitted to donors.

The project for the reorganisation and strengthening of the Extension Service, not as yet implemented in this shape, but to be included in the ADP, was to involve the integration of the extension services, of which there are three: agriculture (agronomy/mechanisation), animal husbandry and crop protection. The Ministry of Agriculture has had this matter under discussion for the past three years without as yet finding a satisfactory solution for "integration" and, whereas it is commonly held that a policy decision is needed, in reality it is more likely that improved co-ordination, possibly leading to closer integration, will be worked out by trial and error during the course of the ADP.

3.3 MAJOR BARRIERS TO DEVELOPMENT

During the first development plan, coinciding with the first generation of CILSS projects, the major constraints - many clearly of very long standing - which affected agriculture were in summary:

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(1) The data on food aid imports are frequently inconsistent. A Ministry of Agriculture (PPMU) paper dated 11th October 1982 showed no food aid cereal imports for the three years 1977/78 to 1979/80 whereas Table 3 of the Food Strategy Report Vol. I shows substantial emergency food aid imports in all three years with data provided by the Food Aid Unit, Ministry of Agriculture and the WFP, Banjul.

3.3.1 Natural constraints

Of these, the short rainy season and erratic seasonal and inter-seasonal variations in precipitation, are the most important (Section 1.1.1). The prevalence of trypanosomiasis throughout the country is also a major factor inhibiting the optimal development of the livestock industry and its contribution to the draught power requirements of arable crop production, notwithstanding a high degree of trypanosome tolerance amongst the indigenous N'Dama cattle. A high incidence of endemic human disease, notably malaria and gastro-intestinal diseases, also inhibits the full utilisation of human labour resources at peak periods of the year. The relatively low fertility of all but a small proportion of alluvial soils in its turn means that increased yields to support a rapidly growing population cannot be achieved without increasing use of fertilizers. There is also a wide range of plant diseases depressing crop yields.

3.3.2 Socio-economic and Technical Constraints

There is little evidence to suggest that the land tenure system is a significant constraint (although it is sometimes referred to as such), although land fragmentation (and small plots) affects the costs of both animal and mechanical power cultivation (especially the latter). Low levels of literacy and numeracy in the rural areas are obstacles to the involvement of the people in the development of institutions such as co-operatives, village development committees and agricultural extension. This, plus the risk arising from climatic uncertainty, and the low capital endowments of the great majority of the rural population, inhibit the adoption of yield-increasing technology. Available technology in seeds, plant protection, draught power, soil and water management and in the transition from shifting cultivation, is as yet not fully developed to meet Gambian conditions, although considerable progress has been made.

3.3.3 Constraints in Management and Training

The doubling in the numbers employed in the public sector during the past decade has not been matched by a corresponding increase in management as reflected in an increase in the quality of services provided. No detailed study of agricultural manpower requirements has been undertaken, however, and it is not clear to what extent the provision of services to agriculture have been affected by poor management, inappropriate staffing and by the difficulty of financing recurrent cost requirements. The lack of adequate training and appropriate experience is clearly an obstacle to the effective deployment of financial resources for development, however, and the skills and judgement required in the technical aspects of agriculture are probably underrated. Upgrading the skills and performance of existing public sector employees and removing the incompetent to make room for new, better qualified entrants is therefore essential, as in any public service.

3.3.4 Shortcomings in Government Policy

The constraints to increased production arising in some developing countries as a direct result of government policies which act as a disincentive to farmers are not self-evident in The Gambia. Unless food aid is very carefully administered, however, there is a constant danger that it may act as a disincentive to increased food production (and the consumption of locally produced food). To ensure that this does not happen is a joint responsibility of the international community and the Gambian government. Vaccilating credit policy and unsound credit administration has not directly prejudiced increased production in the past - on the contrary, it has resulted in an injection of much needed capital into the rural economy, although in a very haphazard way - but it has seriously prejudiced the chances of operating a viable credit system in the future which would support the provision of productive inputs.

Levels of direct taxation on groundnut exports have not been unreasonably high(1), and the operation of a price stabilisation reserve by the GPMB is in principle sound, as undue fluctuations in producer prices generally act as a disincentive. The diversion of these funds to other purposes is a mistaken policy, however, and, as is now the case, has reduced the Board's capacity to cushion prices.

In such a small country, any unnecessary proliferation of institutions adds to the burden of overhead costs and, therefore, diverts resources away from production. It may also result in still further dilution of skills which are in short supply. The creation of an Agricultural Development Bank alongside the GCDB and the Co-operatives, who carry the much more difficult task of handling thousands of unsecured loans to small farmers, is a case in point.

Apart from agricultural credit, government policies have not given rise to subsidies of unmanageable proportions, but may do so in the case of fertilizers unless the rate of subsidy is further reduced. The provision of very highly subsidized tractor services, however, is highly dangerous, as the country cannot afford the use of such machinery on a large scale or, apparently, even to maintain the present limited services upon which farmers may become increasingly dependent to their own detriment if services collapse or charges are suddenly raised. High subsidies also encourage inefficient use.

Shortcomings in agricultural research and extension, already referred to in Sections 2.3.1 and 2.3.2, require structural/institutional changes as well as improvements in training

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(1) At 10 per cent ad Valorem the export tax contributes about 8 per cent of Government recurrent revenues but represents about 15 per cent of the farm gate price of unshelled nuts, and its removal would increase the scope for maintaining producer prices which may otherwise have to be sharply reduced next year.

and management. To the extent that policies and priorities have not been clearly defined and strategies inappropriate and insufficiently matched by resource allocations, these have acted as constraints to the provision of adequate research and extension services. It would be an exaggeration to describe past shortcomings in research and extension as major constraints to increased rainfed production, but with the increasing need to intensify production and raise productivity, the task of increasing the effectiveness of these essential services becomes increasingly urgent. The same applies to the provision of improved inputs (technology), whose choice and effective use is to a large extent an outcome of research and extension.

While there is room for improvement, particularly in short-term storage facilities at Secco level and in transport facilities for crop evacuation, Gambian farmers are reasonably well served and deficiencies in marketing facilities cannot be regarded as constituting a major constraint to increased crop production. However, it is in the interests of farmers in particular and the country as a whole that marketing margins and their constituents should be regularly monitored and evaluated with a view to reducing costs. The reduction of losses in harvest and post-harvest operations is clearly important in increasing the availability for consumption of crops that are produced. Such losses, and those at field level, are a considerable constraint to the availability of food in volume and value.

3.3.5 Financial Constraints

The figures in Section 2.4 indicate that resources available to government for development (domestic and external) are considerably higher per caput than in many low income developing countries. While the difficulty to finance recurrent costs is frequently apparent, it is evident from the Estimates that a relatively high proportion is accounted for by Personal Emoluments - a reflection not only of salary increases but also of the rapid increase in numbers during the 1970s. Since these represent an inescapable cost in the short term at least, the degree of fluctuation (and uncertainty) in the financing of recurrent costs shown in Table 32, cannot but be a serious constraint to the proper utilisation of the public sector manpower that is available. To plan ahead for the improvement of developmentally important services such as research, extension, input supply and marketing, there must be an irreduceable level of support ("other charges") in the recurrent expenditure budget, unless it is to be accepted that staff will be under-utilized and costly research trials abandoned. (As the GPMB has been permitted to generate its own working capital in the past, the effects of fluctuating budgets upon produce marketing has fortunately been minimal).

The same Tables 32 and 33 also indicate that there is a very considerable fluctuation in the volume of aid available in which, not only is an increasing proportion of essential recurrent costs included in the project funds, but there has also been a substantial amount of aid in a form where it has served as

budgetary support. Invaluable as the increased flow of aid has been (and unless agricultural production can be accelerated the need for it will continue indefinitely), the establishment of numerous projects within what should be - given adequate government resources and consistent and appropriate policies - an interrelated, long-term programme of services to promote agricultural production, creates considerable problems in financial management and in the planning and implementation of cost-effective programmes. The solution to these problems lies outside the scope of this report and must be addressed in part to donors.

The referred to figures do suggest, however, that if Government recognizes the significance of agricultural services it should so arrange that they consistently receive higher priority when funds are constrained.

CHAPTER IV

PERSPECTIVES AND FUTURE PROGRAMMES

4.1 GENERAL PERSPECTIVES

The Five Year Plan, 1981/82 - 1985/86 (FYP II), in Chapter 13, Agriculture and Animal Husbandry (p. 143), lists the agricultural development objectives of the Second Plan as:

1. to increase export crop production and productivity in order to increase rural cash income and foreign earnings;

2. to increase food crop production and productivity in order to raise the nutritional status and better meet the food requirements of the population;

3. to encourage efficient use of the land and water resources in order to reduce soil degradation and enhance land productivity;

4. to continue encouraging diversification and to endeavour to make farming more attractive to the farmer;

5. to promote development of commercial production of intensive and high value agricultural products.

Chapter 11, Rural and Regional Development, under the heading of Agriculture (p. 124/125), sets out the main strategy for the achievement of the above objectives and those of fisheries, forestry and livestock. For agriculture, excluding the more specific aspects of these other activities, the strategy sets out to:

1. increase agricultural production through the provision of improved inputs, through improved production techniques, storage, transport and marketing facilities combined with an equitable pricing policy and supported by adequate credit and savings facilities, and geared towards diversification;

2. promote better husbandry methods, improvement of mixed farming techniques, and improvement of pasture methods, and encourage large-scale livestock production and improvement of village poultry;

3. improve and rehabilitate swamps and improve existing irrigation schemes.

The main targets for agriculture are to increase production of:

Groundnuts	from	110,000 tons	to	135,000 tons
Cotton	from	1,600 tons	to	4,000 tons
Cereals	from	65,800 tons	to	78,800 tons

The contribution projected for each of the various cereals is shown in Table 8, from which it is clear that diversification does not imply a substitution of other crops for The Gambia's mainstay, groundnuts, but rather an increase in other crops, e.g. cotton (and horticulture which is not quantifiable). In view of recent levels of production achieved (Table 5), these targets now appear unduly modest, with the possible exception of cotton (depending, however, on the ADP)(1). However, in the light of recent fluctuations in climatic conditions, they need to be viewed in terms of aggregate production over the five years. To achieve total output as envisaged over the five year period will not be a mean achievement.

An important consideration will be the ability of the government to maintain the prices of export commodities at an attractive level to producers, particularly for groundnuts, bearing in mind that it is the intention to reduce fertilizer subsidies. Even if the groundnut export tax is abolished (or waived as has been the case in the past), world market prices for groundnut products will have to recover substantially in 1983/84 if current prices are not to be sharply reduced. A further devaluation of the dalasi would provide additional room for manoeuvre in maintaining producer prices for groundnuts (and cotton), but about a third of any increase in local currency earnings would be offset by the increased costs of imported rice. It must also be remembered that a reduction in the heavy subsidies on irrigated rice and the transfer of pumping and cultivation services to newly formed co-operative societies, may also depress production through reducing incentives and, temporarily at least, dislocating services.

FYP II, in recognition of the general economic situation of the country and the exhaustion of government and GPMB reserves, lays emphasis upon increased production. The Food Strategy Report (Part 2, pp. 54-56), in furtherance of the need to increase the impact of government programmes in the most cost-effective way on the alleviation of poverty in the rural areas, listed 17 points for attention in the design of food and nutrition programmes. The majority of these relate directly to the design of programmes for increasing agricultural production. As was pointed out, some of the points in question might seem trivial individually, but collectively they could be of major significance. There is certainly no doubt of the need to improve the incremental capital-output of all government investments when development resources are so scarce, but to achieve this objective requires an effort by producers which is matched by the public sector at all levels.

FYP II forecasted that some 90 per cent of the development budget for the plan would have to be met from external sources. As suggested in Section 0.2, this proportion is likely to be even higher in the light of subsequent events, and it is clearly desirable that a high proportion should be in the form of grants. Moreover, if essential services are to be maintained, not least

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(1) In the case of cereals, it will be noted that production in the base year chosen is now estimated to have been higher than the actual target.

to support increased agricultural production, external funds will be needed which can be used for budgetary support of these services.

4.2 ON-GOING AND FUTURE PROJECTS

4.2.1 Project Design and Implementation

In what are referred to as second-generation projects in the CILSS terminology, there are a number of projects presently being implemented, on-going from 1981, which are still being pursued, as well as others currently in the pipeline in various stages of preparation or negotiation. In conception, the most important aspects to be borne in mind in promoting agricultural production in The Gambia are that:

1. it is the farmers (men and women) who produce from the land and who decide what and how much to produce. Government can merely increase incentives or lessen disincentives or constraints;

2. increasing incentives or removing or lessening constraints requires a close understanding of farming systems and careful project design and continuous monitoring, which can only be achieved through a close working relationship with farming families.

The FYP II proposes to increase local participation, but in agriculture the only effective way of doing this is through a well selected and appropriately trained and managed extension service, backed by adequate research, which works with farmers. And as the Plan recognises, this must include women farmers.

The need to increase production and productivity rapidly during the current plan period needs no further emphasis, but haste may also be counterproductive, and there are longer term issues such as improved resource management which cannot be neglected. An improvement in the implementation of programmes is essential if their effectiveness is to be improved and unless adequate time is allowed and effort made to strengthen institutional capacity in the co-operatives and central government agencies, this is unlikely to be achieved. An institution building element is therefore involved in the majority of projects, but, for the current generation of projects, manpower development - training, motivation, the acquisition of skills and management- needs priority over new buildings.

Notwithstanding the addition of further in-service training and the supplementation by external expertise (technical assistance personnel), the cumulative weight of all programmes undertaken through public sector institutions must be carefully assessed in relation to existing levels of manpower capacity, which should not be overloaded if efficiency is to be improved. Over-complex projects should, in any case, be avoided as they inevitably lead to difficulties in implementation. The scope for encouraging the voluntary agencies to expand their already

valuable role in developing small projects, e.g. the Action Aid programme for swamp rice causeways, and in such aspects as village horticulture in which women are the main beneficiaries, also needs to be fully utilised. In this way the burden of project implementation otherwise falling upon the public sector can usefully be spread.

4.2.2 Policy Measures Required

The main policy measures which are required to give optimal support to programmes and projects to accelerate rainfed agricultural production are:

1. consistency in the allocation of adequate funds for financing, development and recurrent expenditures to agricultural services so as to ensure their continuity in accordance with clearly identified priorities;

2. the maintenance of attractive producer prices within the limits imposed by market forces and national and international resources for price stabilization;

3. an assured supply of inputs (including spare parts) at prices which take account of producer prices, costs of production and the cost of the inputs themselves, both to the farmers and to the economy. Here, as in the case of producer prices, undue seasonal price fluctuations need to be avoided;

4. the maintenance of co-ordinated policies for prices, credit, input supply, marketing and for extension, which avoids a multiplicity of, or conflicting advice to, farmers, and which take full account of the capacity and needs of different categories of producer, both men and women;

5. the progressive improvement in access to marketing facilities in which marketing, transportation and storage costs will be kept under review with the intention of reducing the price spread between producer and final consumer, subject to 6 below;

6. the development of efficient processing facilities to increase the internal market for locally produced cereals and other food;

7. avoidance of undue levels of agricultural taxation and subsidies. Surpluses acquired by marketing agencies such as the GPMB should be regarded as the property of producers, earmarked for specific purposes, and protected by law from diversion to activities not directly supporting agriculture; and

8. a strong political will, as required in the Lagos Plan of Action, which needs to extend to the achievement of improved standards of financial control and accountability.

4.3 PROJECTS INCLUDED OR TO BE INCLUDED

Table 34 sets out the Development Expenditure proposals for FYP II for the Agricultural sector, including Natural Resources. Only five projects (marked with an asterisk) relate directly to rainfed agriculture and, of these, the Agricultural Development Project (ADP), successor to the RDP, is the most important. For Agriculture, the Plan gives details of only two "major projects", the ADP for rainfed agriculture and the Jahally and Pacharr Smallholder Project for irrigated rice; but an outline, in terms of agricultural development expenditure, of the second largest project included in Table 34, the Mixed Farming/ Resource Management Project, is given below, as well as a summary of the Horticultural Development Programme and the UNDCF Supported Swamps Rehabilitation and Irrigation Development Project.

Chapter II, of the Plan (Rural and Regional Development), however, contains additional proposals for agricultural development to be financed from a Regional Development Fund (RDF), replacing the previous Divisional Development Fund (DDF) and the Department of Community Development Fund, together amounting to D4m which, it is hoped, will be augmented by external grants especially from non-governmental organisations (NGOs). This allocation of finances belies the potential importance of the medium- and small-scale projects which, taking agriculture alone, it is intended to finance at village and Divisional level with these resources, viz:

- food production projects, causeways, bunds and dams, gardens, marketing and transport, milling, and, specifically for women, storage facilities, donkey carts, grinders and decorticators.

4.3.1 Horticultural Development Programme

This programme for which D2.0 million is provided under FYP II (Table 34) extends over the period of the development plan. It is intended to provide national coverage with emphasis on horticultural activities in the Western Division supplying the hotel and restaurant industry and the urban population(1).

Production of budded fruit trees and seedlings is expected to rise from 16,000 in 1981/82 to 40,000 by the end of the plan and vegetable seeds will also be provided through the Horticultural Division of the Department of Agriculture. Technical assistance will be available to assist in the development by the private sector of suitable marketing, storage and transportation arrangements.

The provision of support on these lines is expected to stimulate additional private sector investment in commercial horticulture. There remains considerable scope, however, for the development of horticulture for local consumption in the rural areas through the regional funds referred to previously and through assistance from NGOs.

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(1) GOTG (MEPID). "Profiles of Projects Included in the Five Year Plan for Social and Economic Development 1981/82 - 1985/86", Banjul 1982.

TABLE 34

COST, FINANCING AND DEVELOPMENT EXPENDITURE
OF SECOND PLAN PROJECTS - AGRICULTURE & N.R.

(Million Dalasi)

Sector/Project	Total Cost	Second Plan Expenditure	Financing			Expenditure by year					Carry over Third Plan
			Grant	Loan	GLF	1981/82	1982/83	1983/84	1984/85	1985/86	
Agriculture and Natural Resources	186.7	131.3	62.3	55.6	13.4	6.8	19.5	33.4	35.6	36.0	46.4
Jahally and Pacharr Rice Development	31.0	27.6	8.0	16.6	3.0	-	6.7	10.6	7.4	2.9	3.4
Swamp Development/Rainfed-Rice Dev.*	5.0	5.0	5.0	-	-	-	1.0	1.0	1.0	2.0	-
Horticultural Development*	2.0	2.0	-	-	2.0	0.3	0.3	0.4	0.5	0.5	-
Ndama Multiplication Programme	6.0	6.0	2.0	4.0	-	-	-	1.0	2.0	3.0	-
Forestry Programme	9.0	6.0	5.0	-	1.0	1.2	1.2	1.2	1.2	1.2	3.0
Artisanal Fisheries	8.7	7.7	7.5	-	0.2	1.5	3.0	3.2	-	-	-
Industrial Fisheries	60.0	30.0	7.0	22.5	0.5	1.2	2.0	8.0	8.0	10.8	25.0
RDP-I*	1.0	1.0	-	1.0	-	1.0	-	-	-	-	-
Mixed Farming/Resource Management*	11.0	8.0	7.8	-	0.2	1.1	1.8	2.0	2.0	1.1	-
ADP-II*	50.0	35.0	20.0	11.5	3.5	-	3.0	5.0	13.0	14.0	15.0
Miscellaneous (GLF-Funds)	3.0	3.0	-	-	3.0	0.5	0.5	1.0	0.5	0.5	-

Source: Table A p. 2, Chapter 3 of the Five Year Plan, 1981/82 - 1985/86.

4.3.2 Swamps Rehabilitation and Irrigation Development

Bearing in mind the relatively high cost of irrigated rice production, the optimal utilisation of swamps has been recommended on more than one occasion, e.g. by the Food Strategy Report (1981). The estimated costs of this project are almost equally divided between rainfed (swamp) and irrigated rice production - US$1.211 million for the former and US$ 1.426 million for the latter, made up as follows:

Irrigated rice development	UNDCF	$1,162,000
	GOTG	$ 264,000
Swamp rehabilitation	UNDCF	$ 903,000
	GOTG	$ 308,000

Commencing in 1982/83, the provision of the necessary contribution from government resources is likely to prove a constraint. The programme, which is of high priority, covers the rehabilitation of five swamps in the Western Division - construction of bunds, sluice gates, ploughing of land to allow rapid percolation of the first rains and a systematic leaching programme to promote desalinisation. (The irrigated component is largely to be devoted to the procurement of machinery and equipment, hence the higher proportion of external funding envisaged.)(1)

Some degree of uncertainty exists in the case of two major externally funded projects which have an important bearing on agricultural perspectives in the medium term. The one, the Agricultural Development Project (ADP), the second phase of the RDP I implemented during FYP I, and the other the Mixing Farming and Resource Management Project funded by USAID which is currently (April 1983) being reviewed. It is necessary, therefore, to make some assumptions about what these projects are likely to cover and for how long. In the case of the ADP, the Staff Appraisal Report is still awaited (although shortly expected) in The Gambia, but in the light of the joint preparatory work undertaken by, and the detailed discussions held between the IBRD missions and government personnel, there exists a fairly strong base upon which to make such assumptions. For the Mixed Farming Project, during the preparation of this report on rainfed agriculture, the team has had the opportunity for informal discussion and exchange of views with the USAID Review Mission on priorities and feasibilities, although the direction of further funding is clearly dependent on subsequent negotiations between Government and USAID.

4.3.3 The Agricultural Development Project

It is assumed that the proposed project will include all Divisions, unlike the RDP I, that it will commence in 1984 (with an impact on production in the 1984/85 season) and that it will extend over a period of two years, that is until the 1989/90 season. The project is expected to focus on increasing the

(1) GOTG (MEPID). "Profiles of Projects Included in the Five Year Plan for Social and Economic Development 1981/82 - 1985/86", Banjul 1982.

production and returns from groundnuts, rice (other than irrigated rice which would benefit, however, from research and multiplication at Sapu), maise, cotton sorghum and millet. The number of farm families (probably defined as dabadas this time rather than compounds) to be directly involved is likely to be in excess of 10,000, although considerably larger numbers stand to benefit from improved services arising from the project.

Orientation. In the light of experience with RDP I in which infrastructural components assumed too large a part (partly as a result of over-runs on building costs), the ADP will place emphasis on production, and improvements to essential services to agriculture - extension and training, research, seed multiplication and distribution, input and credit delivery systems and effective programming and monitoring with a view to strengthening and making more efficient use of existing resources. A contribution to the improvement of produce marketing would come through improvements to selected co-operative society seccos and additional training of GCU and primary society staff.

Funding. With project costs of around US$24-25m and IDA and IFAD loans of US$13-14m, support from other donors (most of which is now in grant form to The Gambia) is likely to be needed to a total of around US$10m, assuming that Government is not in a position to contribute more than US$1m in view of current financial constraints. A further, although phased reduction on fertilizer subsidies has been frequently recommended (and farmers may also be required to contribute more to crop protection), but if the project is to succeed in raising output (as discussed in Section 1.3.2), it will require a further increase in fertilizer use for which farmers must pay an increasing amount. Recurrent costs of fertilizer use in association with the project is likely to amount to US$19-20m of foreign exchange(1).

Relationship with Other Projects. The ADP would complement and be complemented directly by a number of other externally funded projects, viz in co-operative training (USAID/CLUSA), strengthening the PPMU (UNDP/FAO and IBRD, but more donors may contribute); in Crop Protection (USAID); in fertiliser promotion (FAO/Danida), and as yet unfunded FAO project on the Establishment of an Agricultural Statistics Division under the PPMU and on the Reduction of Post Harvest Losses in Farm Based Stores. Other related projects include the FAO Revolving Fund for Agricultural Credit for Women, the Mixed Farming Project (particularly for maize) and the emergency and consolidation programme funded by the United Kingdom to ensure the survival of the research and seed multiplication activities at Sapu during the hiatus between the RDP I and the ADP, and such support as may be forthcoming from bi-lateral sources for irrigated rice production. Other projects having an indirect bearing include that of the cereal banks and for a strategic grain reserve.

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(1) An increase in fertilizer aid could of course offset this and provide local funds for e.g. rebuilding the GPMB price stabilization reserve and for credit insurance (see under Fertilizer Aid).

Some issues raised. Apart from securing donor support to close the funding gap, the question has been raised whether The Gambia can afford to provide even the small amount of local costs involved in the ADP - a visit from the IMF is expected shortly which may have pertinent views on the level of government borrowing and spending -; whether the institutional base is strong enough to handle a project of this size, allowing both for experience in RDP I and the measures contained in the project to strengthen the key institutions, as well as the substantial number of smaller projects in the agricultural sector which inevitably compete to some extent for available manpower, transport and other services financed from presently very limited recurrent cost financing possibilities (see Section 4.3.6, however). The point has also been made that a project encapsulated within a time-span of five years (as in most projects) with a predetermined level and mix of inputs is less likely to succeed in an area such as small-scale farming, with so many variables, than a more flexible programme spread over a longer period. This may be so, but as The Gambia does not have the resources to carry out such a programme, it is academic unless donors are prepared to provide support in these terms on the scale required. Whether The Gambia is likely to have the resources to maintain improved services after the project has ended will depend largely on its success in increasing production and improving efficiency, but if the project is successful, a third phase, to extend the programmes involved to additional producers over a longer period of time, is obviously a strong possibility.

Since the size of the project has been raised, it is necessary to consider briefly the question of scaling down. A reduction in the size of the project could be achieved either by reducing the coverage, now aimed at 25 per cent of the "farming units" over a five-year period, or reducing the range of crops to be included, or a combination of both. Either would have the effect of increasing the overheads as a percentage of total costs. Without much doubt, a significantly re-designed project would almost certainly set the project back by at least a year, and postpone much-needed improvements in services to farmers which should extend well beyond the "target" group.

A reservation on risk. Project assumptions on incremental yields over the five-year period are relatively modest, even though allowing for only one drought year in five with a 40 per cent reduction in yields. Recent experience (see Section 1.1.1) suggests a higher ratio of drought years, although not all crops and not all areas will be affected equally. The averaging of crop yields over a number of seasons for the purpose of demonstrating improvements in farmers' average returns and rate of return on the project does not take account of the consequences of a drought year on the repayment capacity, subsequent creditworthiness or confidence of farmers utilising a loan package. The need for some sort of credit insurance to provide partial cover against the vagaries of climate therefore seems desirable if not essential (Sections 2.3.6 and 4.3.11).

Conclusions. This project has yet to be finally negotiated and fully funded. The activities proposed are all of high priority and well integrated as conceived. High levels of management will be required, however, for successful implementation. Care will be needed that the allocation of time and resources to participating farmers does not result in a reduction of services to others. One relatively large integrated project is preferable to an additional number of small projects requiring much greater co-ordination, provided that sufficient contingency funds and flexibility are maintained to fill unforeseen gaps. All donors providing or contemplating support for rainfed agriculture (and animal husbandry) should review their programmes in the light of the final shape of the ADP with a view to optimising mutually reinforcing benefits.

4.3.4 Mixed Farming and Resource Management Project (635-0303)

This project, financed by a USAID grant is about two years into its five-year life. In March-April 1983 it is being evaluated and amended with the expectation that its total cost will be approximately US$10.5m, including an internal contribution by Gambia Government of about $1 million equivalent to D2.5m.

The project's purpose is to promote the diversification and intensification of crop and livestock production within existing Gambian farming systems in order to increase net rural family incomes on an ecologically sound and sustainable basis consistent with that element of USAID's assistance strategy which supports agricultural diversification. The three related productive improvements sought through research, farm trials, training and so forth lie with maize, on-farm forage and range management. Associated socio-economic research and survey, land-use mapping and experiments with mechanical technologies support these three thrusts.

The project has been relatively successful so far in demonstrations of an improved maize package, in assisting Livestock Owners' Associations with grazing-land management and on-farm forage production and utilisation, and, more generally, in integrating its activities into the Government's agricultural administrative system.

It is possible that the amended project will, in addition to completing the sequence of developments now being implemented, also support new project-related marketing studies, nutrition interventions and agricultural statistical work.

4.3.5 UK Support for Research and Seed Multiplication

This project, officially referred to as the Agricultural Research and Seed Multiplication Unit = Sapu Projects (1983) was not included in the Development Plan (FYP II). It arose as a result of the hiatus following the end of the RDP I and the proposed ADP, during which inadequate funds were available to maintain essential research and seed multiplication activities upon

which the ADP depends heavily. A total of £584,000 (including capital and technical assistance) was therefore made available by the United Kingdom for what was initially a "rescue" operation, followed by a consolidation phase, covering an 18-month period from October 1982 to March 1984, with provision for some continuing consultance and technical assistance, e.g. the provision of an agricultural economist for the research programme. It is assumed that the termination of the main bridging operation will coincide with the start of the ADP.

4.3.6 The US Food for Development Programme

Background. Concern was expressed in the Food Strategy Report on the possibly adverse effects of food aid on agricultural production in The Gambia, and in this report mention has been made of the need to ensure that food aid imports are closely geared to local availability if the incentives to domestic production are not to be blunted. Provided that efforts to promote the consumption of local foodgrains, e.g. sorghum, millet and maize are not relaxed, however, this reservation does not apply to food aid in the form of rice. Because of the large structural deficit involving heavy annual expenditure on commercial imports, the provision of increased supplies of concessional rice can only be of benefit in relieving the drain on foreign exchange and, if the local currency derived from the sale of such rice is used to promote incremental production and not to support services or expenditures which cannot be sustained subsequently, such food aid can be of great benefit in overcoming the serious financial problems referred to in Section 2.4 of this report.

It is desirable, but not essential, that food aid in the form of rice should be made up of broken rice as is normally imported by the GPMB from the Far East (if only because available funds will go farther), rather than of superior quality grain, in order not to introduce new consumer preferences. However, it has to be recognised that the Gambian consumer already has a wide range of choice as between several local varieties and those hitherto imported.

Utilisation of funds. The grant of US$9 million under PL 480 (Title II Section 206) over the next five years in the form of rice could be used, amongst other priorities, to provide alternative revenue in place of the groundnut export tax, which as already observed, may have to be waived next season, if it is not abolished, unless farmers are to suffer a very severe reduction in prices should the world market price not recover substantially from its 40 per cent fall this season. Other specific uses directly geared to strengthening agricultural output include:

1. the Provision of recurrent cost financing, to make good any shortfalls that may occur, notwithstanding the ADP, in essential research, training, marketing and extension activities;

2. contributing to the re-establishment of the GPMB price stabilization reserve funds (with the safeguard already referred to in Section 4.2.2);

3. establishment of a Credit Insurance Fund, to the maintenance of which farmers themselves would subsequently contribute.

Proposals to establish a Credit Insurance Fund (for seasonal production loans to cover against serious crop failure through drought), subject to a feasibility study, were included in the Food Strategy Report (1981) and subsequently referred to in the current development plan (FYP II) as an issue to be given further consideration. The case for such a fund is now considered to be at least as pressing as it was in 1981 and, as no provision for it is contemplated in the ADP, recommendations for a feasibility study and for initial funding, should a feasible model be identified, are therefore included in this report. If PL 480 local currency generation is not available for this purpose for any reason the expectation is that another donor may consider undertaking the feasibility study and/or providing some of the initial capital required to establish the fund.

Conclusion. In the light of the problem arising from the shortage of recurrent cost financing to support income-generating activities in agriculture which are solved by the provision of project aid, even where provision is made for the recurrent expenditures incurred in connection with the implementation of the project itself, it is considered appropriate to stress that the use of the PL 480 programme referred to is likely, if used properly, to provide a very valuable element of support to agriculture during a critical period of years, with the flexibility that is required to ensure that unforeseen gaps in agricultural services will not remain unfilled through inadequate recurrent cost financing. Furthermore, as there will be substantial savings in the foreign exchange costs of imported rice, the likelihood of such gaps occurring through a shortage of foreign exchange available to government for allocation to essential services in agriculture will also be considerably reduced.

4.3.7 Soil and Water Management

This project, funded by USAID (635-0202) with a grant of $2.5 million, is not included in the development estimates of FYP II. It overlaps the first and second plans and is currently being reviewed. The original objectives were to:

1. establish a Soil and Water Management Unit within the (then) Ministry of Agriculture and Water Resources;

2. develop technology for improved agricultural/pastoral methods that are consistent with Gambian abilities and resources;

3. train Gambian soil and water management specialists and agricultural assistants to apply solutions to soil and water management problems at national and village level.

The future of this project in supporting further work on soil and water management is now under review, but further support for training is expected. It has to date provided the only substantial impetus to the training of Gambian personnel in conservation methods, including the production of a useful handbook on soil conservation for field staff. The training of a Gambian cadre of specialists in soil and water management has not been proceeded with, but the sensitizing of a large proportion of the extension personnel to soil and water management issues and to simple ways of conserving soil and water has been achieved.

4.3.8 Sahel Regional Projects

Projects of direct relevance to rainfed agriculture funded on a regional basis and not, therefore, included in The Gambian Development Estimates include:

1. Regional Food Crop Protection (RFCP) and Integrated Pest Management (IPM) both USAID-financed activities under the regional Crop Protection Programme executed by CILSS/FAO;

2. Regional Agrometeo- and Hydrological Programme (AGRHYMET), a CILSS/WHO project financed by various bi- and multilateral donors.

The benefits of the first programme at national level are derived through the Crop Protection Division of the Ministry of Agriculture whose activities are described in Section 1.2.5. The climatological data referred to in Section 1.1.1 of this report are a direct outcome of work undertaken under the AGRHYMET programme, through the Department of Hydromet.

4.3.9 Increased Fertilizer Aid

An increase in fertilizer aid from the modest levels hitherto provided through the IFSS and bilaterally can be justified on the same grounds as for the US Food for Development Programme, i.e. savings in foreign exchange and generation of local funds for agricultural development.

According to a 1982 FAO report(1), every dalasi of foreign exchange spent on single-superphosphate fertilizer for groundnuts, at world market prices than prevailing, generated an additional foreign exchange gain of D6.41. Even at half this rate, investment in further fertilizer is in the national interest. Foreign exchange has to be available in the first place, however, and the fertilizer import requirements of the ADP alone are calculated to amount to approximately US$20m over five or six years, in relation to a target group comprising only about 25 per cent of the farm production units and excluding irrigated rice altogether. Fertilizer consumption projections for The Gambia need to be

(1) Fertilizer Use Promotion: Distribution and Credit Assistance, 1st July 1981 - 31st October 1982, The Gambia. Interim Report, FAO 1982.

revised when the ADP proposals are finalized, but even taking account of the likely effects of reduced subsidies, existing projections are almost certainly bound to be revised upwards.

The provision of additional fertilizer aid can be justified, however, solely in relation to the requirements of the ADP. The question of supporting the procurement of additional fertilizer for farmers not reached by the ADP would require careful liaison with the ADP management and, almost certainly, some expansion of the type of activity undertaken by the FAO Fertilizer Programme - largely through Trust Funds and donations of fertilizer - to ensure its efficient use.

It would not be appropriate here to attempt to specify any particular level of fertilizer aid, which is a matter for negotiation with interested donors. The utilization of local currency generated by the sale of fertilizer provided through foreign aid could be directed most appropriately to the purpose outlined in the US Food for Development Programme, to which should be added local costs for agricultural statistics as an important element of the work of the PPMU and currently not funded. A summary of this project is provided below.

4.3.10 FAO Pipeline Projects (rainfed-related)

The following is a list of FAO-executed projects in the pipeline as of mid-April 1983. Those not yet funded with any degree of certainty are marked with an asterisk. Of the latter that for the Establishment of an Agricultural Statistics Division is dealt with in more detail for the reasons given below.

GAM/81/003 STRENGTHENING OF THE PLANNING, PROGRAMMING AND MONITORING UNIT OF THE AGRICULTURAL SECTOR. PPMU. US$1,076,815

\+ GAM/81/005 POST-HARVEST LOSSES IN FARMER-BASED STORES. US$451,000

\- DEVELOPMENT OF HORTICULTURE. US$527,670

\- STRENGTHENING OF CROP PROTECTION SERVICE. US$620,000

\- PRODUCTION AND PROCESSING OF CEREALS INTO COMPOSITE FLOUR BY RURAL WOMEN FARMERS. US$384,864

\+ \- VERTEBRATE CROP PROTECTION. US$526,000

\- RICE COMMODITY POLICY STUDY. US$96,000

\- REVOLVING FUND FOR AGRICULTURAL CREDIT FOR WOMEN. US$60,000

\+ \- TECHNICAL ASSISTANCE AGRICULTURAL DEVELOPMENT BANK. US$288,910

+ - APPLICATION OF REMOTE SENSING FOR IMPROVING LAND AND WATER RESOURCES. US$341,000

- GROUNDWATER INVESTIGATION AND DEVELOPMENT. US$1,822,000

+ - EMERGENCY ASSISTANCE FOR CROP PROTECTION SERVICES. US$1,500,000

+ - ESTABLISHMENT OF AN AGRICULTURAL STATISTICS DIVISION. US$734,005

A summary of these projects is not available at the time of writing this report, although detailed project proposals have been prepared for most of them. It is not possible to evaluate them here. However, the project for agricultural statistics is outlined below.

Establishment of an Agricultural Statistics Division

This can more appropriately be described as strengthening the service created during the first phase of the PPMU within the Ministry of Agriculture. Apart from the need to expand the coverage of primary data gathering, there is a need to improve the quality of processing and publication of statistical data for planning purposes and, also, of research-related surveys.

The proposed unit will cover both the needs of the Ministry of Agriculture and, in the field of forestry and fisheries, those of the Ministry of Water Resources and Environment to which the PPMU also has responsibilities. In agriculture, the detailed Project Document prepared by FAO includes reorganising and strengthening livestock population and products surveys (currently almost non-existent), assisting the Central Statistics Department (CSD) in preparing for the 1984/85 FAO decennial Census of Agriculture and:

> "Carrying out of Annual Agricultural Sample Surveys to provide estimates on area and production of crops, farming practices, use of inputs and improved techniques, crop disposal, producer prices, household livestock slaughterings, self-sufficiency in food, etc."

With the exception of the first two items, acreage and production, virtually no information is available in The Gambia.

This project was designed to commence in January 1983, but UNDP funds were not available. There are two reasons why the earliest possible funding is desirable. First, an improved statistical series for the 1983/84 crop season would provide a sounder baseline for the ADP than exists at present. Second, as implementation depends upon the selection, training and utilisation of some 25 Agricultural Assistants, it would be more satisfactory for this to be completed before the deployment of the extension service envisaged in the ADP is embarked upon.

4.3.11 Production Credit Insurance Fund

After very full deliberations with the FYP II preparation Sub-Committee on Credit, Marketing and Inputs, the Food Strategy (1981) put forward proposals on credit policies and strategies (Part II, pp. 127-134), institutional aspects (Credit Co-ordination, pp. 193-195) and for a Credit Insurance Fund (Part III, Annex 6). With the aid of a newly appointed Credit Adviser, provided under an IBRD facility in anticipation of the ADP, the GCU is now preparing a credit policy document which is currently awaited. It is understood that this does not include specific proposals for credit insurance, but discussions indicate that the proposal would be fully supported by the GCU. Prior to completion of the Food Strategy Report, an outline of the credit insurance proposals were sent informally to the relevant Division in FAO and approved in principle there and by the (then) FAO Credit Advisor in the PPMU.

The essential elements of the Credit Insurance Fund are:

1. It should be confined to production credit (hence the title now used) and that it should cover only seasonal credit issued through the Co-operatives on officially approved and supervised projects such as the ADP. (It would not, therefore, cover larger loans issued by GCDB or (now) the ADP direct to borrowers.)

2. It would preferably coincide with the abolition of subsistence credit.

3. Farmers would contribute to it (at a rate to be determined on an actuarial basis but initially at a rate of perhaps 5 per cent of the sum borrowed, but accepting that in the case of serious drought the Fund would require a subvention through government).

4. Cover would be provided only against serious crop failure through drought, not assessed on an individual basis but rather that of a District or such sub-division of a District as may be practicable.

5. Its establishment (preceded by a feasibility study) would be accompanied by a nation-wide extension programme to explain

   (a) that in future no write-off of production credit would take place, but that

   (b) in the case of "Acts of God" in the form of drought, a predetermined proportion of the seasonal production credit utilised for the crops intended would be met from the Credit Insurance Fund to which every borrower would subscribe and which would therefore constitute <u>their</u> insurance.

It is envisaged that the Fund should not provide cover for medium-term credit for implements, etc. as to do so would be too complicated, and that provided the GCU reserves are established to make appropriate provision, medium-term loan payments should merely be rescheduled in the case of serious crop failure.

The cost of a four-month feasibility study is estimated to be US$40,000. (Consultant plus expenses).

An initial injection of capital of about D4 million is estimated to be the minimum required to establish the fund.

The Consultant would be required to work closely with the Department of Agriculture, the Department of Hydromet, the GCU Credit Department and the PPMU.

4.4 CONCLUSIONS ON THE PROGRAMME

The programme for rainfed agriculture outlined in this Chapter includes the greater part of the investment requirements and supporting recurrent expenditures that can reasonably be utilised effectively over the current Five Year Plan. Some parts of it, in particular the Agricultural Development Project (ADP), are programmed to carry over into the next plan and it is to be expected that other components referred to in this Chapter will also be continued into the Third Five Year Plan if results justify it.

None of the components dealt with are of a short-term nature, although by the end of the ADP it is to be expected that this and other programmes will collectively contribute to a substantial improvement in agricultural output and to the economic position of the country, thus measurably reducing the present dependence on external funding for such a large part of the agricultural development programme. Specifically, it should be possible to achieve the FYP II targets for production in aggregate over the five year period, and to lay the foundation for a faster rate of growth - given always that too many drought years do not intervene.

The required achievements call for political will and support throughout the public sector for concerted action to improve the efficiency of all institutions serving the agricultural sector, including the maintenance of adequate producer prices and associated policies, and for a general effort to increase the effectiveness of all government spending. The full mobilisation of public-sector manpower, aided by increased performance-related training, will be indispensable. Given reasonable management and the proper use of supplementary professional personnel provided through foreign aid, the programme outlined is not inconsistent with the manpower available in The Gambia for agricultural development. The need for the consistent provision of adequate funds to support agricultural personnel in their work has been stressed in this Report. If this is forthcoming, as is proposed, the challenge to be met is that of demonstrating a high rate of return to this investment in terms of increased agricultural output and productivity.

Annex 1

REGIONAL STRUCTURE OF PRODUCTION FOR THE 1981/1982 SEASON

	G/NUTS		RICE				SORGHUM		MILLET				MAIZE		FINDO		COTTON	
			UPLAND		SWAMP				EARLY		LATE							
	AREA '000 Ha	PROD. '000 Tons	AREA '000 Ha	PROD. '000 Tons	AREA '000 Ha	PROD. '000 Tons	AREA '000 Ha	PROD. '000 Tons	AREA '000 Ha	PROD. '000 Tons	AREA '000 Ha	PROD. '000 Tons	AREA '000 Ha	PROD. '000 Tons	AREA '000 Ha	PROD. '000 Tons	AREA '000 Ha	PROD. '000 Tons
WESTERN	9.5 9.0	12.3	1.5 1.3	1.2	0.9 0.8	1.1	1.9 0.96	0.9	0.3 0.07	0.09	4.0 2.2	1.5	0.39 0.24	0.53	0.4 0.33	0.2	NIL NIL	NIL
LOWER RIVER	9.7 8.4	14.0	1.7 1.7	2.0	6.0 5.4	6.3	0.6 0.39	0.5	1.2 0.9	1.1	1.5 1.1	1.4	1.4 1.2	1.66	2.3 1.32	0.9	NIL NIL	NIL
NORTH BANK	23.7 23.3	29.1	0.02 0.02	0.02	4.9 4.4	5.7	2.2 1.4	1.9	6.3 5.8	6.5	2.14 2.6	3.9	1.76 1.7	2.43	0.6 0.54	0.4	NIL NIL	NIL
MacC. ISLAND	21.5 21.2	29.4	0.4 0.4	0.5	8.0 8.0	10.1	5.4 4.37	3.4	4.5 4.5	6.6	0.5 0.5	0.8	1.16 1.06	2.12	0.04 0.03	0.02	.745 .562	0.617
UPPER RIVER	21.4 18.5	24.1	1.0 0.8	1.0	4.2 3.7	4.7	5.1 4.78	6.0	0.2 0.2	0.2	5.8 5.2	7.2	3.4 3.4	5.73	1.2 0.96	0.7	2.302 1.993	2.186
THE GAMBIA	85.8 80.4	108.9	4.62 4.22	4.72	24.0 22.3	27.9	15.2 11.9	12.7	12.5 11.47	14.49	13.94 11.6	14.8	8.11 7.6	12.47	4.54 3.18	2.22	3.047 2.555	2.803
AVERAGE YIELD			1.27 1.35		1.02 1.12		1.16 1.25		0.84 1.07		1.16 1.26		1.06 1.28		1.54 1.64		0.49 0.70	.919 1.097

N.B: The top set of row hectarage figures refers to area planted and the bottom set refers to area harvested.

Source: Agricultural Sample Survey Report of the PPMU Statistic Section

Annex 2

COMPARISON OF CLIMATIC FACTORS BETWEEN BASSE AND YUNDUM

Observation/ Calculation	Station	J	F	M	A	M	J	J	A	S	O	N	D	Total Year
Mean daily sunshine hour (assumed identical for Basse)	Yundum	9.0	9.2	9.9	10.2	9.8	8.3	6.5	5.4	6.3	7.7	8.5	8.6	
Mean monthly rainfull mm	Yundum (28 yrs) Basse (26 yrs)					4 19	70 127	269 209	462 338	300 242	94 90	6 10		1205 1035
Mean temp., °C	Yundum Basse	23.2 24.7	24.6 27.3	25.5 29.2	25.5 31.4	25.8 32.3	27.1 29.9	26.7 27.8	26.1 26.9	26.4 27.2	26.7 28.2	25.6 27.5	23.3 24.7	
Mean vapour pressure mm Hg	Yundum Basse	10.0 6.5	9.8 6.7	12.5 8.7	12.3 10.9	15.8 16.1	18.5 20.4	19.3 21.3	19.9 22.0	20.6 20.0	21.2 18.0	13.1 14.6	10.3 6.8	
Mean daily wind run km	Yundum Basse	95 45	105 50	115 55	130 65	125 85	115 60	105 60	85 50	65 40	55 30	85 30	90 33	
E_o Penman Open water potential evaporation mm per day	Yundum Basse	4.2 3.3	5.1 4.0	5.7 5.1	6.5 5.9	6.2 7.1	5.5 5.8	4.7 4.7	4.2 4.2	4.4 4.4	4.4 4.4	4.0 4.0	3.9 3.1	1780 1700
E_t Penman Evapo transpiration for short green crop mm per day	Yundum Basse	3.4 2.9	3.8 3.6	4.5 4.4	4.9 5.0	4.8 5.6	4.4 4.6	3.8 3.8	3.3 3.3	3.5 3.6	3.5 3.7	3.3 3.4	3.2 2.7	1422 1420

Source: LRS Report

Annex 3

MECHANICAL TECHNOLOGY: STRUCTURE OF AGRICULTURAL PRODUCTION/REGION/PRODUCTION UNIT (DABADA) AS AT 1981/82 SEASON

Type of Draught/ Implement	The Gambia				Western				Lower River				North Bank				MacC. Island				Upper River			
	% age of:				% age of:				% age of:				% age of:				% age of:				% age of:			
	O	R	B	N	O	R	B	N	O	R	B	N	O	R	B	N	O	R	B	N	O	R	B	N
Tractor	0.2	4.2	NIL	95.6	NIL	0.5	NIL	99.5	NIL	NIL	NIL	100	NIL	NIL	NIL	100	0.6	5.0	NIL	94.4	0.3	11.2	NIL	88.5
Cultivator	0.2	NIL	5.6	99.8	NIL	NIL	NIL	100	NIL	NIL	NIL	100	NIL	NIL	NIL	100	0.6	NIL	NIL	99.4	0.3	NIL	NIL	99.7
Plough	23.8	3.4	11.1	67.2	18.9	10.4	8.5	62.2	12.1	NIL	7.2	80.7	NIL	NIL	NIL	100	11.2	0.6	3.4	84.8	53.5	3.8	5.9	36.8
Seeder	19.1	4.2	8.6	35.6	22.2	7.5	10.8	59.5	42.0	1.4	17.9	39.7	85.6	1.7	8.5	4.2	63.7	4.5	7.3	24.5	50.0	4.5	9.8	35.7
Weeder	45.5	1.8	2.3	44.1	19.3	0.9	5.7	74.1	29.0	0.5	16.9	53.6	83.1	0.8	5.1	11.0	65.4	2.8	6.7	25.1	49.0	3.1	7.3	40.6
G/Nut Lifter	5.7	NIL	2.3	92.0	1.9	NIL	5.1	92.9	1.0	NIL	14.8	94.2	NIL	NIL	0.8	99.2	25.1	NIL	NIL	74.9	2.1	NIL	0.3	97.6
Horses	13	NIL	NIL	87	NIL	NIL	NIL	100	NIL	NIL	NIL	100	21	NIL	1	78	20	NIL	NIL	80	22	NIL	2	76
Donkey	38	2	4	56	11	3	2	84	42	2	8	48	56	1	9	44	30	2	8	60	50	2	3	45
Oxen	26	3	4	67	28	9	6	57	12	NIL	6	82	24	2	5	69	31	NIL	1	68	33	5	3	67

KEY: O = Owners; R = Renters; B = Borrowers; N = None (traditional labour devices)

N.B.: Rows are not exclusive.

Source: 1981/82 Sample Survey Report of the PPMU Statistics Section.

Annex 4

PURCHASE AND PRICES OF GROUNDNUT AND TERMS OF TRADE

1974/75 - 1980/81

	1974/75	1975/76	1976/77	1977/78	1978/79	1979/80	1980/81
Purchase of groundnut by GPMB thousand metric tons	137.2	137.8	124.8	82.3	119.7	65.8	45.0
Export price (f.o.b. Banjul) Dalasi/metric ton(1)	633	549	841	879	729	608	816
Purchase price of groundnut (f.a.q.) Dalasi/metric ton(2)	306	365	402	402	421	421	460
Purchase price/export price (%)	48.3	66.5	47.8	45.7	57.8	69.2	56.4
International price: in current $/m.t. (c.i.f. Rotterdam)(3)	452	424	551	621	565	493	650(4)
- do - in constant 1977 $	499	460	551	525	417	326	403(4)
Index of terms of trade of The Gambia (1965/66 = 100)	116.6	84.6	97.8	89.6	85.6	58.2	

Source: Table 2, Chapter 2 of the Five Year Plan, 1981/82 - 1985/86

(1) Unshelled basis, weighted average (f.a.q. + h.p.s.)

(2) Since the quantity of h.p.s. nuts is very small (generally under 2000 m.t.) the differential between f.a.q. and h.p.s. prices has been ignored in the calculation

(3) Source: IBRD - Commodity price forecasts - June 1981

(4) Estimated

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