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NIGERIA

OYO STATE

OYO NORTH AGRICULTURAL DEVELOPMENT PROJECT

STAFF APPRAISAL REPORT

March 18, 1980

West Africa Projects Department
Agriculture Division I

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CURRENCY EQUIVALENTS

Currency unit - Naira (₦)
US\$1 - ₦0.60
₦1 - US\$1.67

WEIGHTS AND MEASURES

Unless otherwise stated, all weights
and measures in this report are metric.

1 metric ton - 0.98 long ton
1 hectare (ha) - 2.47 acres
1 kilometer (km) - 0.62 mile

FISCAL YEAR

April 1 - March 31 (until January 1, 1981)
January 1 - December 31 (from January 1, 1981)

ABBREVIATIONS

ADP	Agricultural Development Project
APMU	Agricultural Projects Management Unit for West Africa
AISU	Agricultural Inputs Services Unit
APMEPU	Agricultural Projects Monitoring, Evaluation and Planning Unit (KADUNA)
ARMTI	Agricultural and Rural Management Training Institute
ASC	Agro Service Center
ASP	Advanced Service Package
BSP	Basic Service Package
BPCC	Budget and Policy Coordinating Committee
CAPO	Chief Agricultural Planning Officer
FDA	Federal Department of Agriculture
FDRD	Federal Department of Rural Development
FGN	Federal Government of Nigeria
FMA	Federal Ministry of Agriculture
FMF	Federal Ministry of Finance
FSC	Farm Service Center
IAR	Institute of Agricultural Research
IITA	International Institute of Tropical Agriculture
LGA	Local Government Area
LGC	Local Government Council
MANR	Ministry of Agriculture and Natural Resources (Oyo State)
MTIC	Ministry of Trade, Industries and Cooperatives (Oyo State)
MLG	Ministry of Local Government (Oyo State)
MOW	Ministry of Works (Oyo State)
NACB	Nigerian Agricultural and Cooperative Bank
NAFPP	National Accelerated Food Production Program
NGPC	National Grain Production Company
NSPRI	Nigerian Stored Product and Research Institute
NIFOR	Nigerian Institute for Oil Palm Research
NPMC	Nigerian Produce Marketing Company
NRRI	National Root Research Institute
NSS	National Seeds Service
NSTDA	National Science and Technology Development Agency
OFN	Operation Feed the Nation
ONPMU	Oyo North Project Management Unit
ONPTCC	Oyo North Project Technical Coordination Committee
OYSG	Oyo State Government
OYSICC	Oyo State Investment and Credit Corporation
THU	Tractor Hire Unit
ULV	Ultra Low Volume
UI	University of Ibadan
UPE	Universal Primary Education

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- IBRD 14027 - Existing Agricultural Services, Roads and Dams
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OYO STATE

OYO NORTH AGRICULTURAL DEVELOPMENT PROJECT

I. BACKGROUND

1.01 The Federal Government of Nigeria (FGN) has requested Bank Group assistance in financing an agricultural development project in the Ifedapo, Irepo and Kajola Local Government Council (LGC) areas of Oyo State. This report appraises a project designed to increase the productivity, incomes and standards of living of the farm families in these areas by providing or strengthening farm support services, promoting better farming practices and effecting infrastructural and institutional improvements. Direct beneficiaries would be about 51,500 farm families, each cultivating about 2.0 ha, who can be expected to adopt basic improved practices on at least part of their farms, and about 3,500 participants each cropping from 2.5-5 ha, but as part of medium and large group farms.

1.02 An Identification Mission visited Oyo State in April 1976 and reviewed State agricultural prospects and population statistics and, in the light of recent local government reform, made recommendations on a suitable zoning structure for agricultural development administration. Following field study and discussions with both State and Federal officials, full agreement was reached on location, concept and preparation arrangements for the project. Subsequently, FGN financed a team of consultants, assisted by Federal and State counterparts, to prepare a feasibility study. Field studies were completed in January/May 1977 and a final report was submitted in August 1978.

II. THE AGRICULTURE SECTOR

2.01 Nigeria. The Federal Republic of Nigeria comprises 19 States and covers a total land area of 924,000 km². Total 1978 population is estimated at roughly 81 million, which is nearly 20% of the total for the African continent. Average GDP per capita (estimated at around US\$560 in 1978) is low and unevenly distributed; income in rural areas is considerably lower.

2.02 Economic Trends. The Nigerian economy is dominated by the oil sector, which accounts for 30% of GDP, over 90% of export earnings and 80% of Government revenue. The increase in the oil price in 1973/74 enabled the Government to embark on a massive investment program and this contributed to GNP growth averaging 6% per annum between 1973 and 1977. However, growth was concentrated in those sectors that benefitted in particular from the rapid expansion in Government expenditure, i.e. infrastructure, education and large scale manufacturing, and performance of the productive sectors, notably agriculture, has been disappointing.

2.03 The unprecedented rise in public spending (Federal current expenditure increased from US\$1.1 billion in 1973/74 to US\$4.2 billion in 1977/78, and capital expenditure from US\$1.2 billion to US\$9.7 billion), quickly exhausted the oil-produced internal and external surpluses, and Nigeria faced

considerable fiscal and balance of payments constraints in 1978. The economy was unable to generate goods and services at the rate demanded, and consequently the domestic price level rose by over 22% per annum between 1974 and 1978. Just when severe restrictions on imports and government expenditure started to effect the economy a combination of a higher level of oil output and 65% rise in the price of oil during the first half of 1979 substantially improved the country's financial position. Though the oil price is expected to continue to rise gradually in real terms through 1990, oil production may not exceed the present level of 2.15 million barrels per day. The overall growth prospects for the next few years are good, but the longer term outlook largely depends on the successful outcome of efforts to diversify the economy and in particular to improve performance in the agricultural sector.

2.04 Sectoral Characteristics. 1/ Agriculture is by far the most important economic sector in Nigeria; it is estimated that about 61% of the population derives its income from agriculture which constitutes 23% of GDP; 5% of total exports and 62% of non-oil exports. Structurally, Nigerian agriculture is overwhelmingly small scale. Agricultural production depends on traditional cultivation methods and, in general, farm level efficiency is low.

2.05 Cropping patterns vary within the country's main ecological zones. In the southern forest zones, where rainfall is bimodally distributed over a wet season of up to eight months, the agricultural economy is largely based on tree crops with annual staples providing subsistence and subsidiary income. In the Guinea and Sudan savannah zones of the north, rainfall is monomodal within a six-month spread and production is based almost entirely on annual crops. Between these two zones is an area known as the "middle belt" supporting both southern Guinea and transitional forest savannah vegetation. Cropping in this zone is a mix of annual and tree crops, though rainfall quantity and spread are inadequate for successful economic exploitation of the latter.

2.06 Agricultural production has been disappointing, averaging 1% per annum from 1970-77, equivalent to less than half the average population growth. This same period has been characterized by rapidly rising domestic food prices as demand outstripped supply mainly due to population and income growth. This has been coupled with a marked decline in traditional agricultural export crops apart from cocoa. During the same period, total exports (including petroleum) increased from N852 million to N8.2 billion, whereas importation of food and live animals rose from N50 million to nearly N440 million; and to N814 million in 1978.

2.07 Federal Sector Institutions. 1/ The more important institutions involved in the project include the Federal Ministry of Agriculture (FMA); the Federal Department of Rural Development (FDRD) and the Agricultural Projects Monitoring, Evaluation and Planning Unit (APMEPU) at Kaduna.

2.08 Development Strategy. The framework for economic policy is set out in the Third Five-Year Development Plan (1975-80). Although there seems to be no well defined agricultural sector strategy, the Government is acutely aware of the need to improve performance in this sector, and to use oil revenues,

1/ See Nigerian Agricultural Sector Review for a full description (Report 2181-UNI).

a depleting asset, to expand and diversify the economy in which agriculture continues to be the dominant sector. In the revised Third Five-Year Development Plan, a total of ₦3.0 billion was earmarked for the sector to support a targeted growth rate of 5%. The program included development of several major river basins for irrigation, dissemination of modern farming techniques to smallholders, improved inputs distribution and marketing services and support for various integrated development projects. Rural development is being promoted with complementary investments in secondary and feeder roads, rural electrification, health facilities and other social services. The forthcoming Four-Year Development Plan (1981-85) is expected to have the same basic features.

2.09 The Government's main short-term objective is to improve internal price stability in basic foodcrops and to ensure adequate food supplies to the rapidly expanding urban centers. Beyond this aim of assured domestic food supplies, Government's longer term objectives are to create a prosperous and efficient agricultural sector that could reduce population drift to urban centers, and to revive the role of Nigeria as an agricultural exporter.

2.10 Implementation of local government reforms has been taking place since 1977. The reforms are significant, both politically and from a standpoint of practical rural development, and in effect replace a more traditional local government administration at subregional level by an elected Local Government Council (LGC). This reform has been brought about chiefly to increase popular participation in the conduct of local government. In undertaking this reform, the Federal Government recognizes the importance of decentralized administration and the power of local opinion if the long-term development effort is to be successful. The potential powers and responsibilities of the LGC are considerable and involve all aspects of development from agriculture, education and health, to roads and water supplies. It is government's intention that the LGCs will, in the long term, control and operate agricultural extension services. Admittedly this will have an impact on the structure and role of the State Ministries of Agriculture but at this stage its extent cannot be determined. Nevertheless this development has far-reaching potential, even though LGCs are expected, during the next decade, to face difficulties in securing the services of sufficient numbers of competent and experienced staff. Furthermore, the lack of properly coordinated and planned policies and deficiencies in funding are likely to prevent their smooth development. However, LGCs are a practical reality and ADPs in Nigeria will where possible provide support for their development. The proposed project would also actively support this goal (para 8.04).

2.11 Development Constraints. Undoubtedly, the main short-term development constraint in the sector is the lack of effective agriculture support services. Produce evacuation is hampered by lack of feeder roads, and many farmers have to travel long distances to the unevenly distributed and unreliable sources of farm supplies.

2.12 At present, subsidy levels, the demand for farm inputs (and particularly fertilizer) is high and at times unsatisfied; in many areas this has encouraged a thriving black market. However, even within areas of relatively high consumption of purchased inputs, with traditional farming practices, physical yields are still low and it is likely that many farm operations would be nonviable at economic prices.

2.13 Agricultural support services remain almost entirely in the hands of the public sector, and present Government policies, inter alia, on input subsidies are not geared to encourage vigorous private sector participation. However, given Nigeria's size and massive development program and the existence of an economic system largely based on private enterprise, Government may wish progressively to divest itself of responsibilities such as input and produce marketing. This would require the creation of an economic framework appropriate to profitable involvement of private entrepreneurs in the agriculture service sector. In addition, a greater effort is required, particularly by the agricultural research institutions, to improve the analysis of technical, economic and financial aspects of farming innovations for adaptation to the different social and ecological conditions of Nigeria; thereby providing an essential background to a sound input supply policy and the development of appropriate delivery systems.

2.14 Agricultural development in Nigeria is taking place against a background of rapid development in the nonagricultural sectors and rising standards of education, both of which lead people to react against the poor returns to labor and the drudgery associated with traditional agriculture. Recent years have seen a marked drift of young people away from rural areas and a sharp rise in wage rates for hired labor. Ultimately, a prosperous agricultural sector, capable of reducing this drift, would only be achieved through application of advanced farming techniques that would provide significant increases in income per man-day. This is likely to lead to greater mechanization and the utilization of modern herbicides and other chemicals that will increase yields and reduce labor requirement. Eventually larger farming units, either group or individually operated, are likely to evolve.

2.15 Bank Role and Key Sector Issues. Total Bank commitments for agriculture in 1971-79 are over US\$382.0 million and encompass 17 projects (see Map IBRD 12135R4). The first loans in Nigeria were for the now completed Western State Cocoa Project (1971, Loan 764-UNI, US\$7.2 million) and the Second Cocoa Project (1974, Loan 1045-UNI, US\$20.0 million) which is being successfully implemented in Oyo, Ondo, Ogun and Bendel States. These were followed by three integrated agricultural development projects in the north: Funtua project (1974, Loan 1092-UNI, US\$29.0 million), Gusau Project (1974, Loan 1099-UNI, US\$19.0 million), and Gombe Project (1974, Loan 1164-UNI, US\$21.0 million); a Rice Project (1974, Loan 1103-UNI, US\$17.5 million) in Anambra, Imo and Cross River States; a Livestock Project (1974, Loan 1091-UNI, US\$21.0 million); three Oil Palm projects: Nucleus Estate/Smallholder Oil Palm Project, Ondo State (1975, Loan 1192-UNI, US\$17.0 million), Nucleus Estate/Smallholder Oil Palm Project, Bendel State (1975, Loan 1183-UNI, US\$29.5 million) and Smallholder Oil Palm Project, Imo (1975, Loan 1191-UNI, US\$19.0 million); in 1977 two new integrated agricultural development projects, Lafia (Loan 1454-UNI, US\$27.0 million) and Ayangba (Loan 1455-UNI, US\$35 million); and most recently in 1979, two additional integrated agricultural development projects: Bida Agricultural Development Project (Loan 1667-UNI, US\$23.0 million) and Ilorin Agricultural Development Project (Loan 1668-UNI, US\$27.0 million), all of which are located in the important middle belt zone of Nigeria; and in the southern part of the country the Rivers State Oil Palm Project (1978, Loan 1591-UNI, US\$30.0 million), a Forestry Plantation Project (1979, Loan 1679-UNI, US\$31.0 million); and finally a project for an Agricultural and Rural Management Training Institute (1979, Loan 1719-UNI), US\$9.0 million), the first of its kind in Africa. The Projects have had varying

degrees of success. The two cocoa projects were successful during the development and establishment stage, and over 40,000 ha of cocoa were replanted of which latest analysis indicates that 80% is successful. The oil palm projects are now picking up after early delays in establishing management structures and problems of lack of delegation of authority by the State Agriculture Administration. The livestock project has had a disappointing beginning, mainly because it proved too complex and dispersed to be effectively managed from the Federal level. Overall management proved weak and difficulties arose in arranging effective cooperation with NACB. Recently (December 1978), Government has contracted the management of the project to a consultant firm, experienced in the field of livestock projects in Nigeria and other parts of West Africa. Moreover, NACB has taken steps to remove obstacles that had previously prevented it from meeting its obligations to the project. These and other proposed actions have resulted in significant operational improvements. The first three integrated agricultural development projects (Funtua, Gusau and Gombe) have completed about three quarters of their development period and are considered successful. Studies by the built-in project evaluation units indicate that these projects have achieved significant farmer impact, and production trends to date indicate more positive agricultural growth rates than those obtained by non-project farmers. A full analysis of data collected by APMEPU is now underway, and will be incorporated in two ongoing Bank sponsored research projects (RPO 671-30/88) which specifically address farmer response to project recommendations and their effect on farm level incomes. The analysis would be included in the respective project completion reports.

2.16 Experience of implementing existing projects has reinforced Bank concern over a number of critical policy issues, resolution of which is important for medium and long-term sector development and which must be taken into consideration in future projects. First: while under present conditions subsidies on selected on-farm developments may be desirable, the current policy of subsidies on nondurable inputs (fertilizer, insecticides, herbicides), irrigation water rates, tractor hire charges, interest rates and other items is encouraging inefficient resource use, discouraging development of farm support services by the private sector and straining Federal and State Government's fiscal and administrative resources. Second: fertilizer procurement and distribution has been centralized at the Federal level, resulting in inefficient supply to farmers and a needless additional burden on the already overstrained agriculture public administration. Third: State and Federal funding procedures are not yet satisfactory, and this has created severe problems for project execution. Fourth: credit policies and the performance of NACB have not yet provided a viable financial framework for the development of either small-holders' or commercial agriculture. Finally, the lack of experienced manpower at managerial, administrative and technical levels is a major constraint in the planning and implementation of development programs, often compounded by poor manpower utilization and frequent switching of staff.

2.17 The appraisal, negotiations and supervision of existing agricultural projects in Nigeria has given the Bank and Government an opportunity for a continuing dialogue on key sectoral issues. The Government generally shares Bank concerns though some differences in approach remain, for instance over the question of continuing input subsidies. Because the issues in question are politically sensitive, and often administratively difficult to resolve, it would be unreasonable to expect their prompt and simultaneous

resolution. An agriculture policy-oriented sector mission visited Nigeria in 1978 and has produced additional factual material on which further progress is possible in the exchange of views between Government and Bank, and the Bank is currently assisting FGN prepare a food and agricultural plan; this plan will address many of these and other issues raised in the aforementioned Sector report. Meanwhile, Bank-assisted projects will necessarily involve special arrangements in some areas such as Federal and State flow of funds, reimbursement of input subsidies, credit and input procurement (para 5.35), all of which are deemed essential to successful implementation of such projects.

2.18 To cope with management and administrative constraints, the short-term solution adopted in Bank-supported projects in Nigeria has been international recruitment, and the establishment of special project management units. A long-term solution must necessarily involve the training of Nigerian management staff and the restructuring of service institutions. The recent loan (para 2.15) to establish an agricultural and rural management training institute will complement an already substantial in service training component for ongoing projects. Concerning Federal and State planning and monitoring capability, the Government views the Agricultural Projects Monitoring, Evaluation and Planning Unit created under the Funtua Agricultural Development Project (Loan 1092-UNI) and expanded under the Ayanba Agricultural Development Project (Loan 1455-UNI) as a first step toward creating a planning and monitoring capability for rural development in the Ministry of Agriculture. At this stage, APMEPU's planning capability is in its infancy and is confined primarily to project identification, and to providing assistance to State agricultural planning units. Project preparation is normally undertaken by consultants, and will continue as such for some years to come.

III. OYO STATE

3.01 General. Oyo State was created in its present form as a result of the administrative reorganization of February 1976, when the former Western State, was subdivided into the three separate states of Oyo, Ogun and Ondo (see Map IBRD 13708R1). Administratively, Oyo State is divided into 24 Local Council Government Areas (LGAs), each controlled by a Local Government Council (LGC).

3.02 Agricultural Sector. The State's agricultural policy is very broad, but is primarily aimed at increasing agricultural output with self-sufficiency in essential foodcrop production as a stated objective. Overall, agricultural development receives a high priority in the State Government's budgetary allocations; the average allocation to agricultural sector over the last four years of the current five year plan has averaged around 8% of total state budget. However, more recently (1978-79) the share of agriculture in the states planned capital expenditure has declined from about 12% in 1976-77 to 4% in 1978-79. In the Third Five-Year Plan, total allocations for agriculture were ₦78.6 million, of which amount ₦30.6 million was earmarked for arable crop development including farm inputs and infrastructure development. In the current budget, ₦23.0 million has been allocated to agriculture. Overall, performance of this sector has been far from satisfactory; production, as in most of Nigeria, has stagnated and the State has had to increasingly support its urban populations with imported food. If immediate measures to raise

foodcrop production levels are not taken, production may in fact begin to decline from traditional levels. The Oyo North agricultural development project aims to foster the development of smallholder foodcrop farms in a zone of high and largely unexploited potential (Chapter IV, paras 4.01-4.04).

3.03 Ministry of Agriculture and Natural Resources (MANR) has eight divisions: finance and administration, agricultural extension, engineering, planning, produce inspection, forestry, veterinary and fisheries. In addition, there are two semi-autonomous units - the Agricultural Inputs Services Unit (AISU) and the Cocoa Development Unit (CDU), the latter partly funded under Loan 1045-UNI. Administratively, the state is divided into four agricultural zones namely Ibadan, Oshogbo, Ilesha and Oyo. Following the Local Government reform of August 1976, the MANR zonal scheme was extended to cover the newly created LGAs. Subsequently, 24 LGA coordinators have been appointed with direct responsibility for implementation of functional projects and sub-projects. Although it is quite clear that Oyo state MANR intends in the long term to transfer the full control of its agricultural operations to the LGC's, it is as yet too early to predict the exact nature and direction of the change. Overall, the State has a fairly large extension staff (para 8.07), but mainly because of lack of a proper in-service training (para 3.06); poor logistic support and the absence of well defined work objectives, the impact of extension work is limited.

3.04 Research. There is no research station within the project area but the close proximity of the Universities of Ile-Ife and Ibadan and such institutions as IITA, the Institute of Agricultural Research and Training (IART) at Moor Plantation as well as the National Cereals Research Institute (NCRI) has resulted in numerous trials being conducted within the project area. In addition, extensive series of UNDP fertilizer trials are carried out in adjacent areas of Kwara State, which could provide useful backup information on yields and fertilizer rates. Recommendations from these and other trials are, however, rarely disseminated to farmer's level.

3.05 Farm Credit. The main institutional source of agricultural credit in the state is the Oyo State Investment and Credit Corporation (OYISCC) which made almost 954 foodcrop loans in fiscal 1977-78 amounting to about N1.2 million. ^{1/} Loans were largely short term, and helped finance purchase of fertilizers, seeds and hired labor costs (see paras. 8.12-8.16). Limited amounts of farm credit are also provided by the Cooperative Bank and the National Agricultural and Cooperative Bank (NACB). Commercial bank lending is mainly restricted to financing tractor and other farm equipment loans to the Nigerian Tobacco Company's (NTC) registered tobacco growers.

3.06 Agricultural Training. The State considers IART as its training arm. The Institute which is administered by the University of Ile-Ife provides training for all middle-level MANR agricultural staff. For its senior staff (Agricultural Officers) the state relies on graduate courses offered by the Universities of Ibadan (UI) and Ile-Ife (UIFE). Junior level staff are trained at the two Agricultural Schools at Akure (Ondo State) and at Moor Plantation (Ibadan). Courses cover a wide range of subjects, but

^{1/} OYISCC's total credit disbursement during the same period (1977-78) amounted to N4.5 million with 4,194 loans.

there is an urgent need for well-administered on-the-job training, and opportunities for further specialization need to be provided. Training for basic level agricultural staff (field overseers, agricultural instructors) was provided at the Ilesha Farm Institute which also trained interested farmers. Vocational training, especially in agricultural machinery is provided at the MANR's Agricultural Machinery Center at Fashola as well as the Oyo trade center located at Oyo.

IV. THE PROJECT AREA

A. Physical Features

4.01 General. The project area (see Map IBRD 14027) covers some 12,310 km² or 32% of Oyo state and includes 3 Local Government areas (Ifedapo, Irepo and Kajola) in the north of the state. This area is primarily utilized for subsistence food crop production at a low level of yields, with cash cropping being limited to a few well defined areas of tobacco and isolated patches of cocoa. Since the States other three zones (excluding Oyo North) are mainly cocoa growing areas, the project area was selected in order to balance food crop production in the state with cash crops; thereby developing an under-utilized potential.

4.02 Topography and Soils. Northern Oyo State is characterized by gently rolling plains rising from some 200 m in the southwest to 500 m in the north-east. The area is underlain by basement complex acidic rocks associated with quartzite outcrops and shales. Locally granites and syenites give rise to inselbergs which break the overall flat outlook of the landscape. Average slopes are from 2-6% with the flatter topography and consequently poorer drainage in the north. The vast majority of the soils in the area are slightly acid loamy sands underlain by sandy clay loams or sandy clays. The cation exchange capacity, total exchangeable bases, and nutrient status are all low. Consequently, the agricultural potential is only fair and with existing techniques most of the soils cannot stand continuous cropping, however, there are localized patches of stronger soils, many of which are underutilized due to lack of access (para. 4.05).

4.03 Climate. Annual mean and total rainfall varies from 1,100 mm in the north to 1,200 mm in the south, although local topography effects do influence the totals. Most of the precipitation occurs between March and October and is only partially bimodal with a limited drier period in July/August in the south, which is even less marked in the north. Rainfall analysis 1/ reveals excellent possibilities for single cropping. However, a long season followed by a short season crop (possibly interplanted) is a distinct possibility.

4.04 Vegetation. The area lies within the broad savannah transition zone separating the southern rain forests from the northern semi-arid Sudan zone. Vegetation is generally derived savannah with variations in cover closely linked with edaphic conditions and particularly soil depth and drainage.

1/ For details, see Project File C1.

B. Infrastructure and Social Services

4.05 Roads and Communications. As there is no rail, air or river transport, the project area is totally dependent on the road system, which consists of 341 km Federal (Trunk A) roads, 86 km of State (Trunk B) roads, 834 km of LGC roads and about 2,000 km of small village tracks and footpaths. The condition of roads in the project area is extremely poor, even the main federal road from Basi to Kishi is in a state of utter disrepair and during the rainy seasons portions of it are almost impassable. Although maintenance of the main road network is vested in the respective authorities, there is little evidence of effective maintenance and the poor road system can be considered the greatest single constraint to development.

4.06 Power, Water Supply, Health Services. Rural electrification in the project area is undertaken through Federal and State Government programs. While three major towns - Shaki, Ago-Are and Illero - are already served with electricity, contracts have recently been awarded for supplying power to four other townships. The majority of the area's population relies for water supplies on streams or wells. The quality of most rural water supplies, particularly from private wells, is poor, as they often rely for recharge on direct surface runoff. The Oyo State Water Corporation has primary responsibility for developing the rural water supply system in the project area. The other organization dealing with this aspect is the Ogun-Oshun River Basin Authority (OORBA) which plans to develop the Ogun-Ofiki River basins. Oyo State Water Corporation has built a large dam and treatment plant to serve the town of Shaki. Health services and facilities, comprising three Government hospitals, 12 maternity centers and 20 dispensaries are limited. There is a Baptist hospital at Shaki and a rural health center has just been constructed at Igboho. The most common endemic diseases are malaria, dysentery, bilharzia and guinea worm.

C. Socio-Economic Features

4.07 Population statistics throughout Nigeria are unreliable. The 1973 census has been formally abandoned by Government, and whatever official figures are available are derived from the 1963 census. The present report however recognizes that the 1963 Census somewhat overenumerated Nigeria's southern population; and therefore in estimating the project areas future population (1985), a medium population growth rate variant of 2.5% per annum was used. On the foregoing basis, current (1978) population estimates for each LGA are: Ifedapo - 207,000; Irepo - 235,000, and Kajola - 168,000 giving a total area population of 600,000. Of which 85% or about 510,000 can be considered as rural. Given that the "average" farm family is made up of 6.5 persons, there are an estimated 79,000 farm families in the project area. In 1985, the total projected population for the project area would be 727,000.

4.08 The project area lies in the heart of Yorubaland, and Yorubas form the main ethnic group, though small groups of Hausa tradesmen and Fulani pastoralists dwell in and around several of the townships. The Yorubas share a broad common culture and language, but historically comprise a number of semi-autonomous kingdoms which developed individual subcultures and dialects.

In common with much of Yorubaland, settlement is significantly urban oriented, with large numbers of farmers living in a nucleated urban environment; the 1963 census recorded nearly 60% of the population residing in townships of over 20,000 inhabitants, though much of this total is accounted for by the rural towns of Shaki, Irepo, Igbeti, Kajola, Illero, and Ifedapo. Average density of the farming population is estimated at 50/km² but this varies throughout the project area, for example in the Ifedapo LGA mainly due to the forest area, average population density is as low as 38/km². In general, the agricultural population of the area is stable; outward migration is minimal, and limited to the drift of young males to urban areas. There is some seasonal inward migration mainly from the north and neighboring Republic of Benin.

4.09 Land Tenure. Under the new Land Use Decree promulgated in March 1978, authority and control over all agricultural lands has been vested with the respective local governments. The management of such lands would be carried out with the help of Land Allocation Advisory Committees to be established by the State Governor. Although in some cases such Committees have already been established, it is as yet too early to predict how effectively the provisions of the new Law would be administered. This notwithstanding, its provisions are not expected to prove detrimental to the project implementation, and if anything it is likely to facilitate procedures for obtaining land titles which could serve as collateral for farm credit. This is especially significant for the advanced farmers who because of their relatively higher investment credit needs, may seek credit from commercial banks which may want to enforce more rigid collateral policies (para 8.16). Since for agricultural land, the existing ownership patterns and tenurial patterns are expected to continue under the customary system for some time, the existing system is discussed in the next paragraph.

4.10 The basic pattern of land ownership and usage in the project area has been the so-called communal land tenure system, under which traditional leaders are considered to be the custodians of all land in their areas of jurisdiction, and are empowered to grant usufruct to individuals/families. Theoretically, all lands could be repossessed by the community acting through the chief and traditional elders on the death or departure of the usufructuaries. In practice, however, lands are generally inheritable through the family. At the discretion of the head of the family, land can also be divided among family members, or leased out to other families or even to strangers; however, sale of farmland is traditionally frowned upon, or indeed prohibited. To summarize, for all practical purposes communal ownership is effectively exercised only in respect of vacant, virgin or undistributed land, and an individual or family, once granted a piece of land, would usually enjoy de facto security of tenure. The need for proper demarcation of holdings to facilitate obtaining loans and ensure security of tenure has encouraged more formal holding arrangements. Proof of title can take the form of either a "Certificate of Occupancy" or a "Right of Occupancy". The procedure for obtaining the former is time consuming as it involves a survey by a chartered surveyor, and though a few individuals have recently obtained Certificates of Occupancy the amount of land affected is extremely limited and mainly urban.

D. Land Use, Farm Structure and Farm Enterprises

4.11 Land Use. There is no recent land use survey of the project area; the only reliable survey is the one undertaken in 1976 by the Land Resources Division of the Ministry of Overseas Development. ^{1/} This survey, however, basically emphasizes the potential for land use, and therefore, cannot be used to interpret the existing land use patterns. The other source of information is the 1977 Oyo State Rural Agricultural Sample Survey, and the 1970-72 Western State Farm Management and Resources Survey. In view of the varied and often differing land statistics, it should be appreciated that figures for farm sizes, cropping patterns, farm income, are present "best estimates". However, during implementation, it is expected that the proposed project Monitoring and Evaluation Unit (para. 5.21) would provide more satisfactory information on this aspect. Meanwhile, the project design would retain sufficient flexibility to take account of such findings.

4.12 Existing information, including air photo interpretation, indicates that around 307,000 ha (about 25% of the project area) are cropped within a system of shifting cultivation, the fallow ratio ranging from 1:1 to 1:2 (four cropping years as against 4 to 8 fallow years). Assuming that the expansion in area has at least kept pace with the population increase (average 2.5% per annum) and that the traditional average fallow periods have declined, the area presently cultivated in any one year is about 180,000 ha. When set against the estimated farming population (510,000), the average holding size would be about 2.0 ha per farm family (6.5 persons/family).

4.13 Farm Structures. All available information confirms that the great majority of project area farms are the relatively small subsistence type. While farm sizes range from 0.5 ha to 5.0 ha, the average holding is 2.0 ha. Few farms are either larger or smaller than the mean. Virtually all of the farms in the project area are owner-cultivated. The few larger farms mostly utilize commercial or government tractor services, and either grow tobacco or some other cash crops. Group farming (average 50 ha per group) is fairly widespread, and the MANR as well as OYSICC credit records show slightly over 100 such farmers' groups.

4.14 Farm Labor and Income. The average family contributes over 80% of the total farm labor input. While most of the heavy field work is undertaken by men, the women contribute towards harvesting, food processing, and marketing. Traditional groups based on mutual aid exist, but their use is not widespread. The "average" farm family probably numbers 6.5 persons who provide on average about 1.5 man-days of labor per work day. The rather low labor availability per family mainly reflects the fact that with UPE, child labor is restricted. Assuming that the average work days per month are 20, the annual family labor availability is 360 man-days. Of this, about 50% is used on productive farm work and 22% on crop processing and marketing, the rest is utilized in other domestic activity. Prior experience, field observations and independent farm management studies in the area, show that under traditional agricultural practices, an average farm family can cultivate about 1.8 ha even during the peak labor demand period. Labor profiles (Project

^{1/} Land Resources Study 23. "Soils of the Western State Savannah in Nigeria" (3 volumes) 1976.

Working File C1) for the improved practices shows that the average farm family would have sufficient labor for farming about 2.0 ha, without any substantial need for additional hired labor.

4.15 Existing average farm income from the typical 2.0 ha smallholdings in the project area are around N770 including some off-farm income (para. 9.02). This income is clearly insufficient to fully meet the farmers nutritional and other basic needs, and during the slack season the men seek off-farm employment. Wages in the project area vary by location approximately reflecting the value of alternative real income earning activities available to the laborers. For example, while it would be possible for an unskilled male laborer during the peak season to earn up to N4 per man-day, or even more, especially on non-farm work such as periodic construction jobs, during the slack season at times wages approximate labors 'reservation price,' for which the Government official wage of N2.0 per man-day is a reasonable index.

4.16 Crop Production. The bulk of agricultural production comes from manually cultivated rainfed crops. The growing season of over 200 days permits a sequential cultivation of a wide range of crops with differing growing periods. Almost two-thirds of the crops are grown during the first rainfall cycle (March-June), and since the duration of the rainy season is relatively short, the late crop is often relay cropped. Mixed cropping is less widespread than in other areas of Nigeria and a consistent pattern of intercropping or even sequential cropping is rarely found. This is due mainly to the bias in favor of cash crop such as maize and yams and the absence of traditional mixed crops like cotton, millet, and groundnuts. While planting starts with the earliest maturing crops - early maize and continues with sorghum, the late maturing crops, cassava and yams, are planted rather indifferently in the first or second rainy season. The acreages eventually planted to sole or intercrops are however as much functions of opportunity, and seasonal labor availability as of prior planning. On average, probably around 60% of crops are however planted sole, the balance falling within an intercropped or relay mixture of 2 to 4 crops. The principal annual crops are maize, cassava and yams, representing about 76% of the cropped area. Sorghum is the next important crop, occupying about 8% of the cultivated area. A wide range of minor crops (cowpeas, okra, vegetables etc.) are often intercropped or grown as catchcrops. The main cash crop is tobacco, which is cultivated by 3,500 farmers who market their produce through the Nigerian Tobacco Company (NTC).

4.17 The traditional farming system based on shifting cultivation helps maintain fertility and soil structures. The bush fallow rotation usually comprising 3-6 years of cropping is followed by a period of natural fallow (6-10 years). Cultivation practices include the predominant use of hand tools and implements while tractor services are limited and are mainly used by large group or commercial farmers. Use of other modern farm inputs is also extremely limited. For example during the 1977-78 only 1,300 m/tons of fertilizer and 7.2 m/ton of improved maize seed was distributed in the project area.

V. THE PROJECT

A. Summary Description

5.01 Project objectives, which are in full accord with Federal and State Government policies (para 2.08), are to increase food production and farm incomes through improving the productivity of the land and labor of some 55,000 farm families, most of whom are cultivating approximately 2 ha. The project would help to develop the considerable food productivity reserve, which lies untapped in the traditional rainfed sector in the northern part of the state. It would tie in with the overall agricultural development strategy of OYSG in that the southern parts of the state are potentially more suitable for tree crop-production (Chapter IV). The project to be implemented during the five-year period 1980/81 through 1985/86 would include:

Farm and Crop Development

- increasing production of the major crops grown by smallholders on about 33,000 ha through the introduction of a Basic Service Package (BSP) involving improved farming practices, strengthened extension services and provision of improved seeds, fertilizer, crop protection measures and improved manual and mechanized techniques including some expansion of both state and private tractor services;
- introducing a more Advanced Service Package (ASP) based on techniques of weed control including minimum tillage, which due to the advanced nature of the techniques required would be limited in area to no more than 12,500 ha;
- establishing a farm management service with planning capability to assist group and individual farmers in their operations;
- conducting trials to test the introduction of new technology and farming practices;
- providing support to the state seed multiplication service and organizing outgrowers to ensure an adequate supply of seeds and planting material;
- assisting with land clearing through the rental of hand operated winches and other aids to light bush clearing;
- establishing a reliable and efficient farm input supply system.

Civil Works

- constructing 550 km of new feeder roads, improving 250 km of existing roads and maintaining these roads for three years until they are handed over to Local Government;
- constructing 40 small to medium dams;

- constructing 300 wells; and
- constructing project offices, workshops, farm building, stores, staff houses, and 17 Farm Service Centers.

Institutional Support

- providing for a management structure with the required technical and administrative staff, logistical support and funds to implement the project, evaluate project progress, and provide guidelines for future projects;
- providing integrated in-service and formal training schemes for all levels of staff together with such courses for farmers as may be necessary;
- assisting the Agricultural Input Services Unit (AISU) to operate an efficient input supply and distribution system.

Consultancy

- assisting MANR in startup operations for the project;
- providing technical consultancy on agricultural management and introduction of new techniques;
- carrying out a hydrogeological survey of the project area;
- assisting in establishing management training; and
- evaluating a potential tax base for LGAs.

B. Detailed Features

5.02 Farm and Crop Development. Project intervention would improve cultivation practices on an estimated 33,000 ha farmed by some 51,500 small-holders who would benefit from the Basic Service Package (BSP), and on 12,500 ha farmed by 3,500 farmers participating under the Advanced Service Package (ASP).

5.03 Basic Service Package (BSP). It is difficult to estimate farmer response on a project of this nature, but drawing on experience of similar ongoing projects in Nigeria, it is estimated that the majority of farmers estimated at 70% of the total would participate to some degree. The majority would however not follow all the crop recommendations, but only those crop packages with particular appeal to the individual. Under field conditions the proper application of all aspects of a crop package takes time and the main immediate benefits would undoubtedly result from improved attention to timeliness of planting, weeding and harvesting, correct planting densities coupled with modest inputs of inorganic fertilizer, pesticide, and improved and dressed seed. Local research results indicate that significant yield responses can be obtained for maize, yams, cassava and cowpeas which account for some 78% of the total cropped area. Details of inputs and estimated yields are at Annex 1, Table 1.

5.04 The main impact of the BSP would be channelled through an efficient and widespread distribution network including 20 farm service centers (FSC), and a greatly strengthened general extension service. The number and extent of FSC coverage have been determined on the basis of existing land use population densities and future expansion into new areas. Each center approximately serves an area with a radius of 8 km, a criteria that has proved adequate on ongoing ADPs. It is expected that on completion of the BSP portion of the project, basic improved husbandry would be practiced on 8,000 ha of maize (13% of the total area under maize), 10,000 ha of yams (25%), 12,000 ha of cassava (30%), 3,000 acres of sorghum (20%), and 1,500 acres of cowpeas relay cropped with maize (30%). These estimates of uptake are based on a balanced assessment of the attractiveness of the individual crop packages taking account of relevant labor constraints and experience on ongoing projects. The increment in marketed surplus from BSP farms excluding "without project" production, and after deductions for seed, storage losses and farm family consumption, is expected to reach approximately 17,000 tons of maize; 800 tons of sorghum, 24,000 tons of yam and 39,000 tons of cassava. Detailed estimates of incremental production are shown at Annex 1 Tables 2 and 3. Although production projections have been confined to the major crops due to their overriding importance in the area's cropping patterns, in practice the project would address a range of cropping problems with the aim of promoting as wide a spectrum of crops as practically feasible. The project would increase the number of extension workers in order to reduce the existing field staff farm ratio from 1:2,000 to 1:600 and increase efficiency by training existing staff and improving logistical support. The increase in extension staff would be mainly through redeployment of underutilized staff (para 8.07) and further training of lower level extension agents. Even so, the exact staffing ratio must be viewed with considerable flexibility until such time as the demands and needs of the farmer are properly evaluated. The extension service would be administered through the headquarter unit and through three area centers conforming with LGA's.

5.05 Advanced Service Package (ASP) would be designed for group and individual farmers displaying the management aptitude to handle more sophisticated techniques and cropping system. ASP would introduce advanced systems incorporating chemical weed control and minimum tillage on both a mechanized and manual smallholder basis. This would allow increased cropping areas and yields and thus would increase incomes, reduce drudgery and make farming a more rewarding occupation. It is fully recognized that minimum tillage techniques have not as yet been adopted by Nigerian farmers apart from a few isolated instances of chemical weed control. It is the purpose of this project and that of Ilorin and Ekiti-Akoko to attempt to establish these techniques on a wider basis. Even so, it is estimated that only 17% of the improved cropping area of the project would be affected and this would take place from year 3 to year 5 of the project.

5.06 Minimum tillage, which combines minimum soil disturbance with a cover of plant debris is an innovation which promises to provide the stable agricultural system which has been lacking to date. Under the systems proposed, herbicides would be judiciously introduced in combination with both mechanical and hand cultivation. This would be followed by adoption of full minimum tillage techniques, including both direct planting in uncultivated soil, and the use of pre- and post-emergent herbicides for complete weed control.

5.07 A mechanized minimum tillage approach would involve an extension of existing tractor hire units (THU) but would require lower powered tractors than a conventional mechanical tillage scheme, and would reduce wear and tear and hence maintenance costs for the tractor fleet. Although minimum tillage is being introduced, in view of Government commitments, some conventional mechanical cultivation would continue and soil conservation works would be designed on all the larger cleared areas. Nevertheless, the eventual aim would be to promote minimum tillage to the utmost once the techniques of large scale application were thoroughly tested locally (para 6.05). These systems would be introduced within the framework of sound rotations and husbandry practice, and development would be supervised by a specially trained team of management advisors and extension workers (para 5.24).

5.08 The adoption of manual minimum tillage for the smallholder hinges on the practicability of herbicide application using controlled droplet applicators in which the amount of liquid carrier and herbicide is kept to a minimum (less than 12 litres/ha) thus eliminating transportation of large quantities of water which would be impractical. It also depends on very thorough training of both farmers and extension staff in well tested fields techniques. This is essential, as misapplication could result in damage to standing crops. However, current research work indicates that these problems can be overcome through field tests, training, and efficient organization.

5.09 Crop development projections have been based on the assumption that the area cultivated per family would show some increase due to elimination of labor peaks and the formation of farmer groups. A total of 3,500 farmers on some 10,000 ha are expected to utilize these techniques and with the reduction in labor demands, it is expected that this area would increase by some 2,500 ha (0.7 ha per family) over a six year period. Progress would be phased and clearing would take place as farmers find they can cope with a larger acreage. This would not entail much extra labor as the present demands for clearing to allow for fallow will be eliminated and project assistance will be given to improve efficiency of hand stumping (para 6.11). The eventual aim would be to promote minimum tillage over the whole 12,500 ha, but initially it would be confined to areas planted to maize and cassava and with a late season crop of cowpeas following the maize in one year in three. Projected incremental production from ASP is estimated at full production to total some 12,000 tons of maize, 19,000 tons of cassava and 500 tons of cowpeas. Crop development and production projections are at Annex 1, Tables 1, 2 and 3.

5.10 Tractor Services. The existing subsidized tractor service currently operated by MANR would be transferred to the projects commercial services division so that it can be run as an efficient and cost effective commercial service. In order to ensure support for BSP and ASP farmers, the project would procure some new and replacement units. The main project workshop at Shaki would conduct major repairs at cost, while minor repairs and maintenance would be carried out at the main Agro-Service centers which are proposed to be taken over by the project (para 5.13). Additionally private operators would be encouraged to buy tractors and would receive both training and assistance, including maintenance, from the project. Cost and performance records would provide a firm basis for determining viable charges for contracting. Farmers would be charged for tractor services at rates equivalent to an efficient commercial service resulting in full cost recovery and assurances to this effect were obtained at negotiations.

5.11 Applied Research. Three existing government farms near Shaki, Ilero and Kishi would be taken over by the project. Crop trials conducted on these stations would improve the coverage and would be linked to the national trials program. In addition, the stations would be used for developing systems appropriate to local conditions including the testing of appropriate technology and machinery. Special attention would be given to practical farm trials and demonstrations of low horse power tractors and appropriate implements suitable for minimum tillage techniques. This program would be carried out in close liaison with the Engineering department of IITA.

5.12 Seeds and Planting Material. Where applicable crops grown on the three farms would generally be used for seed, such production would be limited and targets set in conjunction with the National Seed Service. However, bulking of improved plant material for yam and cassava programs will require substantial areas and the sheer bulk of this material indicates that to reduce transport it should be produced within the LGAs. Although, arable areas under the control of the project will be essential, every effort would be made to set up viable local seed producer associations producing seeds and vegetative planting materials. For this purpose, an appropriate inspection and certification system would be introduced by the project in conjunction with the national and state seed service.

5.13 Farm Input Supplies. The project would provide the necessary input supplies to farmers through its Commercial Services Division (para 8.05). Input distribution would be through 20 FSCs, of which 17 would be constructed under the project (para 5.20) and three existing ASCs, currently operated by AISU, would be taken over by the project. Map IBRD 14028 shows tentative locations of the proposed centers (excluding the three existing ASCs). Whereas currently, an annual 1,300 tons of fertilizer is used in the project area, by project year 5, this is expected to increase to nearly 9,000 tons. Likewise, annual sale of herbicides and insecticides for seed dressing and protection of stored grain would reach N0.7 million by PY5. In order to improve on-farm storage facilities, the project will assist (by providing materials) in construction of such stores. Other items such as tools, planters and sprayers will also be available to farmers, at the FSCs. Credit, both in cash and kind would be made available to the needy farmers. Details of the credit arrangements are given in paras. 8.16-8.17.

Civil Works

5.14 Roads. The existing road network in the area totals 1,260 km of which 340 km are Federal roads, 86 km state roads and 834 km Local Government roads and tracks the latter serving as feeder roads to the Federal and State network. The poor condition of most of the roads within the project area is probably the major constraint to agricultural development. The problem is being further aggravated by the equally poor condition of the arterial links between the project area and the rest of the State. The main reason for the unsatisfactory state of the roads is sheer lack of maintenance. Although the Local Governments have had a recent infusion of new plant and ancillary equipment, virtually no provision has been made for repair and maintenance. More important at present, Local Governments lack technical expertise in plant organization and operation. Maintenance of Federal and State roads also appears to be practically nonexistent, and even though responsibility for

these roads is outside the scope of the project, their proper maintenance is considered to be vital to the project. Therefore during negotiations it was agreed that by June 30, 1980 FGN would furnish to the Bank its plans for rehabilitating the Federal Iseyin-Sheki road.

5.15 The project's objective would be to provide an all-weather feeder road system to serve both areas of existing development and those with high agricultural potential. New roads would follow ridge alignment to improve drainage, reduce construction and maintenance costs and would be surfaced with laterite, which is in abundant supply throughout the area. Using these criteria, a program of 550 km of new roads and 250 km of improved roads has been identified (see map IBRD 14028). These roads would be maintained by the project for 3 years after construction, prior to handover to the respective LGC. The LGC would be closely involved in all stages of planning and construction but thorough training and guidance would be necessary to ensure a smooth and effective transition of responsibility for maintenance.

5.16 Relatively high labor costs and seasonal rural labor shortages rule out labor intensive construction techniques. Currently, existing governmental and private companies are either not interested or not in a position to cope with the construction and maintenance required for the program. It is therefore, proposed to follow the successful practices of ongoing agricultural projects and establish a project-controlled and operated construction unit consisting of 2 bulldozers, 4 motorgraders, 2 vibratory rollers, 3 motorized scrapers, 1 wheeled dozer together with ancillary equipment. In addition to road construction, the unit would also construct dams during the dry season when conditions are optimal.

5.17 Road and water supply maintenance will only be effective after LGCs assume responsibility and if adequate funds are included for this in the LGC budgets. Assurances were obtained during negotiations that OYSG would review annually with the LGCs and the project the road and water facility maintenance and staff training requirements (para 5.26) and that OYSG would provide the LGCs in advance with adequate funds for this purpose. The estimated annual road maintenance cost in the project area would be about N160,000 (in 1980 terms).

5.18 A central workshop would be constructed at Shaki to service and repair all plant and vehicles and equipment. This would have the support of mobile field units and radio links to keep plant and vehicle down-time to a minimum. A comprehensive store of spare parts for plant and vehicles would be maintained to overcome supply problems. The project workshop would be located and designed to ensure long-term support to LGCs for hiring and repairing plant.

5.19 Water. Water supply is critical in most parts of the project during the dry season. This is partly reflected in the self-help efforts to overcome this problem. There are many private wells throughout the area as well as a small number of dams. Most supplies, however, are unreliable and are generally polluted through surface recharging. To help overcome the problem, it is proposed to build 28 small dams, each of about 50,000 m³ capacity, and 12 medium sized dams, of about 100,000 m³ each. These would serve the larger centers of population not already covered by existing or proposed

services. To cover the needs of small villages and hamlets where dam construction would be impracticable or uneconomic, it is proposed to sink 300 wells using hand-operated rigs. Both dams and wells would have measures incorporated to minimize pollution (para. 6.17 and 6.18). Livestock watering facilities and simple low cost water treatment plants would be installed at all dams. The LGCs would eventually maintain these facilities and training and funds would be provided (para. 5.17). In addition, a hydrogeological survey would be carried out in order to provide information for future cost effective water programs (para 6.16). The dam and well program would, however, not be contingent on the outcome of the hydrogeological study.

5.20 Buildings. A major building program would be required. This would include staff housing offices, farm service centers, stores, a workshop and seed farm buildings. The project's administrative center would be at Shaki, with secondary centers at Kishi and Oke-Iho, all being Local Government Administrative centers. Building construction would be done by local contractors through a system of local competitive tendering satisfactory to the Bank. Building works would be supervised by the project building unit which would also be responsible for building maintenance. The project would construct 16 senior, 28 intermediate, 16 junior staff houses, plus 17 Farm Service Centers and contingent offices, buildings and stores (detailed specifications are in Project File C2).

5.21 Evaluation. The lack of quantified information on the area creates a particular need for an effective Evaluation Section to provide a dual service to project management as a data collection, analysis and advisory unit, and to Government and donor agencies as a source of information for effective project supervision and impartial assessment of performance. During the start-up year experienced staff from the Agricultural Projects Monitoring, Evaluation and Planning Unit (APMEPU) in Kaduna would conduct an initial 'thumbnail' farm survey of the project area. Thereafter, the evaluation section would undertake a more formal baseline survey, to provide precise definition of the farming systems practiced in the different agro-ecological zones of the project and to provide information on pre-development crop yields. A detailed evaluation would also be conducted on existing MANR group farming schemes in the area. A continued survey of crop yields would be maintained during implementation, but priority attention would be given to evaluation of the Advanced Service Package, which involves heavy expenditure and which can only be justified by positive evidence that real long-term benefits are materializing. The Evaluation Section would maintain a central data bank of basic planning and progress information, and would also keep a detailed record of management decisions and reasons for any departure from original proposals. The Section would receive technical support in survey design and in methodology, processing and analysis of large-scale evaluation surveys from APMEPU and would maintain close liaison with State Evaluation Units, the National Institute of Social and Economic Research and with the University of Ibadan (para. 3.04).

5.22 Staff Development. The project itself would be a massive training effort in improved agricultural methods; communication and rural administration and would provide a sound basis for on-the-job experience and training under competent senior staff, where the objectives of management and farm development would be clearly laid out. Experience to date shows conclusively

that, under such conditions, Nigerian staff have performed most effectively and learned rapidly by experience. This in itself, however, is not sufficient, and the project would supplement on-the-job experience with formal staff development programs.

5.23 Technical Training. Specialized training courses would be established to train all levels of staff in the agronomic and technical needs of the project. It would be agreed with the State that the project would be authorized to conduct its own training of Extension Assistants who would be employed by the project. This grade of staff would later (in the post-project period) be considered for formal training and induction as Agricultural Assistants. In addition, short courses would be developed for agricultural staff, mechanics, bookkeepers, storemen, salesman, etc. Some selected staff might be sent overseas for specific technical training in fields where courses are not available in Nigeria.

5.24 Staff Development and Management Training. One of the fundamental problems of continuity of project activities relates to the dearth of managerial, as opposed to technical, background among Nigerian agricultural staff. The problem must be approached by a combination of formal training and guided on-the-job experience. Much will depend on the numbers and caliber of staff the state is prepared to second to the project. The senior Staff Development officer would carry out an initial inventory of existing and required staff and training needs. And subsequently, work closely with project technical managers to prepare staff development programs for individual Nigerians in key positions, and for groups of staff at medium and lower levels. Consultants would assist in preparation of this program and in checking on annual progress. It is anticipated that project staff would be enrolled in courses at the proposed Agricultural and Rural Management Training Institute to be located at Ilorin in neighboring Kwara State. Overseas courses in management fields as in technical subjects, would be considered where no comparable Nigerian course existed, but should be limited to relatively short courses with immediate practical relevance to the staff member's responsibilities.

5.25 Farmer training would be carried out through group meetings using audio-visual aids. Practical on-farm demonstrations would play an important role in farmer training. The training section with assistance from outside consultant, would help prepare teaching materials including a reference manual and technical films to demonstrate cropping techniques for use by extension staff.

5.26 Training Administration. The senior training officer attached to APMEPU would work in close collaboration with the Oyo North Project Management Unit (ONPMU) in developing and monitoring new training techniques. The ONPMU Staff Development officer would, apart from project training, also be responsible for working with state officials in developing adequate training programs outside the project area, in anticipation of an expansion of the project to other parts of the state at a later date. He would work closely with the LGCs in the project area to develop training programs for LGC staff, particularly in areas related to project activities, e.g. road and water facility maintenance and administration. The project would utilize the existing facilities

at Fashola and Ilesha Institutes (para. 3.06) to provide the basic training infrastructure required to support the training program.

5.27 Consultant Services. The project would provide OYSG with 36 man-months of consultant services to assist MANR and ONPMU in specific areas where local skills are not available, or where short-term supplementation is required. Specifically, the consultants would:

- (a) provide for technical consultancy (10 man-months) on a periodic basis to review and make recommendations on improvement of basic agricultural management, work methods and organization, and the introduction of new technology. In particular, the consultants should provide practical assistance with developing improved techniques for minimum tillage and also in training extension staff to assist smallholders to reduce labor peaks through the application of simple work and method study;
- (b) provide assistance in establishing management training and staff development programs for project and, where necessary, LGC staff. The consultants (6 man-months) would assist the Staff Development officer to develop such a program within six months of loan effectiveness, and would visit the project on a yearly basis to assess and evaluate the progress of staff training and development. Findings would be reported to the State and to the Bank; and
- (c) provide for 14 man-months of technical consultancy to carry out a hydrogeological study to determine the ground water potential for the area and recommend on the most appropriate and cost effective method of providing domestic water supplies;
- (d) assist the project for three months after loan signature to start up project operations. In particular, and depending upon permanent staff availability, consultants might assist in establishment of accounting systems for the project;
- (e) provide three man-months for tax consultancy to evaluate the potential tax base for LGAs with the possibility of developing equitable tax or fee structures to assist in appropriate cost recovery, for project built feeders roads, dams and wells.

5.28 The consultants would be recruited at an estimated cost of US\$9,000 per man-month individually or through consultant firms. It is expected that international consultants would provide the main input, but efforts would be made to encourage local firms to participate where possible as for example the current use of a Nigerian firm by Funtua and Gombe ADPs to provide inservice management training. Assurances have been obtained during negotiations that for Oyo State - ONPMU would be responsible for preparing detailed terms of reference for review by the Bank prior to engagement of any consultant, and that the latter would be properly qualified and experienced, and would be employed on conditions and terms satisfactory to the Bank.

C. Cost Estimates

5.29 Project costs during the five-year development period 1980/81-1984/85 are estimated at ₦41.6 million (US\$69.4 million) of which ₦16.8 million (US\$28.0 million) or 40% would be foreign exchange costs. If taxes and duties are excluded, costs would be ₦38.9 million (US\$64.9 million). Base costs are estimated on prices obtained during appraisal updated to reflect baseline costs expected in April 1980. Costs include: (a) physical contingencies equal to 5% of base costs except civil work (routine structures involving simple designs which are generally a repetition to those built in other projects) which have 10%; (b) price contingencies for local construction and operating costs at 15% per year for each year of the five year period; for local salaries and labor employed directly by the project 7%; and (c) price contingencies for foreign costs (including those of civil works), calculated on base costs plus physical contingencies, compounded annually, and based on the following annual rates of inflation: 1980, 9%; 1981, 8% and 1982-1985, 7% yearly.

5.30 Total contingencies calculated on the foregoing basis are equivalent to 23% of total costs or 30% of baseline costs. Project costs and price contingencies have been calculated on the assumption that the exchange rate between the naira and the dollar will remain fixed at ₦1=US\$1.67 throughout the project period. This closely reflects the experience of recent years during which time the exchange rate remained practically unchanged despite a rate of domestic inflation in Nigeria which consistently exceeded international inflation by a significant margin.

5.31 The estimates of project cost in dollar terms would be affected by a change in exchange rate policy. If, for example, there were to be a 20% devaluation to compensate for the system of import duties and export incentives currently in force and if the exchange rate were to be adjusted thereafter to compensate fully for the difference between domestic inflation and international inflation projected for future years, then the local component of project costs would be lower when expressed in dollar terms. Under this assumption the local component of project costs would amount to US\$35.1 million compared with the US\$41.4 million estimated on the basis of the present exchange rate. Total project cost would, therefore, amount to only US\$62.1 million (compared with US\$69.4 million estimated on the basis of the present exchange rate) and the share of total project cost financed by the Bank loan would be 46% (compared with 40% estimated on the basis of the present exchange rate).

5.32 Details of project costs are presented in Annex 2, Table 1 and the Project File C4, and summarized below:

Table 1: Summary of Project Costs

	Local	Foreign	Total	Local	Foreign	Total
	---- (N million) ----			--- (US\$ million) ---		
<u>I. Field Crops and Development</u>						
Technical Services	5.6	2.5	8.3	9.4	4.2	13.6
Incremental Farm Inputs	0.4	2.3	2.7	0.7	3.8	4.5
Civil Works	<u>8.1</u>	<u>6.0</u>	<u>14.1</u>	<u>13.5</u>	<u>10.0</u>	<u>23.5</u>
Subtotal	14.1	10.8	24.9	23.6	18.0	41.6
<u>II. Support Services</u>						
Project Management & Adm.	2.1	0.7	2.8	3.5	1.2	4.7
Evaluation Unit	0.5	0.2	0.7	0.8	0.3	1.1
Training	0.5	0.3	0.8	0.9	0.5	1.4
Commercial Services	1.7	0.7	2.4	2.8	1.1	3.9
Consultants Services	-	<u>0.4</u>	<u>0.4</u>	-	<u>0.7</u>	<u>0.7</u>
Subtotal	<u>4.8</u>	<u>2.3</u>	<u>7.1</u>	<u>8.0</u>	<u>3.8</u>	<u>11.8</u>
Total Base Costs	18.9	13.1	32.0	31.6	21.8	53.4
Physical Contingencies (6%)	1.2	0.7	1.9	2.0	1.2	3.2
Price Contingencies (24.9%)	<u>4.7</u>	<u>3.0</u>	<u>7.7</u>	<u>7.8</u>	<u>5.0</u>	<u>12.8</u>
Total Contingencies (30.8%)	5.9	3.7	9.6	9.8	6.2	16.0
TOTAL ESTIMATED PROJECT COSTS	24.8	16.8	41.6	41.4	28.0	69.4

D. Proposed Financing

5.33 Of the total project cost of N41.6 million (US\$69.4 million), the Bank would finance N16.8 million (US\$28.0 million) at the lending rate current at the time of loan approval and for a period of 20 years, including a five year grace period. The Bank loan would cover 40% of total project costs or 43% of project costs net of taxes, equivalent to the foreign exchange cost; FGN would finance N10.4 million (US\$17.4 million) representing 25% of project costs, in addition to funding farm input subsidies, and OYSG N14.4 million (US\$24.0 million) or 35%, of project cost, in addition to maintaining its existing expenditures in the project area (para 5.35). A summary of this proposed financing plan is shown below (detailed financing plan is at Annex 2 Table 3).

Table 2: Proposed Financing Plan by Expense Category
(N/million)

	<u>Total</u>	<u>IBRD</u>	<u>FGN</u>	<u>OYSG</u>	<u>% Distribution</u>
Buildings and Construction	7.4	4.2	1.6	1.6	17
Plant, Vehicles and Equipment	7.2	6.5	0.4	0.3	17
Salaries and Wages	15.4	2.6	5.0	7.8	36
Consultant Services	0.5	0.5	-	-	4
Operating Costs	7.5	-	3.1	4.4	18
Farm Inputs	3.6	3.0	0.3	0.3	8
Total N million	41.6	16.8	10.4	14.4	100
Total US\$ million	69.4	28.0	17.4	24.0	-
Percentage		40	25	35	-

5.34 The Bank loan would be made to the Federal Government who would onlend it on the same terms and conditions to OYSG under a subsidiary loan agreement drawn up between FGN and OYSG. Ongoing projects are suffering from inadequate inflows of funds from Government sources, and in order to address this problem, assurances were obtained during negotiations that Bank disbursements would be made directly to ONPMU's commercial bank account; ONPMU would be authorized to establish overdraft facilities equivalent to six months working capital requirement as estimated in the annual state approved budget and that the overdraft would be guaranteed by OYSG; FGN and OYSG would provide their quarterly contributions to the project at least three months in advance, in accordance with the approved annual budget; and the management of ONPMU would submit at least four months prior to each fiscal year the project's proposed annual budget, as approved by the Budget and Policy Coordinating Committee (BPCC)(para 8.02), to the Federal Ministry of Agriculture, the State Ministry of Agriculture and Natural Resources, and the Bank.

5.35 Farm inputs are costed on an incremental basis. Fertilizers and would be sold on a subsidized basis following established Federal and State policies. It is essential that ONPMU receives subventions from FGN and the procedure of procuring fertilizer centrally and distributing it to the States including a timetable has been agreed upon at negotiations. Project operating expenditures are incremental to estimated existing government recurrent expenditures on agricultural development, in the project area of N900,000 per annum (1980 constant terms). Details of existing expenditures are in Project Working File C4. OYSG would continue disbursing these funds to the project in addition to the incremental requirements shown in the above table. Assurances to this effect have been obtained during negotiations.

E. Procurement

5.36 Fertilizers, chemicals, motor vehicles, road making equipment and tractors valued at about N9.4 million (US\$15.7 million) would be procured

through international competitive bidding in accordance with Bank guidelines. Contracts for less than US\$100,000 would be procured according to local competitive procedures acceptable to the Bank. For contracts of less than US\$30,000, competitive shopping would be employed. Items for procurement would be bulked to permit optimum use of competitive bidding. Total purchases under these two procedures are estimated at N2.4 (US\$4.0 million). Domestically manufactured goods would be allowed a 15% preference or the applicable import duty, whichever is lower, when comparing bids with those of foreign manufacturers. Experience has shown that contracts for houses, stores and buildings, which are valued at about N7.4 million (US\$12.4 million) are not attractive to foreign contractors due to dispersed location, small size of contracts and competitiveness of local contractors; such contracts would be awarded on the basis of local competitive bidding. Construction of feeder roads and small dams, for which labor and materials are valued at N5.0 million (US\$8.4 million), would be undertaken by the project on force account, due to a continuing shortage of dependable contractors able to undertake this type of work. A large part of the project cost would be operating expenses and local salaries, valued at about N14.3 million (US\$23.9 million) which are unsuitable for competitive bidding. The services of consultants and internationally recruited staff valued at N3.1 million (US\$5.2 million) would be obtained in accordance with procedures acceptable to the Bank.

F. Disbursements

5.37 Expenditure would be fully documented. A schedule of Bank Loan disbursements is at Annex 2, Table 4. The Bank loan would be disbursed during 1980-85 as follows:

- | | |
|--------------|---|
| Category I | 60% of the cost of buildings, offices, houses and furnishings, totalling US\$6.2 million; |
| Category II | 100% of the foreign expenditures on directly imported vehicles, tractors, roadmaking equipment and spare parts (or if locally procured 90% of expenditure) totalling US\$9.9 million; |
| Category III | 100% of the cost of salaries and allowances of internationally recruited staff and consultant services and overseas training totalling US\$4.6 million; |
| Category IV | 100% of foreign expenditures on directly imported fertilizer, chemicals and other farm inputs (or if locally procured 85% of expenditure) totalling US\$4.5 million; |
| Category V | an unallocated amount of US\$2.8 million. |

Disbursements for all categories would be made against contracts of procurement entered upon by ONPMU according to the specification of para. 5.36. No

payment would be made against certificates of expenditure and/or for force account works.

G. Accounts and Audits

5.38 ONPMU would keep records in accordance with sound accounting practices to reflect its operational and financial position and would have these audited by a firm of independent external auditors acceptable to the Bank; the audited accounts and the auditor's reports, including a statement as to whether Bank funds had been used for their intended purpose, would be submitted to the Bank within four months of the end of the fiscal year. Assurances to this effect were obtained during negotiations.

H. Programming and Budgeting

5.39 Annual budgets would be prepared by Oyo-North Project Management Unit (ONPMU) based on appraisal estimates amended, where necessary, to reflect changes in costs and projected development policies. These would be submitted to the Budgeting and Policy Coordinating Committee (BPCC) (para 8.02) for approval. ONPMU would prepare quarterly cash flow statements which would be submitted to BPCC and ONPMU would operate on the basis of these statements. ONPMU would prepare, for prompt submission to the Bank, quarterly and annual progress reports, including summaries of expenditures and use of funds. On the basis of the approved annual budgets, the State and Federal Governments would make budgetary allocations and thereafter would make available to ONPMU all necessary funds quarterly and in advance (see para. 5.34). However as a condition of effectiveness a separate bank account for ONPMU would be opened with a commercial bank, and an initial deposit of ₦2.0 million (about 25% of project year one expenditures) of which ₦1.0 million paid-in by FGN and ₦1.0 million by Oyo State.

VI. TECHNOLOGY AND PRODUCTION SPECIFICATIONS

A. Crop Development

6.01 Agronomic recommendations and yield projections (summarized at Annex 1, Table 1) are based on relevant research; experience in other projects and observed performance under field conditions. Development proposals for the BSP have additionally taken account of the ecological and edaphic conditions in the project area, and the socio-economic constraints, including family finances and labor availability. The technology proposed is simple and relatively inexpensive. In brief, substantial increases in the present low maize and cowpea yields are projected on the basis of the impact of improved varieties; increased fertilizer use; better husbandry and pest control. While

conservative yield increases are anticipated for yams and cassava, for which new varieties are also available; only moderate increases are expected for sorghum. However, as further information becomes available from research and project trials, and as farm management standards improve, further modifications and achievements can be expected.

6.02 The proposed technology would involve the use of improved planting material (including cleaned, dressed and certified seed), appropriate fertilizer use, insect, pest and disease control, improved and more timely cultivation and sound post-harvest practices. Planting material for root crops would include improved strains of cassava resistant to leaf mosaic and cassava bacterial blight and varieties of yams which are high yielding, resistant to disease and insect pests, long storing and palatable. Yam setts would be dusted prior to planting. To reduce post-harvest losses, provision has been made to treat crops stored on farm against pests. In addition, maize cribs would be built, with project supplied materials, to introduce farmers to improved methods of drying and storage which would allow reaping during the rainy season (para 5.13).

6.03 More sophisticated technology would be introduced for farmers participating in the ASP program. This would include, for the conventional cultivation package, tractor plowing, hand planting, hand controlled droplet application (CDA), herbicide spraying (with provision for backup mechanical weed control), and tractor trailer assistance with harvesting. The rotation would be three years maize and one year cassava, followed by a fallow period. At least one of the first two maize crop would be followed by late cowpea and for this crop maize cribs would be mandatory. The cassava crop would be planted in September after the third maize crop. Yams would generally be grown in rotation with vegetables, sorghum and other food crops but are, not included in the maize-cassava rotation due to the need for ridging which would reduce trash needed for minimum tillage. Efforts would be made to at least partially mechanize the ridging for yams. Staking of this crop is not as essential as further south but improved labor effective methods of staking would be investigated.

6.04 Cultivation of mechanized non-minimum tillage cassava would include ridging. For the minimum tillage package, the sequence of operations would be trashing of crop residues and weeds with a rotary slasher, spraying with a blanket herbicide, spraying with a pre-emergent herbicide (when cowpeas are to be planted the pre-emergent herbicide would be omitted), hand planting and assistance with mechanized transport at harvesting. The rotation would be as for conventional mechanical cultivation, but without any fallow period. Yield projections under these systems are summarized at Annex 1, Table 1. These are conservative, but allow for a development phase while farmers acquire basic management skills. Later yields should further improve, and other legumes such as soybeans could probably then be introduced into the rotation.

6.05 Minimum tillage techniques have been used in many countries and are extensively applied in the United States using conventional applicators which require large quantities of water as a base for the herbicide. Application in the project area would be more difficult due to problems in transporting large amounts of water, and a new application technique, Controlled Droplet

Application (CDA) spraying will be used. The problems in adopting this are mainly managerial although some technical problems remain. If the tractor operations are efficiently organized, most of these operations present no problems. Herbicides have been tested at IITA, and the recommended types and rates are satisfactory, although capable of improvement; however, application remains a problem and more work needs to be done on the utilization of hand and tractor-mounted sprayers. These sprayers, as for ultra low volume insecticide sprayers, apply a blanket spray of minute droplets, use very little water as a base and generally need far less of the active chemical ingredient than conventional applications thus minimizing adverse environmental side effects. Standard sprayers would be available as a backup if necessary.

6.06 The project would adopt techniques similar to the IITA minimum tillage plots and would endeavor to develop stable farming systems suitable to the area. Initially, a simple but practical rotation of three years maize plus one year cassava is proposed, with the cassava to be underplanted late in the third maize crop. The second year of maize would be early planted and followed by cowpeas in the same season. Adopting this rotation and using conservative figures for yield increases and machinery output, it is estimated that the increase in yield and acreage will raise average farmer gross incomes to levels which should make the enterprise economically attractive. (For details see Summary of Farm Budgets in Section IX Financial Implications for Farmers, and Annex I, Tables 5, 6, 7 & 8). Since the large-scale application of minimum tillage farming to West Africa is a pioneering effort, the present design of the project is conservative with only a relatively small proportion of farms adopting the new approach. The intention, however, is to maintain flexibility of project design and should the minimum tillage system 'take off' in the early years, project management should naturally encourage wider adoption than assumed in this report.

6.07 The timely supply of farm inputs in adequate quantities is essential for the uptake of new technology. In the light of delays experienced in the supply of fertilizer to the ongoing Bank-assisted projects, assurances were obtained at negotiations that deliveries would follow an agreed timetable, the progress of which would be jointly monitored by FGN and the Bank, and that the system of Central Fertilizer Unit (CFU) procurement would be reviewed after two years. Fertilizer would be procured through the CFU using international competitive bidding with the same system of checks on timely supply as apply to other projects. Details of annual requirements are given in Annex 1, Table 4.

6.08 The exact percentage composition of crops, particularly under BSP can only be a matter of estimation, and can be expected to change with economic factors and technical advances. The overall area under cultivation is estimated to grow at 2.5% in line with population increase, but in areas adjacent to towns, where pressure on land is at a maximum, cultivated areas would increase due to the falling percentage of fallow land. Comparative production and yield estimates are shown in table 3 below. The overall production in terms of grain equivalent is expected to increase from 193,000 tons to 233,000 tons at full development, an increase of 21% or equal to an annual growth rate of about 4%. This compares favorably with the existing national average agriculture production performance of about less than 1% per annum.

Table 3: Increases in Production

	<u>Pre-Project</u> <u>Net Production</u> -----M'-----tons-----	<u>Incremental</u> <u>Production</u> -----	<u>Average</u> <u>Production</u> <u>Increase</u> -----	<u>Annual</u> <u>Growth Rate</u> -----%	<u>Yield Increase</u> <u>from Full Adoption</u> <u>Improved Practices</u> -----
Maize	47,000	17,000	36	5.3	87
Sorghum	6,500	800	12	2.3	76
Yams	167,000	24,000	14	2.7	57
Cassava	254,000	39,000	15	2.9	28
Cowpeas	425	500	117	16.8	400

B. Tractor Services

6.09 The developments proposed under ASP would require a moderate expansion of tractor services to cater for 8,000 ha annually by Year 6. This would involve, an increase of some 36 in the existing tractor force. In arriving at this number the calculation takes account of the benefits of better organization and management, whereby each tractor (particularly with minimum tillage) should be able to service an estimated 175 ha (involving 750 operating hours per annum).

6.10 Most of the operations carried out under minimum tillage (slashing, spraying) will involve less wear on machinery than conventional operations. However, the practical problems of applying the techniques on a large scale will call for constant liaison with researchers and manufacturers, and the ability on the part of staff to assess results impartially and modify equipment where necessary. There is also a very real possibility that in view of the low horsepower requirements for minimum tillage operations a very light tractor will be adequate. Provision has accordingly been made in the project for a senior mechanical engineer whose duties would include liaison with research, manufacturers and consultants (para 5.11).

C. Land Development

6.11 Proposals for crop development under the ASP would require a total of 2,500 ha to be cleared and stumped. This would be left to the farmer, who in any case is clearing land under his present system to allow for the usual fallow period. Although the general topography of the project area does not demand any heavy land clearing, in some cases there would be need for it. In order to provide for higher standards of stumping the project would procure hand operated winches, which would be hired out to farmers to enable them to fell trees and extract most of their roots in one operation.

6.12 The farm management and planning unit (para 8.05) would include conservation planning capability in order to advise farmers on selection of good arable areas. It would also be responsible for designing and construction of conservation layouts on the government farms. On private or group farms where such work is necessary it would design the works but the farmer would be responsible for construction. For this purpose, if necessary he could utilize the tractor hire services operated by the Commercial Services Division.

D. Feeder Roads

6.13 Detailed phasing and design criteria of the annual road program is in Project File C2. The planning and design of project feeder roads would follow existing Federal, State and local Government systems and would be based on sound engineering and soil conservation practices. In view of the abundance of laterite throughout the project area it is proposed that motorized scrapers be used for earthmoving in preference to lorries and front-end loaders. Road lines would be cleared to a width of 12 metres to accommodate a road 5.2 metres wide, with side drains 1.8 metres wide. New roads would be aligned on ridges, wherever possible, to reduce construction and maintenance costs. The project would establish a casting yard for the manufacture of culvert rings and fence posts.

6.14 The project would undertake maintenance of both improved and new roads for a period of three years prior to hand-over to the local Governments concerned. This would entail two gradings each year for the first 2 years followed by a major overhaul in the third year. It would be vital for the local Governments and their roads personnel to be closely involved in the road programme from the outset so that eventual transfer of maintenance responsibilities to LGCs should be smooth and efficient. During negotiations it has been agreed that all Local Government roads personnel would be made available to the project for both formal and in-service training to enable them for independent road maintenance operation thereafter. In addition to training technical personnel it would be necessary to provide training in budgeting, budgetary control and costing. The possibility of a combined Roads Unit for the three Local Governments was considered. It would obviously be much more efficient and logical to establish such a unit, as full use would be made of the central workshop and overheads would be greatly reduced. If the three Local Governments are able to resolve the political and financial problems such a unit should be established (para. 8.06), or otherwise three individual units would be needed.

E. Water Development

6.15 The project's water development strategy would aim to eventually combine the optimum utilization of surface and groundwater supplies to provide water for humans, livestock, and supplementary water for dry season crops - mainly vegetables. Thus in the future it can be expected that a well balanced

program of small dams, wells, and boreholes should eventually emerge with each method of supply complementing the other. The balance in any specific area would depend on the final utilization of the water, the hydrological nature and climate of the particular area, and the relative cost effectiveness of various methods of supply.

6.16 Since at this stage little is known about the hydrology of the area, the project would develop a strategy of developing surface water dams and wells in appropriate locations, and would at the same time undertake a hydro-geological survey to explore for the groundwater sources. The result of the latter should give a good indication, as did a smaller study carried out under the Gombe ADP (Loan 1164-UNI), of the mix of future water delivery systems appropriate for development in the decade ahead. This survey would be supported by an additional survey, to be financed under the Ekiti-Akoko ADP, that would recommend an appropriate strategy for rural water supplies under the various conditions applying in Nigeria.

6.17 The measures for water supply proposed for this project have the primary objective of filling a very important short term need in providing water during the difficult 5 months annual dry season. Environmentally, the program of dam building will have a beneficial effect on the water table and stream flow, but it is recognized that the dangers of water borne diseases especially, bilharzia infection from washing in the reservoirs would remain. This would be reduced, however, by the provision of an outlet pipe to allow chemical treatment of the water or the use of pressure filtration systems, both of which would supply clean drinking water. Existing streams and pools are, however, currently a source of infection and control of this disease is largely a function of improved health education. A more sophisticated water reticulation systems would be the responsibility of either the State's public works department or the local communities themselves. The latter would be encouraged to finance supplementary reticulation from community funds.

6.18 The Dams and Wells construction program would be phased over four years (year 2 - 5) and would involve annual construction of 10 dams and 75 wells. Dams would be maintained by the project for a period of 2 years after construction; thereafter they would be handed over to the Oyo State Water Corporation. Wells would be handed over to Local Governments after commissioning. In both cases the personnel responsible for maintenance would undergo thorough training by project staff to ensure prolonged and effective use of these amenities. Particular attention would be paid to the control of erosion in the spillways and on the embankments. The latter would be fenced against livestock, and grassed. Trees or termite mounds would not be permitted on the embankment.

VII. MARKET PROSPECTS, MARKETING AND PRICES

A. Market Prospects

7.01 Almost all studies of Nigeria's future food needs predict a widening food deficit for the country over the 1985-1990 period. The recent Nigerian

Agricultural Sector Review (2181-UNI) projects the 1985 food deficit at around 6.6 million tons of cereal equivalent, increasing to 10.6 million tons in 1990. Food imports have soared from US\$97.0 million in 1970 to about US\$1.3 billion in 1978 (para. 2.06). Moreover, due to the increased migration of rural population to the towns in the future the demand for food from urban centers is predicted to increase enormously. Although no recent reliable data are available on foodcrop trade in the project area, available studies suggest a substantial net outflow of grains, partially offset by an inflow of processed or "convenience" foods like bread, cassava, gari and yam flour. The project area serves as a supply source for at least three major urban centers, namely, Oyo, Iseyin and Ibadan, projections show that by 1990, the likely truly urban population of these towns will reach about 2.0 million, thus providing a major demand source for project-induced production.

7.02 At full development, from 1986-87 onwards, total net food production in the project area is expected to reach 230,000 m/tons of cereal equivalent. At the same time while using an average per capita consumption level of 170 kg per annum (grain equivalents), and assuming a project area 1985 population (urban and rural) of 727,000 (para. 4.07), the estimated consumption would be 124,000 m/tons, leading to a modest local food surplus. However, in terms of the overall national demand, the project's incremental production would contribute less than 1% of the national projected food deficit in 1985 of 6.6 million metric tons. In view of Nigeria's overall food shortage situation, and that project production would only constitute a small percentage of total national demand, no difficulty should arise in marketing of project output; in fact project production would be effective import substitution. In addition to human consumption, project grain output (especially maize) would contribute to meeting critical local animal feed shortages.

B. Marketing

7.03 In Nigeria, foodcrops are almost exclusively traded through the private sector on a somewhat laissez-faire basis; Government interference is restricted to insignificant purchases by the Commodity Boards. Foodcrop markets are characterized by many buyers and sellers interlinking between producer and consumer in a complex system of arbitrage and distribution. In general, communication between markets is limited by the poor feeder road system and integration is constricted by the almost complete absence of market information and undercapitalization of market channel participants. Despite its shortcomings, traditional foodcrop marketing is basically adapted to existing production conditions and is thought to function quite efficiently. The project area, like the rest of Nigeria, has both a chain of small periodic village markets and some large urban markets at Shaki, Kishi and Oke Iko. In addition, marketable surpluses from the area reach the nearby urban markets of Oyo, Ibadan, Iseyin and Ilorin. Although there are adequate market outlets for project-induced output, there exists unnecessary price differentials for given crops between producing locations within the project area and between most of these and the urban markets. There are several reasons for the relatively undeveloped nature of project area markets, but the lack or absence

of crop evacuation roads is a major contributing factor. It is expected that by improving the area's feeder road system, the project would not only facilitate marketing but in some cases, would open up new areas to the market economy. Monitoring and evaluation results from the ongoing projects in northern Nigeria indicate that improved farm to market roads have resulted in a better flow of market information, increased competition and improved prices, all of which have impacted positively on the farmers' selling position. The project would help improve existing marketing arrangements by: establishing and promoting trading links between producer and consumer including promotion of group and cooperative marketing schemes; providing assistance in kind for on-farm storage; and coordinating the use of the existing storage facilities.

C. Prices

7.04 Foodcrop prices in Nigeria are largely determined by the relevant domestic supply and demand conditions. While official price regulation is confined to export crops, Government operates through its various Commodity Boards a minimum guaranteed price scheme. However, in recent years the unusually high domestic free market prices have rendered the Government's guaranteed floor price virtually ineffective -- the Commodity Boards now acting only as buyers of "last resort". One conspicuous result of the almost 500% increase in urban food price index during the 1970-77 period has been a widening ratio between domestic and world market prices for tradeable commodities like maize and sorghum. Given the predicted food deficits, and the increasing budgetary constraints as well as logistic difficulties in obtaining imported food, it is quite likely that at least for sometime, high domestic food prices would continue. Project production is however unlikely to have any overall effect on domestic market prices and in general the price outlook for project crops is favorable.

7.05 Although domestic price data for crops like yams, cassava and cowpeas are collected by both MANR and the Ministry of Finance and Economic Development (MOFED), the quality of the data base is highly suspect. Therefore, in order to assemble future farmgate prices for internationally non-traded crops (cassava, yams, cowpeas), the MOA prices series were crosschecked with other data to arrive at the reference prices which are post-harvest wholesale prices in the selected markets. Future economic farmgate prices for maize, sorghum and fertilizers were derived from the Bank's annual (April 1979) commodity price forecasts of world market prices, updated to April 1980 (the expected date of project start up), by applying the index of international inflation; these prices were also adjusted for transport, handling and primary marketing costs. Financial crop prices (for farm budgets) reflect local rural retail market conditions adjusted to farmgate. A summary of economic and financial farmgate prices is given below and details are in the Project File C-3.

Table 4. Farm-Gate Prices of Inputs and Outputs

<u>Crops</u>	<u>Naira/m/ton</u>			
	<u>1980-85</u>		<u>1980</u>	<u>1985</u>
	<u>Financial</u>	<u>Economic</u>	<u>Economic</u>	
Maize	240		169	182
Sorghum	200		156	166
Cassava	102		102	102
Yams	305		305	-
Cowpeas	691		691	-

<u>Fertilizer</u>	<u>1980</u>		<u>1985</u>	
	<u>Financial</u>	<u>Economic</u>	<u>Financial</u>	<u>Economic</u>
NPK (15:15:15)	228	274	256	305
CAN	178	210	209	247

VIII. PROJECT ORGANIZATION

A. Organization and Management

8.01 The project embraces a range of activities which at present are the responsibility of different ministries and institutions. Many of these activities are interdependent and successful implementation requires a very close liaison or direction by a single management unit with a degree of autonomy not normally associated with government operations. An administrative structure is therefore required which would enable the project to be implemented efficiently, while at the same time retaining a close liaison with an adequate representation at the ministries and institutions concerned with project actions.

8.02 Until now, each Bank-assisted project in Nigeria has established a Project coordinating committee to be responsible for overall project policy. However, now that Bank involvement in the sector is increasing, and with certain states operating as many as three or four Bank agricultural projects, it is considered preferable to establish a single common committee, called the Budgeting and Policy Coordinating Committee (BPCC), for each state as has already been agreed for Ondo and Ogun State under the forestry project (Loan-1679 UNI). This approach could avoid duplication of efforts or inconsistencies in decisions between different projects, and is thought more likely to attract high-level support from the various participating agencies. Once BPCC is established as an effective body, its role in State policy-making would not only affect the Bank-assisted projects but it would also be a useful forum for the formulation of overall State policy for the agricultural sector.

8.03 The project would be implemented by a semi-autonomous management body the Oyo-North Project Management Unit (ONPMU) within the Ministry of

Agriculture and Natural Resources of Oyo State. The management unit would be responsible to BPC which would be responsible for reviewing budget and policy matters, not only for the Oyo-North ADP, but also for other Bank-financed agricultural projects in the States. The advisory body to BPC would be the existing Planning, Budgeting and Monitoring Division of MANR. BPC would determine common policy issues; have an overall view of a number of project budgets involving a significant portion of the State's agricultural allocations; ensure common conditions of service; award major contracts; etc. BPC would comprise the Permanent Secretary of Agriculture (Chairman), Chief Agricultural Officer, Chief Agricultural Engineer, Chief Conservator of Forests, Chief Agricultural Planning Officer (CAPO), the Project Manager of AISU, the General Manager of the Oyo State Water Corporation, Project Managers of Bank-assisted projects, a representative of the Ministry of Finance and Economic Development, and a representative of the FMA. Representatives of other Ministries or agencies would be co-opted when required. The CAPO would be Secretary to the Committee. A condition of effectiveness would be that Oyo State had, through publication in the official gazette, established ONPMU and BPC with terms of reference and composition satisfactory to the Bank.

8.04 ONPMU would take over the MANR agricultural responsibilities in the project area except for forestry and veterinary functions. ONPMU would have a large degree of operational and financial autonomy but would liaise and coordinate its activities with other relevant public agencies in the area to minimize duplication of programs and to facilitate post-project management. Particular emphasis would be placed on liaison with the LGCs, and a senior project headquarters officer would be designated to coordinate project and LGC operations. Since the LGCs will be in a formative phase, at this crucial stage the project would play a highly constructive role in contributing to staff training and providing advice and assistance in areas such as planning and budgeting. Assurances were obtained at negotiations that MANR would give high priority to ONPMU staff recruitment and as far as possible promptly accede to ONPMU requests for secondment of MANR technical and other staff to the project. Assurances were also obtained that responsibility for all agricultural extension work in the project area would be transferred to ONPMU no later than April 1, 1980.

8.05 The project organization is shown on Chart No. IBRD 20056. The apex of ONPMU would be the project manager's office, and this would include the key administrative and financial divisions. Reporting to the project manager would be two departments and three further divisions:

- the Technical Services Department would be responsible for smallholder extension, land use planning, farm management advisory services, seed multiplication, and applied research;
- the Engineering Services Department would be responsible for dams and wells, the construction of roads, the supervision of building contracts and the operation of project workshops;
- the Training Division would be responsible for training project, cooperative and when necessary LGC staff, and for staff development, and also for formal farmer training, and production of training materials;

- the Commercial Services Division would be responsible for farm input supplies, tractor hire services, marketing and cooperative development; and
- the Monitoring and Evaluation Division would monitor and evaluate project technical, economic and financial progress, collect planning data, conduct land use surveys, and prepare land planning data.

8.06 The Oyo North Project Technical Coordination Committee (ONPTCC) would be established once the project is operational. ONPTCC would serve as a local coordinating unit for ONPMU. It would comprise representatives of the LGCs and other government agencies operating in conjunction with the project. Selected farmers and project technical staff would also be members. ONPTCC would play a particularly important role in siting the Group Farms, farm service centers and roads, would review project related disputes, establish guidelines for land allocation (when necessary) and provide a forum to ensure coordination of project and non-project activities. Eventually ONPTCC could evolve into a joint board that would coordinate and execute activities of common interest to the LGCs concerned as provided for in the Edict establishing the LGCs.

B. Staffing

8.07 Nigeria is generally short of trained and experienced staff with the capability of initiating and implementing a development program such as is described in this report. Experience from ongoing projects indicates that the shortage is particularly evident at senior and middle levels of management. The problem is further aggravated by the disparity between salary levels in the public and private sectors, and by some State Governments' reluctance to employ Nigerian personnel non-indigenous to the State. However, compared to some other states where Bank projects are under implementation Oyo State is relatively well staffed, although staff tend to be concentrated in towns and there is some reluctance to accept rural postings. Presently the state has about 1,064 agricultural staff (excluding cocoa development unit staff), of which there are: 63 agricultural officers, 280 agricultural superintendents and 721 agricultural assistants. The project area has only 42 agricultural staff. Detailed incremental staff requirements for the project are in Project File C1.

8.08 The effectiveness of present staff deployment is limited by a shortage of extension workers in the project area (1 to 2,000 farmers), poor roads, lack of transport and the absence of defined work programs. Even though statewide, the number of Agricultural Assistants is adequate, the majority are deployed in the cocoa growing areas. The main shortfall in staff is in the Junior grades and it would appear that some redeployment of these grades from other areas would be feasible until crash training of junior staff is effected to fill the shortfall. Personnel trained by the project under crash programs could be upgraded at a later date (para. 5.23). Recruitment

of personnel for many middle grade posts is possible in Ibadan (where there is sufficient talent) provided salaries are sufficiently attractive. In the four ongoing rural development projects, the Bank encouraged State governments to identify and recruit suitable Nigerians for key positions but in nearly every instance, it proved not possible. The project has therefore provided funds (about US\$85,000 per man-year) ^{1/} for international recruitment of the following key staff: project manager, chief accountant, chief of technical services, senior planning officer, senior staff development officer, farm management adviser, chief development engineer, senior mechanical engineer, senior hydrological engineer, senior roads engineer, commercial manager; and credit and cooperative adviser to be posted with AISU. During negotiations, assurances were obtained that persons with qualifications and experience and on terms and conditions of employment acceptable to the Bank would be appointed to these posts. The appointment of the project manager, and chief accountant, would be a condition of loan effectiveness.

8.09 During negotiations it was agreed that the Nigerian authorities would recruit on their own the international staff for this project, through a consulting firm acceptable to the Bank. The higher cost per man-year (para 8.08) reflects the fees of the consultant firm contracted to provide the key staff. The signing of a contract agreement between OYSG and firm acceptable to the Bank would be a condition of effectiveness. The appointment of the project manager and chief accountant would also be a condition of loan effectiveness.

C. Input Distribution and Farm Credit

8.10 Background. Presently, Oyo State has two institutions, namely the Agricultural Input and Services Unit (AISU) and the Oyo State Investment and Credit Corporation (OYSICC) that could be reinforced, and through effective coordination could provide the framework for an efficient statewide input distribution and credit organizations.

8.11 Early in 1978, OYSG established AISU as a semi-autonomous agency with statewide responsibility for making farm inputs and services available to farmers. AISU operates from Agro-Service Centers (ASC), located at each of the State's LGC headquarters. All three LGAs in the proposed project area have ASCs. These centers serve as supply outlets for fertilizer (received from the FMG), improved seeds, sprayers and small tools, and tractor hire services. Although AISU is designed to function as a semi-autonomous entity, in practice it has to rely heavily on the State for its budgetary allocations, especially for its operating expenditures which are fully met through State budgetary appropriations. During the 1977-78 fiscal year a sum of N8.7 million

^{1/} Includes US\$30,000 base salary; US\$18,000 for post allowance, cost of living allowances and gratuity, US\$12,000 for medical, education and settlement costs, and US\$4,000 for international travel. Company overheads 10% and fees 18%.

was approved for AISU, of which ₦3.9 million was expended. Total revenues during the same period were only ₦0.4 million against a targeted revenue of ₦1.5 million. AISU's fiscal reliance on the State will not diminish unless there is a change in the present Government subsidy policy which prevents it from charging an adequate markup for the services it provides and more importantly from recovery of the full cost for its services. For these reasons under the project, a commercial services division would be established which would operate on a cost plus basis to ensure a timely procurement and distribution of inputs to project area farmers.

8.12 OYSICC, established as a successor to the former Western State Investment and Credit Corporation is the State's major credit institution. In addition to other forms of credit and investment activities, OYSICC has a full fledged agricultural credit department. OYSICC's agricultural credit operations are mainly confined to lending for cocoa marketing (mostly through cooperatives) while food crop production loans have been limited. This is evident from the fact that during 1977-78 OYSICC made agricultural loans amounting to ₦4.5 million (US\$6.9 million), of which only ₦1.2 million (US\$1.8 million) was for food crop production. Of this, project area farmers received only ₦0.8 million or 18% of OYSICC's total lending. While OYSICC's debt recovery on marketing loans has been satisfactory (about 90%), loan collection for food crop credit has been poor (less than 40%). The high arrears rate has further exacerbated OYSICC's perennial shortage of working capital and resulted in a shift in its loan portfolio in favor of the less risky export crop marketing and plantation type lending.

8.13 Despite these financial and other limitations, OYSICC is anxious to lend for food crop production, and in pursuance of this objective it has stationed credit agents at all of the 23 statewide ASCs. OYSICC credit agents are authorized to process and approve individual loans up to ₦100. Potential borrowers, are identified either by MANR extension agents or AISU marketing staff. Short term loans for hired labor and other farm inputs carry interest rates ranging from 5% to 8%, depending on the source of OYSICC funds. Loan recovery is at harvest and usually debt is allowed to 'roll over' to a maximum 12 month period. Follow up on borrower's performance is almost non-existent, and action is only initiated in case of default.

8.14 Input Distribution. The project would establish its own input supply and distribution system for project area farmers. Fertilizers, chemicals, sprayers and other essential farm incremental inputs would be procured directly (fertilizer would be an exception if FGN continues its present centralized procurement system). Tractors and other equipment would also be procured and operated with project funds. Improved seeds would be produced on project farms, and by contracted outgrowers (para 5.12). All farm inputs would be marketed through the 17 project established FSCs (para. 5.04), supplemented by the three existing project area ASCS, presently operated by AISU.

8.15 From the very outset the projects input supply unit would operate on commercial lines and would eventually merge with AISU. To help AISU become

efficient, the project would provide it with technical assistance to progressively help it build up its procurement ability and improve its distribution on a cost-recovery basis. The project's commercial manager will contribute to the training of AISU's commercial staff, and a Credit and Cooperative adviser (para 8.08) would be posted at AISU. Since commercialization of the input supply system would largely depend on the Commercial Services Division's capacity to generate its own revenues, the principle of allowing full cost recovery for services is important and was therefore agreed upon with the State during negotiations. In view of the government's existing fertilizer subsidy policy, however, it may not be possible at project initiation to impose a mark-up on fertilizer sales, which are expected to be the single most important revenue generating item representing 80% of turnover. Consequently, during negotiations it was agreed that any operating losses incurred by ONPMU, on this account, would be met by the State Government. Reimbursements by the government for procurement of annual incremental farm inputs (para 5.35) would be credited to ONPMU trading account, which would be operated by the Commercial Services Division.

8.16 Farm Credit. Aside from the limited credit currently supplied by OYSICC, project area farmers mainly rely for their credit needs on non-institutional sources, including friends, relatives and at times local traders. Although at present levels of subsidy the need for project credit is expected to be minimal, some credit would be required for farmers adopting the advanced services packages. In fact, for farmers participating in the advanced services package, availability of credit is considered to be an added incentive for adoption of advanced farming techniques. In such cases, the project would liaise closely with OYSICC to ensure an adequate and timely supply of credit to project farmers. Individual credit needs would be assessed by OYSICC in conjunction with extension aides and the projects commercial officer. Although credit needs for project farmers would differ depending on the type and level of operation, at full development an average credit (at subsidized costs) for a 2.0 ha and a 5.0 ha advanced farm could be around ₦150 and ₦690 respectively. The annual total short-term credit need both in kind and in cash for participating farmers is estimated to be around ₦1.5 million. The credit needs would be entirely met from OYSICC's own funds, but given OYSICC's continuing funding problems (para. 8.12), assurances were obtained at negotiations that the State would ensure that OYSICC has access to adequate funds to meet the credit requirements of project area farmers. Such funds can be borrowed under State guarantee from NACB, which already provides OYSICC with funds to meet its onlending operations for cocoa marketing.

Terms of Lending and Credit Recovery

8.17 Loans made by OYSICC would bear a minimum interest rate of 10%. This is higher than OYSICC's prevailing interest rates but lower than the projected Nigerian inflation rate over the project life (15%). Thus under these conditions, interest rates must be considered subsidized. During the ongoing dialogue between the Bank and Government on this and other issues (para 2.17), the Bank has argued the desirability of proceeding towards more realistic interest rates which would, inter alia, allow for an adequate spread

for the lending institutions, and at the same time, would lead toward more positive interest rates. On an individual project basis some progress has been achieved, but Government continues to view its concessionary interest rate as a means to reduce the farmer's production costs and hence encourage agricultural investment. Development projects of the type proposed here, comprising the bulk of recent Bank support to agriculture in Nigeria, contain proportionately limited and rather insignificant credit components, and thus, are not considered the best vehicle to bring about changes in the national agricultural credit policy. At this stage, therefore, it has been agreed that the previously agreed assurance should be followed and (see Bida and Ilorin Agricultural Development Loans 1667-UNI; 1668-UNI respectively) that project interest rates for short-term production credit would be 10% or 2-1/2% above NACB rate, whichever is higher. This formula allows for automatic adjustment in the event of any significant general upward adjustment of the Nigerian interest rate structure. Since the Bank is now exploring with Government avenues to support future agriculture projects, in which by their nature, credit, and credit institutions would play a central role, these projects are expected to provide a better forum to obtain changes in agricultural interest rates within the framework of the country's overall monetary policy. Credit recovery would be the sole responsibility of OYSICC. The 10% interest rate to be charged should be adequate to meet OYSICC's credit administration costs.

D. Post-Project Development

8.18 The development proposals contained in this report are expected to have a substantial impact on agricultural production and family incomes during the 5 years of intensive development; such achievement, however, is meaningful only if accompanied by sufficient institutional reform to ensure that progress is sustained in the future. Although this is a subject requiring a consensus within Government which cannot be prejudged at this stage, certain guidelines have been proposed that will call for further amplification by project management and Federal and State Governments during implementation.

8.19 It is essential that farmers continue to have access to timely supplies of inputs, and hence it is important that the input supply unit and the credit agencies are strengthened during the life of the project to become essentially self-reliant. The present government monopoly and subsidy structure preclude input organizations, such as AISU from applying an adequate markup and this also acts as a barrier to the participation of private sector. It would be an important objective of project management to seek ways in which the latter could participate in conjunction with the project's newly-established input supply unit. It is essential that the private sector is encouraged to expand in such activities as tractor hire services to farmers and supply of inputs through local retail outlets and sale of improved planting material. Methods must be evolved which will compensate for the present subsidies, which enable government institutions to operate at uneconomic rates.

8.20 Since activities of the Technical Services Department and Training Division are likely to remain a continuing government commitment to agriculture, it has been staffed at levels appropriate for the long-term development needs of the areas. The project area is part of one of four agricultural administrative zones of the State, and it would be feasible to consider a second stage under which each zone would come under the charge of a Chief Agricultural Development Officer, whose responsibilities would correspond to those of the Project Manager of this project. This is stressed as it is important to view the project's administration as a possible spearhead to strengthening the local government structure. The proposed expansion of Funtua, Gusau, and Gombe Agricultural Development Projects to statewide operations, currently under appraisal, would provide guidelines for post-project organization in other states, including Oyo.

8.21 While it is not yet clear how areas of responsibility will finally settle down between the States and the LGCs, an important role must also be expected for the recently reformed local government administration. There is a need for a greatly strengthened mechanism for coordinating planning and implementation of rural development activities. The logical entity for this role would be an appropriately staffed local government administration which would receive technical support from the project and would later be extended to the zones described above (para 8.20). In particular the LGCs would take over the road responsibilities of the project (para 6.14). Assurances were obtained during negotiations that during the fourth year of implementation the Federal and State Governments, together with the Bank, would review project progress and plans drawn up by the Evaluation Department (in conjunction with the Planning Section of APMEPU) and would make recommendations for the future of project activities.

IX. FINANCIAL ANALYSIS

A. Financial Implications for Farmers

9.01 Using available farm level socio-economic data, four farm models have been constructed which broadly represent the different cultivation practices and farm sizes (range 2.0 ha - 5.0 ha) in the project area. All farm models represent owner-operated farms; in which family labor constitutes the major input. Incremental farm incomes would depend largely on the crop combinations as well as the farmer adoption rates, and therefore the farm models are necessarily hypothetical. Production coefficients for the farm budgets are those in Chapter VI and farm prices are domestic (1978) retail market prices, converted to farmgate. Although in actual practice the farmers investments decision would be influenced, inter alia, by the existing (subsidized input prices), in order to show the effect of a likely removal of current subsidies on farm level incomes, farm budgets were calculated using both subsidized and unsubsidized prices. Moreover, in recognition of the lag in the actual use of inputs, and its associated output; and depending on the cropping patterns and the working capital needs of each farm type, the cash

flows have been generally presented on a time-adjusted basis. While detailed farm budgets are presented in Annex 1, Tables 5, 6, 7 and 8 the results are summarized in Table 5 below:

Table 5. Summary of Farm Budgets
(Unsubsidized Costs)

Farm Size	Farm Model	Farm Family Income		Income Per Capita		Income Per Man-day		Rate of Return	
		w/o P.	w/P.	w/o P.	w/P.	w/o P.	w/P.	%	
-----Naira -----									
I.	2.0	Improved (manual)	769	1,253	109	179	3.2	4.5	-
II.	2.5	Advanced (mechanized)	843	1,598	120	228	3.4	5.0	-
III.	2.5	Minimum Tillage (manual)	843	1,960	120	280	3.4	6.0	-
IV.	5.0	Minimum Tillage (mechanized)	1,253	2,643	120	377	-	-	56

9.02 The large majority of project area farms would be the 2.0 ha manually cultivated farm units, each growing a combination of maize, yams, cassava, sorghum and assorted vegetables. For the 2.0 ha farm models it is assumed that all labor would be provided by the farm family. The results of the farm budget analysis in Annex 1, Table 5 shows that a farm family adopting improved practices for all crops could expect to increase its 'with project' net income to N2,171 (US\$2,002) as against the present of 'without project' income of N769 (US\$1,284). Elimination of subsidies would however, reduce the 'with project' family income to N1,253 (US\$2,092). In terms of return per man-day, participating farmers would be enabled to increase their returns per manday from N3.2/day to N4.7/day (N4.5/day net of subsidies). More importantly, by adopting improved practices, the farm family would be able to employ more productively its available family labor inasmuch as the 'with' project labor requirement would be 268 mandays as against 221 mandays under traditional cultivation practices an increase of about 22%. Provided participating farmers receive a timely supply of inputs (including credit) the estimated average annual net farm income in terms of end-1978 prices is adequate to induce a fairly widespread adoption of BSP, particularly since there is minimal risk for the farmer in moving away from the traditional to the improved (BSP) production technique.

9.03 About 6% of the participating farmers in the project area are expected to adopt fully or partly the advanced cultivation techniques described in Chapter VI, paras 6.03-6.06. The three most common types of ASP operations are expected to be: the 2.5 ha farmers would either use minimum tillage (manual) or conventional mechanical tillage (including a fallow period) and the relatively larger farmers (average farm size 5 ha) would use

mechanized minimum tillage (Annex 1 Table 8). The adoption of minimum cultivation practices are expected to have the following three major advantages. Firstly, it eliminates the need for non-productive fallowing. Secondly, mechanical cultivation costs are reduced, albeit somewhat offset by increased herbicide costs. And finally, available evidence indicates that, with the introduction of minimum tillage, the soil is protected and yields rise markedly from year to year, easily exceeding those on conventional plots.

9.04 Farmers adopting advanced cultivation practices (ASP) would need to hire some additional labor, as the farm family (6.5 persons) on a 2.5 ha advanced farm is assumed to contribute a total of 30 mandays/month, while the peak (monthly) requirements are estimated at some 40 mandays. All hired labor, has been costed at ₦2.0 day. The results of the farm budget analysis, presented in Annex 1, Tables 6 and 7, and summarized in Table 5 above shows that a 2.5 ha advanced mechanized farm, using AISU's tractor services (fully costed) and using modern inputs would be able to increase the net farm family income at full development from the present ₦843 (US\$1,408) to ₦1,598 (US\$2,669). Alternatively for the same farm size (2.5 ha), but using manual minimum tillage practices, the farm family can increase its net income to ₦1,960 (US\$3,273). Although it is apparent that the "with project" net income for the farm using mechanized services is relatively lower than for manual minimum tillage, the former cultivation method would initially be preferred by the farmer - this is not simply because tractor services are currently heavily subsidized, but also because mechanization helps overcome the drudgery attached to farming. Another important decision factor which may prevent a more rapid and widespread adoption of minimum tillage could be that the techniques are as yet unproven and risks are relatively higher. The size of ASP program has, therefore, been kept relatively small and would be considered as a pilot program.

9.05 The 5.0 ha minimum tillage farm budget Annex 1, Table 8 illustrate the financial advantages of adopting mechanical minimum tillage practices on a relatively large scale. The estimated internal financial rate of return for this investment is 56%. This rate of return is however, quite sensitive to a decline in yields (or prices), for example with benefits declining by 25% the investments rate of return drops to 10%. The relatively high rate of return should therefore be only taken as broadly indicative of the profitability of this enterprise. Furthermore, minimum tillage is still in its experimental stage (para. 5.05), and the risk element is high; hence the likelihood of a relatively high rate of return is only necessary to induce farmer interest and to make him risk neutral. Aside from the purely financial advantages of minimum tillage on a 5 ha farm, an additional benefit is that the farm family labor is fully employed on the farm. In summary, farms budgets for all types of advanced farms shows that the net farm income after debt service, is commensurate with the size of loans obtained (para. 8.16), and the inherent risks attached to the proposed cropping patterns. Thus in the long term farmer response to improved technology is expected to be quite high.

9.06 Comparisons of per capita incomes based on farm budgets with income data based on national accounts aggregates must be interpreted with caution under the best of circumstances. This is particularly true in Nigeria where

recent national accounts are unavailable and moreover available estimates are often unreliable mainly due to the use of conflicting GDP deflators. Nevertheless such a comparison will give a rough indication of the relative economic position of project beneficiaries. According to latest Bank estimates Nigeria's national income per capita in 1978 was N335 or US\$560. The present per capita income of project area farmers N109 (US\$182) cultivating 2.0 to 2.5 ha, and growing a mixture of cash and subsistence crops (maize, cassava, yams, cowpeas) is almost one third of the national average income, which means that project area farmers constitute the relative poverty group. With the project, per capita incomes ranging from N179 (US\$299) and N280 (US\$468) would represent a significant improvement above average present conditions. These comparisons indicate that the project would not only increase incomes of a larger number of poor farmers in the project area but would help narrow the income gap between the project area and other parts of the country, and between urban and rural areas.

B. Financial Implications to Government

9.07 The project does not increase directly generated revenue to Government as there are no taxes or cesses on farmers' produce. However, evidence from the ongoing projects suggests that considerable secondary economic activity develops in the non-agricultural sectors in the project area, and there is a marked increase in spending on the part of beneficiaries on consumer goods and services offered by the private sector. Thus, considerable increases in indirect taxation can be expected, but the quantification of the increased taxation is not possible. The fiscal implication to the State and Federal Government over the development period is, however outlined in the Financing Plan at Annex 2 Table 3. Thereafter, to maintain the projected level of agricultural activity and production in the project area the Government would need to spend about \$2.0 million per annum (constant 1985 terms). This includes recurrent expenditures such as extension, training and other supporting infrastructure.

Cost Recovery

9.08 Under present Government policy, farm inputs are highly subsidized; fertilizer is subsidized at about 80% while improved seeds are sold at a subsidy equivalent to about 50%. Despite Government's policy restraining a full cost recovery for some agricultural inputs, wherever possible efforts would be made to make full cost recovery. Under the project, the unsubsidized portion of fertilizers, insecticides, herbicides, maize cribs and tools would be sold to smallholders at a price which would cover all handling costs (para 8.15). FGN or OYSG would reimburse the project for the subsidized portion of the inputs sold to smallholders. Likewise, participants would be charged commercial rates for herbicide application and tractor hire. The farm budget analysis (paras 9.02-9.05) shows that the 'with project' incomes of project farmers would be adequate to meet the full cost of farm inputs and services. During negotiations, assurances were obtained that all inputs and custom hire services provided by the project to participating farmers would be sold

at a sufficient level to recover the cost of those inputs and services, except in those instances where an official subsidy is applied. In the latter case, the Federal and/or State Government would, where warranted, refund ONPMU in advance the value of the anticipated subsidy no later than September 30th of the previous year (para. 5.35).

X. BENEFITS AND JUSTIFICATION

A. Project Benefits

10.01 The project would meet the Government's objective of increasing food crop production, and improving rural incomes, at a cost per benefiting family of about ₦538 (about US\$900), excluding costs due to expected price increases. In addition, project improvements would also benefit urban areas, because the rate of rural migration may be expected to decline as rural life became more attractive.

10.02 By providing an assured supply of modern farm inputs, improved extension services and better market access, the proposed project would support directly by year 5 increased production from 45,000 ha. Some 70% of the project area farm families, or approximately 360,000 people would directly benefit from the project. The introduction of simple technological improvements in production would help raise farm productivity, thus improving farm incomes (para. 9.06) and also the overall food supply situation in the State. An expansion in local food supplies should improve nutritional standards and, both directly and indirectly, reduce reliance upon outside food supplies. The incremental annual production at full development is estimated to be 40,000 m/tons in grain equivalent, which is valued (at 1980 constant economic prices) at US\$10.9 million. Since Nigeria is a net importer of food, incremental project production would be effective import substitution. After deducting the incremental cost of imported fertilizers and agro-chemicals, incremental production (in cereal equivalent) at full development, if valued at forecasted border prices, would result in net annual foreign exchange savings of about US\$6.2 million.

10.03 The project's contribution to employment would stem mainly from the regular work generated at the farm level and also from the jobs created during the investment period. The mechanical package has been designed in a manner that, although it would facilitate land expansion, there would be no real labor displacement. In fact, as would be seen from the labor profiles in the project file Working Paper C1 and farm budgets at Annex 1, Tables 6, 7 and 8, improved cultivation methods or minimum tillage practices would result in raising farm labor productivity - which would inter alia, reduce underemployment and help smooth cycles in farm operations. At full development and for each year thereafter the project would require an annual total of 4,600 man-years. More than 80% of this labor would be provided by farm families while the rest would come from hired labor either on a permanent or part-time basis. The total incremental on-farm employment generated by the project

during the five-year investment period would be about 15,000 man-years. This should not provide a unmanageable labor demand pressure, because even though the project assumes that on average a farm family works 20 days/monthly the total family labor input could increase to 30 manday per month (1.5 mandays/per day). Furthermore there are no other major agricultural or industrial developments planned in or near the project area, which could compete for project labor.

10.04 Among some of the non-quantifiable benefits of the project are the improved rural water supplies resulting from investments in construction of 40 small or medium dams and 300 village wells (para. 5.19). It is estimated that all year round potable water would be available to 125,000 people residing in the near vicinity of the water sources. The provision of relatively pure water would help improve rural health by reducing the prevalence of some waterborne disease (para. 4.06).

10.05 On the institutional side, by fostering appropriate organizations and training of technical staff, the project would help improve the capabilities of Oyo State MANR for implementing and planning future state-wide rural development projects. More specifically, project support for AISU would help the commercial development of state-wide support services (para. 8.14) and which would ultimately lead AISU to become a self-financing farmer company.

10.06 One of the more important institutional features of the project is the high priority given to training. Following the experience with existing projects in Northern Nigeria, the Staff Development Officer would be a key project staff member, and one of the first in post. Financial allocation (Table 1) to training also reflects this priority. The benefits of training would not only be restricted to project staff, but cooperative staff, farmers and LGC staff would also benefit. Training assistance to LGC would include special technical assistance and consultancy to strengthen their financial capability (para. 5.27) -- this would pave the way for possible decentralization of project activities in the post-project period.

B. Economic Rate of Return

10.07 The Economic Rate of Return (ERR) for the overall project is estimated to be 20% (Annex 3, Table 3). Further, assuming a discount rate of 11%, the estimated opportunity cost of capital in Nigeria, the economic net present value (NPV) of project investment in 1980 terms is ₦22.0 million (US\$27.0 million). Assumptions underlying the economic rate of return calculation are at Annex 3, Pages 1 and 2.

10.08 Since the Bank is currently reviewing the relevant national economic parameters for use in the economic analysis of projects in Nigeria, specific or standard conversion factors have not been used for estimating this project's ERR. However, in order to guard against any likely estimation errors, the two most important economic parameters, namely the shadow exchange rate and the economic opportunity cost of farm labor, were tested to measure the sensitivity

of the project to varying assumptions about these parameters (for results see para. 10.12). In view of Nigeria's increasing net protectionist policies and its high rates of domestic inflation relative to those of its trading partners, it is most likely that in the future either the Naira's value would need to be adjusted downward, or existing trade restrictions would be increased. The latter option would in effect imply a widening gap between the SER and the official exchange rate (OER), which would approximately offset the effects of differential rates of inflation in the ERR (as would progressive exchange rate adjustment).

10.09 There is no organized rural labor market in or around the project area which could provide a reasonable estimate of the opportunity cost of farm labor. Furthermore, the demand for agricultural labor is highly seasonal, and even if information on wages were available, due to wage rigidities and the thinness of the labor market, etc. the observed wage rate may be quite different from its economic value. In the project area, even though the majority of farms are owner operated, there is some degree of hiring out of labor during the slack season. The average wage for an eight hour day during this season is N2.0. Assuming this wage is a fair measure of labor's marginal productivity, the opportunity cost of labor (OCL) for the project is estimated to be N2.0 per man-day. This estimate of the opportunity cost of labor results in a value which is in accordance with the other independent measures of the OCL, such as: (i) the marginal productivity of labor on traditional farms, as indicated by the available farm management studies and the farm budget analysis in Chapter IX, paras. 9.01 - 9.06; and (ii) the government's official minimum wage of N2.0 per man-day (including a subsistence allowance), which is the wage at which employment is available on government farm and seed nurseries.

C. Sensitivity and Risk Analysis

10.10 Sensitivity analysis was used to determine which variables would be most crucial to the success of the project. As a measure, the crossover value was used. The crossover value is the value of the variable tested for which NPV discounted at 11% is zero and is a measure of how far the variable can differ from its most likely value before the project becomes economically unacceptable. The crossover value may therefore also be interpreted as the value of the variable tested, beyond which the economic rate of return would be below the estimated opportunity cost of capital -- 11% in Nigeria.

10.11 The numerical results are presented in Annex 3, Table 4, which shows that overall the project is fairly resilient and is largely insensitive to adverse variations in the assumptions. The success of the project is, however, most sensitive to future yield development especially for yams and cassava, which constitute the bulk of project induced production. The other variables tested would have to differ widely from their most likely values to effect the viability of the project. The probability of critical variations is discussed below.

- (a) Yields. The crossover value of aggregate output is about 25% below the expected incremental production. Since both ecological as well as edaphic factors are favorable, and the proposed technologies are relatively simple, even the occurrence of some bad agricultural years would not result in aggregate output being equal to its crossover value. Amongst individual crops, the project is especially sensitive to the attainment of targeted yam yields. The crossover yam yield is 9.0 tons/ha as against the appraisal yield estimate of 7 and 11 tons/ha for unimproved and improved crop. Initial yield results from the agricultural development projects in Central Nigeria (e.g. Ayangba ADP), have shown output per hectare for yams to average around 15.0 tons. Given that the proposed technology for yam production is well tested, it is most unlikely that incremental yields over the life of the project would be so low as to cause the project to fail economically. Nevertheless, to minimize this risk, the attainment of target yields would be a prime objective for project management and a major focus of attention for supervision missions. Finally, close monitoring and evaluation will be an additional safeguard. The project is relatively insensitive to lower cassava and maize yields. The technology for both these crops is well tested, and farmers in the project area are already well accustomed to cultivating these crops. Sensitivity tests show that at full development cassava yields would have to be about 7 tons/ha before the project becomes economically unacceptable at 11%. The without project average yields are estimated to be equal to the threshold (7 tons/ha) and hence the probability of cassava yields being 93% below the most likely values is near zero.
- (b) Prices. In Nigeria, prices of non-traded commodities like yams, cassava and cowpeas are quite firm and are expected to increase further (para. 7.04). Any reduction in benefits is therefore most likely to occur because of yield decreases explained above. As regards input prices, crossover values were estimated for a likely increase in the price of fertilizers. Results indicate that the forecasted price of fertilizers would have to deviate by 123% before the project becomes unviable. Project fertilizer prices are based on projections by the Bank's Commodities Division and it is unlikely that actual prices will differ as much as 20%, which corresponds to the index of fluctuations of fertilizer prices in the past 5 years. However, when tested to a fertilizer price increase of 20%, the project's net present value is reduced to N18.4 million.
- (c) Adoption Rates. Given the nature of small holder farming, it is difficult to predict the exact level of farmer response. However, in order to evaluate the potential impact on the project's value of a lower than predicted farmer adoption rate,

a crossover value was calculated. Only if the area under improved production were reduced by 41% from 45,500 ha to 26,800 ha would the project become economically unviable. An overall farmer adoption rate of 60% of proposed technology is considered realistic: (1) in light of past experience with similar smallholder foodcrop projects in northern Nigeria, and (2) that the major thrust of the project is to promote the BSP, which is not too radical a departure from the farmers traditional cultivation practices.

- (d) Shadow Exchange Rate. Since only about 40% of project costs, and some 20% of total incremental benefits representing traded commodities (maize, sorghum) were adjusted by the SER, the project shows very little sensitivity to the choice of exchange rate. For example, a SER of US\$1 = ₦1 reduces the project's NPV to ₦18.0. However, only a 55% decrease in the economic value of the Naira (US\$1=₦1.85) would result in an unviable project. In effect, this would mean a 64% devaluation of the Naira from its current official exchange rate (US\$1=₦0.60). The probability of such a radical policy measure is however extremely low.
- (e) Economic Wage Rate. The results showed almost no sensitivity to this variable. The crossover economic wage rate is over two and a half times (₦5.0) the assumed opportunity cost of labor.

10.12 Risks. There are no unusual project risks. Project organization is structured within the state's existing agricultural zonal administration (para. 8.01) and implementation problems are expected to be minimal. However, the fact that this project, unlike earlier ADPs, would engage a firm of consultants to provide senior project staff, could result in some delays. In recognition of this likelihood, the contracting of a consulting firm satisfactory to the Bank has been made a condition of loan effectiveness. Failure to achieve anticipated yield levels at full development, especially for the advanced services package is a potential risk. However, the project's basic technical packages are fairly simple, well-tested both at the research station and farm level -- therefore it is not likely that production and yield results will be less than anticipated. For the advanced services package, risks are mainly confined to the initial stages of technology adoption, when farmers may be somewhat hesitant to accept an entirely new technology. Some technical difficulties may be experienced at the introductory stage; however, in the long term the importance of providing a stable farming system which could help check the appalling deterioration of the Savanna areas is so vital that it far outweighs any associated risks.

XI. AGREEMENTS REACHED AND RECOMMENDATIONS

11.01 During negotiations, the following principal assurances were obtained:

- (a) OYSG would review annually with LGC's and ONPMU, the arrangements for maintenance of road and water facilities and staff training requirements. On the basis of this review OYSG would provide the LGC's in advance with adequate funds for the above purpose (para. 5.17);
- (b) all consultants would be appointed with conditions of employment qualifications and terms of reference acceptable to the Bank (para. 5.28);
- (c) ONPMU would submit the BPCC-approved annual budget to FMA, MANR and the Bank at least four months prior to each fiscal year. FGN and OYSG would provide at least 3 months in advance their quarterly contributions to the project in accordance with the approved annual budget (para. 5.34);
- (d) Bank disbursements would be made directly to ONPMU'S commercial bank account (para. 5.34);
- (e) ONPMU would be authorized to establish overdraft facilities equivalent to six months' project expenditures as estimated in the annual state budget, and the overdraft would be guaranteed by OYSG (para. 5.34);
- (f) ONPMU would receive in advance (the previous September) subventions from FGN and OYSG to cover the estimated cost of fertilizer and insecticide subsidies (para. 5.35);
- (g) Project operating expenses are incremental to estimated existing government recurrent expenditures of ₦900,000 per annum. OYSG would continue disbursing these funds to the project in addition to the incremental requirements shown in para. 5.35;
- (h) audited accounts of ONPMU together with the auditor's report including a statement as to whether Bank funds had been used for their intended purposes would be submitted to the Bank within four months of the end of the fiscal year (para 5.38);
- (i) fertilizer procurement under ICB would be undertaken according to a strict timetable agreed between FGN and the Bank, who would jointly monitor progress, and the system of procurement by CFU would be reviewed after two years (para. 6.07);

- (j) MANR would give high priority to ONPMU staff recruitment and as far as possible promptly accede to ONPMU requests for secondment of MANR technical and other staff to the project.
- (k) responsibility for all agricultural extension work in the project area would be transferred to ONPMU no later than April 1, 1980 (para. 8.04);
- (l) according to the agreed recruitment procedures persons (listed at para. 8.08) would be appointed on terms and conditions and with qualifications and experience acceptable to the Bank (para. 8.08-8.09);
- (m) OYSG would guarantee that adequate funds would be available to OYSICC to enable it to meet the credit needs of project area farmers (para. 8.16);
- (n) short-term production loans would bear an interest rate of 10% per annum or 2.5% above NACB's maximum current lending rate, whichever is higher (para. 8.17);
- (o) no later than Dec. 31, 1985, FGN, OYSG and the Bank would review and make recommendations for the future of project activities (para 8.21); and
- (p) all inputs and custom hire services provided by ONPMU to participating farmers would be charged at sufficient level to recover the cost to ONPMU of the inputs and their handling, except in those instances where an official subsidy is applied (paras. 9.08 and 5.10).

11.02 Conditions of loan effectiveness would be that:

- (a) a separate bank account for the project with an initial deposit of ₦2.0 million had been opened with ₦1.0 million deposited by the State and ₦1.0 million by the Federal Government (para. 5.39);
- (b) BPCC and ONPMU had been established through an official gazette, with terms of reference acceptable to the Bank (para. 8.03);
- (c) the Project Manager and the Chief Accountant had been appointed (para. 8.09); and
- (d) the signing of a contract agreement between OYSG and a consulting firm acceptable to the Bank (para. 8.09).

11.03 On the basis of the above assurances and conditions, the project is suitable for a Bank loan of US\$28.0 million.

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OYO NORTH AGRICULTURAL DEVELOPMENT PROJECT
Inputs and Estimated Yields

	Product	Yield	Seed	PHYSICAL			Insecticide			Herbicide ^{4/}	Labor ^{5/} Man Days
				Fertilizer		Potash	Seed ^{1/}	Field ^{2/}	Store ^{3/}		
				Compound	Nitrogen						
<hr style="border-top: 1px dashed black;"/>											
Maize											
Unimproved	Grain	800	15	-	-	-	-	-	-	-	80
Improved	"	1,500	20	200	-	-	0.08	-	2.2	-	99
Advanced (Mechanized)	"	2,400	20	200	200	-	0.08	-	2.2	2.5	70
Advanced (Manual Minimum Tillage)	"	2,400	20	200	200	-	0.08	-	2.2	1+2.5	75
Advanced (Mechanized Minimum Tillage)	"	2,400	20	200	200	-	0.08	-	2.2	1+2.5	64
Yams											
Unimproved	Fresh Tubers	7,000	1500	-	-	-	-	-	-	-	178
Improved	" "	11,000	2000	200	-	-	20	-	-	-	235
Cassava											
Unimproved	Fresh Tubers	7,000	-	-	-	-	-	-	-	-	116
Improved	" "	9,000	20 ^{6/}	100	-	-	-	-	-	-	145
Advanced (Mechanized)	" "	14,000	20 ^{6/}	300	-	-	-	-	-	See Maize	135
Advanced (Manual Minimum Tillage)	" "	14,000	20 ^{6/}	300	-	-	-	-	-	See Maize	115
Advanced (Mechanized Minimum Tillage)	" "	14,000	20 ^{6/}	300	-	-	-	-	-	See Maize	115
Cowpeas											
Unimproved (with maize at 800 kg ha)	Grain	100	9	300	-	-	-	-	-	-	79
Advanced	"	500	12	150	-	-	-	-	-	See Maize	79
Sorghum											
Unimproved	Grain	500	12	-	-	-	-	-	-	-	75
Improved	"	800	15	-	100	-	0.04	-	2.2	-	84

- ^{1/} Basis Aldrex T for grains; Aldrin 2.5% for yams setts.
^{2/} Basis Pyrethroids (1.5 kgs A.I.) + Thiodan (3.5 kgs A. I.) in four sprays.
^{3/} Basis Gammelin 20.
^{4/} Based on Atrazine (2.5 kgs AI/ha) for advanced mechanized production and Atrazine (2.5 kgs AI/ha) plus paraquat (1 kg AI/ha) for minimum tillage three years plus Glyphosate (3 kgs AI/ha) every 4th year. For details see Project File.
^{5/} See Project File for detailed labour requirements.
^{6/} Normal charge for improved varieties of N20/ha.

May 15, 1979

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OYO NORTH AGRICULTURAL DEVELOPMENT PROJECT

CROP PRODUCTION PROJECTIONS

	<u>Tons</u>						
	<u>Year 0</u>	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>	<u>Year 5</u>	<u>Year 6</u>
<u>Maize</u>							
Gross Production	53050	53900	56800	60500	64500	68800	72000
Storage Losses	5305	5390	5680	6050	6450	6880	7200
Seed Retention	982	986	1008	1019	1040	1050	1073
Net Production	46763	47524	50112	53431	57010	60870	63727
Home Consumption ^{1/}	28800	28800	28800	28800	28800	28800	28800
Marketed Surplus	17963	18724	21312	24631	28210	32070	34927
Incremental Production	-	761	3349	6668	10247	14107	16964
<u>Yams</u>							
Gross Production	284000	288000	296000	304000	312000	320000	320000
Storage Losses	56800	57760	59200	60800	62400	64000	64000
Seed Retention	60500	61000	62000	63000	64000	65000	65000
Net Production	166700	169240	174800	180200	185600	191000	191000
Home Consumption ^{1/}	43200	43200	43200	43200	43200	43200	43200
Marketed Surplus	123500	126040	131600	137000	142400	147800	147800
Incremental Production	-	2540	8100	13500	18900	24300	24300
<u>Cassava</u>							
Gross Production	282000	284000	292000	305500	312000	325000	325000
Storage Losses	28200	28400	29200	30550	31200	32500	32500
Net Production	253800	255600	262800	274950	280800	292500	292500
Home Consumption ^{1/}	67200	67200	67200	67200	67200	67200	67200
Marketed Surplus	186600	188400	195600	207750	213600	225300	225300
Incremental Production	-	1800	9000	21150	27000	38700	38700
<u>Cowpeas</u>							
Gross Production	500	625	700	800	900	1100	1100
Storage Losses	75	94	105	120	135	165	165
Net Production	425	531	595	680	765	935	935
Home Consumption ^{1/}	-	-	-	-	-	-	-
Marketed Surplus	-	-	-	-	-	-	-
Incremental Production	-	106	170	255	340	510	510
<u>Sorghum</u>							
Gross Production	7500	7650	7800	7950	8050	8400	8400
Storage Losses	750	765	780	795	805	840	840
Seed Retention	180	182	183	185	186	189	189
Net Production	6570	6703	6837	6970	7059	7371	7371
Home Consumption ^{1/}	14400	14400	14400	14400	14400	14400	14400
Marketed Surplus	(7830)	(7697)	(7563)	(7430)	(7341)	(7029)	(7029)
Incremental Production	-	133	267	400	489	801	801

^{1/} Based on approximate per capita consumption of 30 kg maize, 150 kg (fresh) yams 175 kg cassava, 1 kg cowpeas per annum.

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OYO NORTH AGRICULTURAL DEVELOPMENT PROJECT

Summary of Incremental Farm Input Requirements

	<u>Units</u>	<u>Year 0</u>	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>	<u>Year 5</u>	<u>Year 6</u>	<u>Year 7</u>	<u>Upto Year 20</u>
<u>Agro Chemicals</u>										
Compound	Tons	600	1,238	2,475	4,113	5,550	7,325	7,625	7,625	
CAN	Tons	-	50	300	750	1,100	1,700	2,000	2,000	
Aldrex T	kg	-	140	320	580	880	1,200	1,320	1,320	
Aldrin 2.5%	kg	-	20,000	60,000	100,000	140,000	180,000	180,000	180,000	
Gammelin 20	kg	-	4,400	9,900	17,600	26,400	36,300	39,600	39,600	
Atrazine	kg A.I	-	-	1,250	5,000	10,000	10,000	10,500	10,000	
Primextra	kg A.I	-	-	-	3,750	5,000	7,500	7,500	7,500	
Paraquat	kg A.I	-	-	-	1,500	2,500	2,500	3,000	4,000	
Glyphosate	kg A.I	-	-	-	-	-	4,500	10,500	6,000	
<u>Equipment</u>										
Hand Planters <u>1/</u>	No	-	-	-	50	25	25	25	25	
CDA Sprayers <u>2/</u>	No	-	25	25	425	250	275	300	300	
Batteries	Sets 8	-	100	200	1,900	2,800	4,500	4,500	4,500	
Maize Cribs	M ³	-	-	-	2,400	2,400	2,400	2,400	2,400	

1/ Based on one planter for 20 ha's of manual minimum tillage (maize).

2/ Based on one to 2.5 ha of manual minimum tillage (maize) plus 1 to 10 ha cowpeas.

3/ One M³ hold 1/2 ton of grain and cost N20 (model 2 IITA using teak poles).

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OYO NORTH AGRICULTURAL DEVELOPMENT PROJECT

Model 1:2.0 Hectare Improved Farm Budget (Manual Cultivation)
(Naira)

Item	Without Project ^{1/}	With Project (Unsubsidized)	With Project (Subsidized)
Income			
<u>Production ^{2/}</u>			
Crop	Area	Price/ton	
Maize	(0.6 ha)	N240	115
Cassava	(0.4 ha)	N 80	224
Yam	(0.4 ha)	N238	666
Maize/Cowpeas	(0.1 ha)	N240/N575	25
Sorghum	(0.2 ha)	N200	20
Other crops	(0.3 ha)	n.v.	n.v.
			n.v.
<u>Gross Production Value</u>		<u>1,050</u>	<u>1,648</u>
<u>Less: On-farm Storage Losses ^{3/}</u>		<u>(172)</u>	<u>(135)</u>
<u>Seasonal Credit in Kind ^{4/}</u>		<u>-</u>	<u>68</u>
<u>Seasonal Cash Credit ^{5/}</u>		<u>-</u>	<u>95</u>
<u>Total Revenues</u>		<u>878</u>	<u>1,676</u>
Expenditures			
<u>Cost of Production ^{6/}</u>			
Fertilizers		-	54
Seeds		155	203
Herbicides		-	14
Storage		5	5
Tools		5	5
<u>Total Expenditures</u>		<u>165</u>	<u>281</u>
A. <u>Net Farm Income: before debt service</u>	713	1,395	1,396
<u>Debt Service ^{7/}</u>	-	(179)	(133)
B. <u>Net Benefit: after debt service</u>	713	1,216	1,263
<u>On-farm Man-days ^{8/}</u>		<u>221</u>	<u>268</u>
C. <u>Net Return per Man-day</u>	3.2	4.5	4.7
<u>Farm Family Income</u>			
On-farm Income	713	1,216	1,263
Off-farm Income ^{9/}	50	37	37
D. <u>Net Farm Family Income</u>	<u>763</u>	<u>1,253</u>	<u>1,300</u>
E. <u>Net Income Per Capita</u>	<u>109</u>	<u>179</u>	<u>186</u>
In US\$ (official exchange)	168	277	286

1/ Using traditional cultivation practices and no modern inputs.

2/ For per hectare gross production margins, see Annex 1, table 1.

3/ On-farm storage losses without project - yams 20%, other crops 10%; with project - yams 10%, other crops 5%.

4/ In case of unsubsidized input costs, all fertilizers and herbicides supplied on credit.

5/ 50% of improved seeds costs provided as cash credit, at a flat interest rate of 10% p.a. to be recovered over 12 months.

6/ For per ha cost of production, see project working file C 3.

7/ Short term (12 month) seasonal credit bears a 10% p.a. service charge.

8/ For labor profile, see project file C 1.

9/ Total available farm family labor 360 man-days/annum; only 20% of residual on-farm labor assumed to obtain off-farm wage employment at N2.0 per man-day.

n.v. - not valued

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OYO NORTH AGRICULTURAL DEVELOPMENT PROJECT

Model 2: 2.5 Hectare Farm Budget Minimum Tillage (Manual)
(Naira)

Item		Without Project	With Project (Unsubsidized)	With Project (Subsidized)
<u>Income</u>				
<u>Production</u> ^{1/}				
<u>Crop</u>	<u>Area</u>	<u>Price/ton</u>		
Maize	(1.2 ha)	N240	230	691
Yams	(0.4 ha)	N238	666	1,047
Cassava	(0.4 ha)	N 80	224	448
Cowpeas	(0.4 ha)	N575	23	184
Other	(0.2 ha)	-	n.v.	n.v.
Fallow	(0.2 ha)	-	-	-
<u>Gross Production Value</u>			1,143	2,370
<u>Less: On-farm Storage Losses</u> ^{2/}			(180)	(171)
<u>Seasonal Credit in Kind</u> ^{3/}			-	226
<u>Seasonal Cash Credit</u> ^{4/}			-	45
<u>Total Farm Income</u>			<u>963</u>	<u>2,470</u>
<u>Expenditures</u>				
<u>Cost of Production</u> ^{5/}				
Fertilizers		-	137	41
Seeds		160	261	215
Herbicides		-	70	70
Storage		5	19	19
Tools (including sprayer)		5	10	10
Hired labor	^{6/}	-	49	49
<u>Total Expenditures</u>			<u>170</u>	<u>404</u>
A.	<u>Net Farm Income: before debt service</u>	<u>793</u>	<u>1,924</u>	<u>1,970</u>
	<u>Debt Service</u>	-	(298)	(193)
B.	<u>Net Farm Income: after debt service</u>	<u>793</u>	<u>1,626</u>	<u>1,777</u>
	<u>On-farm Man-days</u> ^{6/}	<u>236</u>	<u>271</u>	<u>271</u>
C.	<u>Net Return per Man-day</u>	<u>3.4</u>	<u>6.0</u>	<u>6.6</u>
<u>Farm Family Income</u>				
	<u>On-farm Income</u>	793	1,924	1,970
	<u>Off-farm Income</u> ^{7/}	50	36	36
D.	<u>Total Farm Family Income</u>	<u>843</u>	<u>1,960</u>	<u>2,006</u>
E.	<u>Net Income Per Capita</u>	<u>120</u>	<u>280</u>	<u>286</u>
	In US\$ (official exchange)	185	431	440

^{1/} For per hectare gross production margins and physical coefficients, see Annex I, table 1.

^{2/} On-farm storage losses without project - yams 20%, other crops 10%; with project storage losses - yams 10%, other crops 5%.

^{3/} Seasonal production credit (in kind) for unsubsidized fertilizers, herbicides and storage costs; credit for subsidized inputs represents cost of herbicides, fertilizers and storage.

^{4/} Cash credit (12 months) for cost of hired labor supplied by OYSICC recoverable at 10% p.a. interest rate.

^{5/} For per hectare cost of production, see project working file C 3.

^{6/} For labor profile, see project file C 1. on-farm man-days include estimated labor for other minor crops not valued.

^{7/} Total available farm family labor 360 man-days/annum; only 20% of residual on-farm labor assumed to obtain off-farm wage employment at N2.0 per man-day. n.v. - not valued.

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ANNEX 1
Table 7

OYO NORTH AGRICULTURAL DEVELOPMENT PROJECT

Model 3: 2.5 Hectare Farm Budget Advanced Mechanized Tillage
(constant 1978 Naira Terms)

<u>Item</u>	Without <u>Project</u> ^{1/}	With <u>Project</u> (Unsubsidized)	With <u>Project</u> (Subsidized)
<u>Income</u>			
<u>Production</u> ^{1/}			
		-- at full development --	
<u>Crop</u>	<u>Area</u>	<u>Price/ton</u>	
Maize	(1.2 ha)	N240	
Cassava	(0.4 ha)	N 80	
Yam	(0.4 ha)	N238	
Cowpeas	(0.4 ha)	N575	
Other	(0.2 ha)	n.v.	
Fallow	(0.2 ha)	-	
<u>Gross Production Value</u>		<u>1,143</u>	<u>2,370</u>
<u>Less: On-farm Storage Losses</u> ^{2/}		(180)	(171)
<u>Seasonal Credit in Kind</u> ^{3/}		-	200
<u>Seasonal Cash Credit</u> ^{4/}		-	132
<u>Total Farm Income</u>		<u>963</u>	<u>2,531</u>
<u>Expenditure</u>			
<u>Cost of Production</u> ^{5/}			
Tractor Hire	-	100	49
Fertilizers	-	137	41
Seeds	160	261	215
Herbicides	-	44	44
Storage (insecticides/cribs)	5	19	19
Tools (including sprayer etc.)	5	5	5
Hired Labor ^{6/}	-	33	33
<u>Total Expenditure</u>		<u>170</u>	<u>599</u>
A. <u>Net Farm Income: before debt service</u>	793	1,932	1,979
Debt Service ^{7/}	-	(365)	(205)
B. <u>Net Farm Income: After debt Service</u>	793	<u>1,567</u>	<u>1,774</u>
On-farm man-days ^{6/}	236	283	283
C. <u>Net Return per man-day</u>	3.4	5.5	6.3
D. <u>Net Return per hectare</u>	330	653	740
<u>Farm family Income</u>			
On-farm Income	793	1,567	1,774
Off-farm Income ^{8/}	50	31	31
E. <u>Net Farm Family Income</u>	<u>843</u>	<u>1,598</u>	<u>1,805</u>
F. <u>Net Income Per Capita</u>	120	228	258

1/ For per hectare gross production margin and physical coefficients see Annex 1 Table 1.

2/ On farm storage losses without project - yams 20% other crops 10% with project yams 10% other crops 5%

3/ Seasonal short term (12 months) production credit for covers cost of fertilizers, herbicides and storage

4/ Seasonal cash credit supplied by OYSICC for hired labor and AISU's tractor services

5/ For per hectare cost of production see project working file C 3.

6/ For labor profiles see project working file C 1.

7/ Both cash and kind credit at a flat interest rate of 10 p.a., recoverable by OYSICC.

8/ Total available family farm labor 360 man days/annum, only 20% of residual on-farm labor assumed to obtain wage employment

n. v. not valued

GHANA
OF NORTH AGRICULTURAL DEVELOPMENT PROJECT
 Model 19: 5.0 Hectare Farm Budget and Cash Flow 1/
 Advanced (Minimum tillage) mechanized
 (Constant 1978 Prices)

	Without Project 2/		With Project (unsubsidized) 15/						With Project (subsidized) 16/						
	Improved Manual 2/		P1	P2	P3	P4	P5	P6	P1	P2	P3	P4	P5	P6	
I. Income															
Production 3/															
Crop	Area	Price													
Maize (0.6 ha) (3.0 ha)	with/	with/p	M240/ton												
Yam (0.4 ha) (0.5 ha)			M138/ton												
Cassava (0.6 ha) (1.0 ha)			M80/ton												
Maize/straw (0.1 ha)															
Sorghum (0.2 ha)			M200/ton												
Compass			M575/ton												
Fallow															
Gross Production Value (less storage losses 4/)				1,513	2,244	2,863	4,157	6,157	6,157	1,513	2,244	2,863	4,157	6,157	
Off Farm Income 5/			37							16					
Total Income			1,550	1,529	2,244	2,863	4,157	6,157	6,157	1,529	2,244	2,863	4,157	6,157	
Expenditure															
Investment Costs															
Tools and Equipment 6/				85						85					
Maize Crths				125						125					
Total Investment Costs				210						210				210	
Operation Costs															
Machinery Hire 7/					234	192	234			140	115	140	115		
Farm Labor 8/			536	536	842	1,078	1,078			536	842	1,078	1,078		
Fertilizers			32	32	303	323	323			32	60	68	68		
Seeds			203	203	67	345	345			203	67	345	345		
Herbicides/Insecticides			14	14	350	215	350			14	350	215	350		
Storage			4	4	7	12	12			4	7	12	12		
Tools			5	5	5	5	5			5	5	5	5		
Total Operation Costs			774	1,778	2,170	2,267	2,170	2,170	2,170	774	1,651	1,838	1,998	1,838	
Incremental Working Capital 9/				587						358					
Total Expenditure			774	1,571	1,788	2,170	2,267	2,170	2,300	1,362	1,651	1,838	1,998	1,838	
Net Benefit (before financing)			766	(42)	456	1,773	1,810	1,987	1,977	187	593	2,105	2,159	2,109	
Incremental Benefit				(608)	(310)	1,007	1,044	1,281	1,011	(579)	27	1,329	1,392	1,251	
Financial Rate of Return (unsubsidized costs) 16%															
(subsidized costs) >100%															
Financing and Net Farm Income															
II. Financing															
Inflow															
Short term loan 10/			121	708	1,091	1,120	1,297	1,120	1,120	679	754	788	948	788	
Medium term loan 11/										168				168	
Farmer's contribution			117	159	59	374	342	382	382	159	59	362	362	382	
Total			238	1,035	1,150	1,494	1,639	1,482	1,620	806	813	1,150	1,310	1,150	
Outflow															
Debt service 12/					133	779	1,200	1,232	1,427	1,427	527	829	867	1,043	
Short Term						45	45	45	45		45	45	45	45	
Medium Term															
Total					133	824	1,245	1,277	1,472	133	572	874	912	1,088	
Net Financing			238	202	326	249	362	16	178	673	241	276	198	62	
Net Benefit after debt service				860	782	2,022	2,192	1,997	1,955	860	1,034	1,381	2,569	2,181	
Add: Value (imputed) of farm labor 13/				536	638	688	688	688	688	536	638	688	688	688	
Farm Family Income			1,296	1,620	2,710	2,880	2,683	2,643	2,643	1,296	1,672	2,069	2,257	2,245	

1/ Expenditure/Revenue and debt servicing appropriately logged to express farm income on a time adjusted basis
 2/ Without project in the improved farm 2.0, all input costs are subsidized
 3/ For per hectare gross margin and physical coefficient see Annex 1 table 1.
 4/ Gross Production adjusted for storage losses - without project; Yams 20% , Other Crops 10%
 5/ 'With Project' Yams 10% , Other Crops 5%
 6/ Total available farm family labor 360/mandays/annum. Without Project only 20% of residual on farm labor assumed to obtain off farm wage employment
 7/ Includes cost of Sprayer; job planter other hand tools
 8/ Tractor services provided by AISH - for details of machinery costs per hectare see Project Working Paper C2.
 9/ Farm labor includes imputed value of available farm family labor
 10/ Incremental working capital represents 50% of annual increments in following years cash operating costs
 11/ Short term credit (12 months) at 10% interest per annum for fertilizers, herbicides, hired labor and machinery hire
 12/ Medium term credit (5 years) at 10% interest per annum for 80% of capital costs repayable in equal annual installments
 13/ Debt repayment due in the next period rather than in the disbursement year
 14/ Equals On Farm family labor costed at M2.0 per day
 15/ Yields assumed to reach full development in P3. In P1, farmer only develops maize 3.0 ha, cassava 1.0 ha and compass undergrown with maize. Yield build-up is also gradual.
 * No major land clearing required, man-days included for light clearing.

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OYO NORTH AGRICULTURAL DEVELOPMENT PROJECT

**Summary of Project Costs
(N '000)**

	PY1	PY2	PY3	PY4	PY5	TOTAL	Foreign Exchange		Taxes	
							%	Amount	%	Amount
I. FIELD CROPS AND DEVELOPMENT										
1. Technical Services, Seed Farms and Extension										
(a) Vehicles, tractors and equipment	932.1	271.2	330.1	521.2	160.5	2,215.1	75	1,594.8	12	265.8
(b) Salaries	782.2	940.7	1,077.9	1,088.5	1,088.5	4,977.8	10	519.1	-	-
(c) Vehicles operating costs	141.5	199.4	237.5	237.5	237.5	1,053.4	45	474.0	20	210.7
Sub-total	1,855.8	1,411.3	1,645.5	1,847.2	1,486.5	8,246.3	32	2,587.9	6	476.5
2. Incremental Farm Inputs	223.4	512.4	536.7	667.3	750.2	2,690.0	85	2,286.5	-	-
3. Civil Works										
(a) Plant, equipment and materials	2,026.7	257.1	159.8	534.8	141.4	3,119.9	78	2,336.2	7	218.4
(b) Salaries	502.1	638.9	638.9	638.9	638.9	3,057.7	23	702.1	-	-
(c) Buildings and construction	1,366.0	2,630.2	688.0	409.3	381.5	5,475.0	37	2,013.2	10	547.5
(d) Plant and vehicles operating costs	128.0	556.3	560.0	492.1	415.8	2,152.2	45	968.5	20	430.4
(e) General services	57.2	53.7	53.7	53.7	53.7	272.0	20	54.4	20	54.4
Sub-total	4,080.0	4,136.2	2,100.4	2,128.9	1,631.3	14,076.8	44	6,074.4	9	1,250.7
SUB-TOTAL I	6,159.2	6,059.9	4,282.6	4,643.4	3,868.0	25,013.1	45	10,948.8	7	1,727.2
II. SUPPORT SERVICES										
1. Project Management and Administration										
(a) Vehicles and equipment	115.3	-	1.7	48.1	1.7	166.8	75	120.1	12	20.0
(b) Salaries	284.0	283.7	283.7	283.7	283.7	1,418.8	24	336.9	-	-
(c) Vehicles operating costs	15.0	15.0	15.0	15.0	15.0	75.0	45	33.8	20	15.0
(d) General services costs	116.3	240.9	251.4	251.4	251.4	1,111.4	14	155.6	18	200.1
Sub-total	530.6	539.6	551.8	598.2	551.8	2,772.0	24	646.4	8	235.1
2. Evaluation Unit										
(a) Vehicles and equipment	75.2	17.5	4.1	57.1	-	153.9	75	110.8	12	18.5
(b) Salaries	65.1	91.8	91.8	91.8	91.8	432.3	-	-	-	-
(c) Vehicles operating costs	14.1	21.2	21.2	21.2	21.2	98.9	45	44.5	20	19.8
Sub-total	154.4	130.5	117.1	170.1	113.0	685.1	23	155.3	6	38.3
3. Training										
(a) Vehicles and equipment	66.7	17.4	-	54.8	-	138.9	75	100.1	12	16.7
(b) Salaries	119.2	119.1	119.1	119.1	119.1	595.6	24	144.1	-	-
(c) Vehicles operating costs	14.1	21.2	21.2	21.2	21.2	98.9	45	44.5	20	19.8
Sub-total	200.0	157.7	140.3	195.1	140.3	833.4	35	288.7	4	36.5
4. Commercial and Credit Services										
(a) Vehicles and equipment	164.3	67.0	15.1	22.7	56.2	325.3	75	234.2	12	39.3
(b) Salaries	336.9	355.4	360.7	360.7	360.7	1,774.4	18	315.1	-	-
(c) Vehicles operating costs	31.3	57.3	57.3	57.3	57.3	260.5	45	117.2	20	52.1
Sub-total	532.5	479.7	433.1	440.7	474.2	2,360.2	28	666.5	4	91.4
5. Consultant Services and Studies	264.6	54.0	75.6	16.2	-	410.4	90	369.4	-	-
SUB-TOTAL II	1,682.1	1,361.5	1,317.9	1,420.3	1,279.3	7,061.1	30	2,126.3	6	401.3
TOTAL BASE COSTS	7,841.3	7,421.4	5,600.5	6,063.7	5,147.3	32,074.2	41	13,075.1	7	2,128.5
Physical Contingencies (6% of Base Costs)	460.4	502.5	314.4	323.6	276.5	1,877.4	40	754.4	7	133.8
Price Contingencies (24% of Base Costs)	389.0	1,237.9	1,434.8	2,158.5	2,473.3	7,693.5	39	3,031.2	6	480.6
ESTIMATED TOTAL PROJECT COSTS	8,690.7	9,161.8	7,349.7	8,545.8	7,897.1	41,645.1	40	16,860.7	6	2,742.9

Note: In all individual salary tables, internationally-recruited staff have been costed at base salary plus allowances; consultant firm fees for recruitment and back-up services appear in the "Consultant Services" table (Annex 2, Table 2).

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OYO NORTH AGRICULTURAL DEVELOPMENT PROJECT

Cost of Consultants and Studies
(in April 1980 terms)

<u>A. Consultant Services (man-months)</u>	<u>PY 1</u>	<u>PY 2</u>	<u>PY 3</u>	<u>PY 4</u>	<u>Total</u>		<u>Foreign Exchange Costs</u>
Basic Agricultural Management Techniques and minimum tillage	-	3	4	3	10		
Management Training and Staff Development and LGC Staff	-	3	3	-	6		
LGA Tax Base Study	-	-	3	-	3		
Hydrogeological Surveys	6	4	4	-	14		
Accounts System	<u>3</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>3</u>		
Total Man-months	9	10	14	3	36		
<u>Costs (N'000)</u>							
At N5,400 per man-month (equivalent to US\$9,000)	Base Costs <u>48.6</u>	<u>54.0</u>	<u>75.6</u>	<u>16.2</u>	<u>194.4</u>	90%	<u>175.0</u>
<u>B. Recruitment fees (N'000)</u>							
12 Staff x N18,000 (equivalent to US\$30,000)	Base Costs <u>216.0</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>216.0</u>		<u>194.4</u>
TOTAL BASE COSTS	<u>264.6</u>	<u>54.0</u>	<u>75.6</u>	<u>16.2</u>	<u>410.4</u>		<u>369.4</u>

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ANNEX 2
Table 2

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OYO NORTH AGRICULTURAL DEVELOPMENT PROJECT

Detailed Financing Plan
(in N'000)

<u>Total Project Costs</u> <u>(including contingencies)</u>	<u>PY1</u>	<u>PY2</u>	<u>PY3</u>	<u>PY4</u>	<u>PY5</u>	<u>Total</u>	<u>Equivalent</u>	<u>As per disbursement schedule</u>
							<u>US\$ Million</u>	<u>(less 10% for contingencies)</u> <u>US\$ Million</u>
Civil Works	1,597	3,453	1,012	676	706	7,444	12.4	
Vehicles and Equipment	3,705	748	650	1,691	525	7,319	12.2	
Salaries and Wages	2,275	2,824	3,192	3,421	3,651	15,363	25.6	
Consultant Services	290	64	96	22	-	472	0.8	
Operating Costs	579	1,464	1,716	1,825	1,921	7,505	12.5	
Inputs	245	608	684	911	1,094	3,542	5.9	
<u>Total</u>	<u>8,691</u>	<u>9,161</u>	<u>7,350</u>	<u>8,546</u>	<u>7,897</u>	<u>41,645</u>	<u>69.4</u>	
IBRD: Civil Works	888	1,920	563	376	453	4,200	6.9	6.2
Vehicles and Equipment	3,290	664	577	1,502	467	6,500	11.0	9.9
Salaries and Wages	382	474	536	575	613	2,580	4.3)	
Consultant Services	290	64	96	22	-	472	0.8)	4.6
Operating Costs	-	-	-	-	-	-	-	
Inputs	208	515	579	772	926	3,000	5.0	4.5
<u>Total</u>	<u>5,058</u>	<u>3,637</u>	<u>2,351</u>	<u>3,247</u>	<u>2,459</u>	<u>16,752</u>	<u>28.0</u>	<u>2.8</u> + Contingencies
								<u>28.0</u>
FGN: Civil Works	343	742	218	145	152	1,600		
Vehicles and Equipment	202	41	36	93	28	400		
Salaries and Wages	741	919	1,039	1,113	1,188	5,000		
Consultant Services	-	-	-	-	-	-		
Operating Costs	239	605	709	754	793	3,100		
Inputs	21	51	58	77	93	300		
<u>Total</u>	<u>1,546</u>	<u>2,358</u>	<u>2,060</u>	<u>2,182</u>	<u>2,254</u>	<u>10,400</u>		
OYSG: Civil Works	366	791	231	155	101	1,644		
Vehicles and Equipment	213	43	37	96	30	419		
Salaries and Wages	1,152	1,431	1,617	1,733	1,850	7,783		
Consultant Services	-	-	-	-	-	-		
Operating Costs	340	859	1,007	1,071	1,128	4,405		
Inputs	16	42	47	62	75	242		
<u>Total</u>	<u>2,087</u>	<u>3,166</u>	<u>2,939</u>	<u>3,117</u>	<u>3,184</u>	<u>14,493</u>		

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(in US\$ million)

<u>Fiscal Year</u>	<u>Quarter</u>	<u>Amount</u>	<u>Cumulative</u>	<u>Balance</u>
1981	First	0.8	-	27.2
	Second	1.7	2.5	25.5
	Third	2.5	5.0	23.0
	Fourth	3.3	8.3	19.7
1982	First	1.5	9.8	18.2
	Second	1.5	11.3	16.7
	Third	1.5	12.8	15.2
	Fourth	1.7	14.5	13.5
1983	First	1.0	15.5	12.5
	Second	1.0	16.5	11.5
	Third	1.0	17.5	10.5
	Fourth	1.0	18.5	9.5
1984	First	1.3	19.8	8.2
	Second	1.4	21.2	6.8
	Third	1.4	22.6	5.4
	Fourth	1.4	24.0	4.0
1985	First	1.0	25.0	3.0
	Second	1.0	26.0	2.0
	Third	1.0	27.0	1.0
	Fourth	1.0	28.0	-

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OYO NORTH AGRICULTURAL DEVELOPMENT PROJECT

Economic Rate of Return Assumptions

1. Project Life: Assumed to be 30 years including a five-year investment period during which development activities would be substantially completed. Full development yields are expected to be achieved in five years by 1986.
2. Phasing of Costs and Benefits: In recognition of the nature of agricultural activity involving a time lag between use of inputs and its associated output, project costs and benefits have been stated on a time adjusted basis, namely that the benefits are assumed to accrue in the year following the use of inputs. However, since the full crop year may overlap with the year of investment only 50% of the farm input costs have been lagged.
3. Project Costs:
 - i. all costs are expressed in April 1980 (date project is expected to start) prices net of identifiable taxes and duties;
 - ii. cost estimates include physical contingencies at the levels specified in para. 5.29;
 - iii. all farm inputs were costed at full economic farmgate prices (summary table of input costs is at Table 4);
 - iv. the opportunity cost for all farm labor was taken as ₦2.0 per man-day (see also para. 10.09);
 - v. since the numeraire used for the analysis is real income measured in terms of domestic currency (at constant 1980 prices), all foreign exchange costs and benefits have been denominated in Naira using a shadow exchange rate (SER) of ₦1.0 = US\$1.23 (as compared to an official rate of ₦1.0 = US\$1.67). (See also para. 10.08).
 - vi. only 50% of the cost of training has been included as benefits from it would also accrue to non-project farmers;
 - vii. all evaluation costs have been excluded because the benefits will accrue to future investments;
 - viii. road maintenance costs have been included for the full project life.

4. Project Benefits: Expected future yields and production with and without project are in Annex 1, Tables 2 and 3.

- i. project benefits comprise the value of incremental crop production priced at economic farmgate prices (for details see summary at Table 4) based on the Bank's world market commodity price forecasts for maize and sorghum. For nontraded crops -- cassava, yams and cowpeas -- output was valued on the basis of domestic retail prices, adjusted to farmgate;
- ii. no additional non-agricultural benefits from improved roads and rural infrastructure were calculated;
- iii. no residual value was added at the end of the project's economic life.

5. Using the foregoing assumptions and discounting costs and benefits over a 30-year evaluation period, the economic rate of return for the project is about 20%. Further assuming a discount rate of 11%, the estimated opportunity cost of capital in Nigeria, the economic net present value (NPV) of project investment in 1980 terms is ₦22 million (US\$27.0 million).

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OYO NORTH AGRICULTURAL DEVELOPMENT PROJECT

Physical Production and Economic Value of Incremental Project Output

	<u>Physical</u> (m/tons) <u>1/</u>					
	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>	<u>Year 5</u>	<u>Year 6-30</u>
Maize	761	3,349	6,668	10,247	14,107	16,964
Sorghum	133	267	400	489	801	801
Cowpeas	106	170	255	340	510	510
Cassava	1,800	9,000	21,150	27,000	38,700	38,700
Yams	2,540	8,100	13,500	18,900	24,300	24,300

	<u>Value</u> ('000 Naira) <u>2/</u>							
	<u>Price per ton</u> (Naira)		<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>	<u>Year 5</u>	<u>Year 6-30</u>
	<u>1980</u>	<u>1985</u>						
Maize	169	182	129	566	1,127	1,732	2,567	3,087
Sorghum	156	166	21	42	62	76	133	133
Cowpeas	719	719	76	122	183	244	367	367
Cassava	102	102	184	918	2,157	2,754	3,947	3,947
Yams	305	305	775	2,470	4,118	5,764	7,412	7,412
Total Benefits			1,185	4,118	7,647	10,570	14,426	14,946

1/ Physical production figures from Annex 1, Table 3.

2/ For calculation of economic prices, see Project Working File Paper C3.

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OYO NORTH AGRICULTURAL DEVELOPMENT PROJECT

ECONOMIC VALUATION OF FARM INPUTS^{1/}
('000 N in 1980 Constant Terms)

	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>	<u>Year 5</u>	<u>Year 6</u>	<u>Year 7 - 30</u>
<u>Fertilizers</u>							
Compound	175	514	962	1,356	1,843	2,143	2,143
Can	10	63	158	231	357	494	494
<u>Total</u>	<u>185</u>	<u>577</u>	<u>1,120</u>	<u>1,587</u>	<u>2,200</u>	<u>2,637</u>	<u>2,637</u>
<u>Agro Chemicals</u>							
Insecticides	25.0	78.0	148.0	228.0	278.0	284.0	282.0
Herbicides	--	--	78.0	110.0	294.0	492.0	360.0
<u>Total</u>	<u>25.0</u>	<u>78.0</u>	<u>226.0</u>	<u>338.0</u>	<u>572.0</u>	<u>776.0</u>	<u>642.0</u>
<u>Tools and Equipment</u>							
Hand Planters	--	--	2.0	1.0	1.0	1.0	1.0
CDA Sprayer	0.9	0.9	14.9	8.8	9.6	10.5	10.5
Batteries	0.2	0.4	3.3	4.9	7.9	7.9	7.9
Maize Cribs	--	--	60.0	60.0	60.0	60.0	60.0
<u>Total</u>	<u>1.1</u>	<u>1.3</u>	<u>80.2</u>	<u>74.7</u>	<u>78.5</u>	<u>79.4</u>	<u>79.4</u>
<u>Farm Labor</u>	<u>238.2</u>	<u>767.0</u>	<u>1,317.0</u>	<u>1,719.0</u>	<u>2,186.0</u>	<u>1,843.0</u>	<u>1,843.0</u>
<u>Total Incremental Farm Input Cost</u>	<u>449.3</u>	<u>1,423.3</u>	<u>2,743.2</u>	<u>3,718.7</u>	<u>5,036.5</u>	<u>5,335.4</u>	<u>5,201.4</u>

^{1/} All costs are rounded. For detailed costs and physical quantities see Project File C 3.
For physical input requirements, see Annex 1, Table 4.

NIGERIA

OYO NORTH AGRICULTURAL DEVELOPMENT PROJECT

Economic Costs and Benefits ^{1/}

('000 Naira, 1980 Constant Terms)

<u>Year</u>	<u>Incremental Project Costs</u> ^{2/}				<u>Incremental Project Benefits</u>	<u>Net Benefits (Costs)</u>
	<u>Capital</u>	<u>Farm Inputs</u>	<u>O and M</u>	<u>Total</u>		
1	5,886.5	235.8	2,871.4	8,993.8	-	(8,993.8)
2	4,565.8	982.9	3,479.9	9,028.7	1,185.0	(7,843.7)
3	2,114.0	2,187.3	3,752.9	8,054.1	4,118.0	(3,936.1)
4	2,510.2	3,392.5	3,673.7	9,576.4	7,647.0	(1,929.4)
5	1,393.9	4,597.0	3,651.1	9,642.0	10,570.0	928.0
6	-	5,445.7	1,364.2	6,809.9	14,426.0	7,616.1
7	-	5,531.3	1,364.2	6,895.5	14,946.0	8,050.5
8-9	-	5,460.4	1,364.2	6,824.6	14,946.0	8,121.4
10	366.0	5,460.4	1,364.2	7,190.6	14,946.0	7,755.4
11-14	-	5,460.4	1,364.2	6,824.6	14,946.0	8,121.4
15	366.0	5,460.4	1,364.2	7,190.6	14,946.0	7,755.4
16-19	-	5,460.4	1,364.2	6,824.6	14,946.0	8,121.4
20	366.0	5,460.4	1,364.2	7,190.6	14,946.0	7,755.4
21-24	-	5,460.4	1,364.2	6,824.6	14,946.0	8,121.4
25	366.0	5,460.4	1,364.2	7,190.6	14,946.0	7,755.4
26-30	-	5,460.4	1,364.2	6,824.6	14,946.0	8,121.4

Economic Rate of Return = 20%

Net Present Value at 11% = N22.0 million (US\$27 million)

^{1/} For detailed assumptions see Annex 3, Page 1.

^{2/} All costs and benefits are rounded.

June 8, 1979

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OYO NORTH AGRICULTURAL DEVELOPMENT PROJECT

SENSITIVITY ANALYSIS

<u>No.</u>	<u>Variable</u>	<u>Appraisal Value</u>	<u>Crossover Value^{1/}</u>	<u>% Change^{3/}</u>
1.	<u>Yields at Full Development</u> (tons/ha.)			
	(i) Yams	11.0	9.0	- 48
	(ii) Cassava ^{2/}	10.0	7.0	- 93
	(iii) Maize	1.8	-	-126
2.	<u>Prices</u> (Naira/ton 1978 terms)			
	<u>Crops</u>			
	Yams	N311.0	N161.7	- 48
	Cassava	N104.0	N 7.2	- 93
	Maize	N180.0	-	-126
	<u>Fertilizers</u>			
	NPK	N276.0	N615.5	+123
	Can	N203.0	N452.7	+123
3.	<u>Farmer Adoption Rate</u> (improved hectares)	45,500	26,800	- 41
4.	<u>Shadow Exchange Rate</u> (US\$ = Naira)	US\$1 = N0.81	US\$1 = N1.85	+129
5.	<u>Farm Wage Rate</u> (per manday)	N 2.0	N 5.3	+164

^{1/} Value of variable for which net present value is zero at a discount rate at 11%.

^{2/} Includes weighted average yield of improved and advanced cassava.

^{3/} The percentage change refers to incremental production; for yield assumptions see Annex 1 Table 1.

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NIGERIA

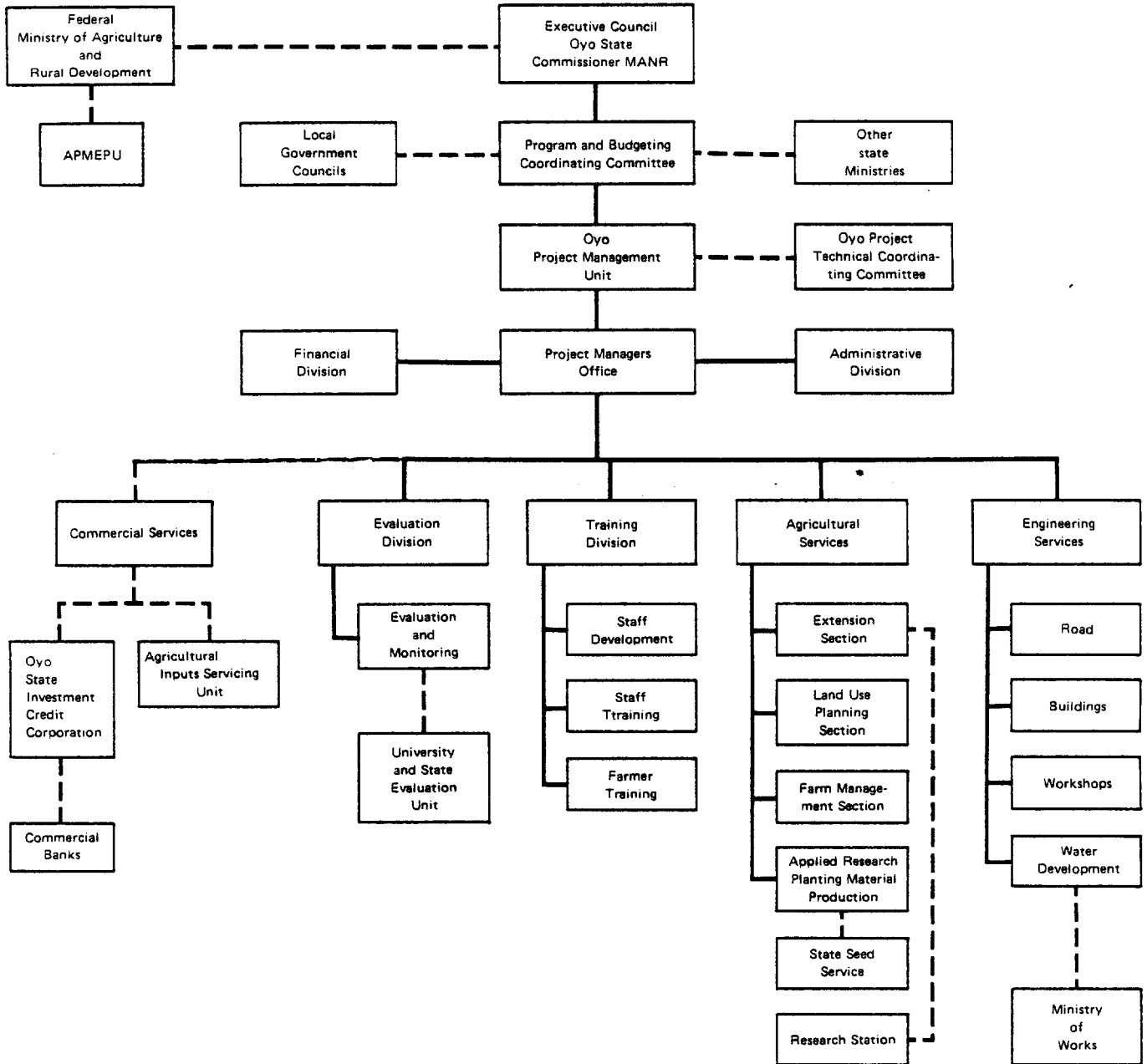
OYO STATE

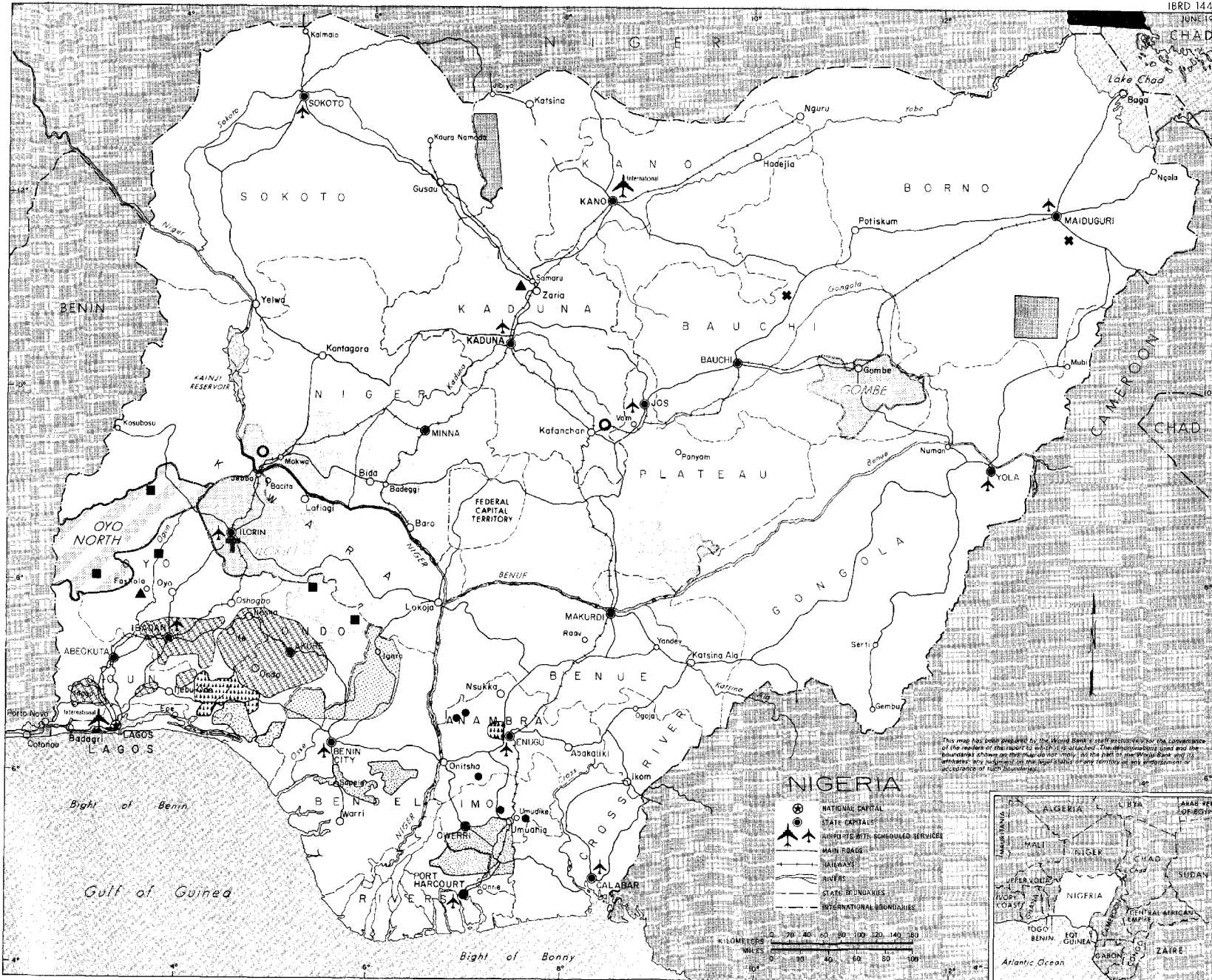
OYO NORTH AGRICULTURAL DEVELOPMENT PROJECT

Selected Documents and Working Papers in Project File.

- A. General Reports and Studies on the Sector/Sub-Sector.
 - A1. Agricultural Sector Review 1979 - Three Volumes IBRD - (Report No. 2181-UNI)
 - A2. Agricultural Development in Nigeria 1973-1985 Federal Ministry of Agriculture and Water Resources.
- B. Reports and Studies Relating to the Project
 - B1. Oyo North Agricultural Development Project - Feasibility Study prepared by BRGM (Nigeria) Ltd. - Two Volumes - August 1978.
 - B2. "Yoruba Smallholder Farming System" - P.S. Zuckerman - PHD thesis University of Reading 1973.
 - B3. Oyo State Rural Agricultural Sample Survey - 1977 Ibadan - Ministry of Finance and Economic Development.
 - B4. Proposal establishing the Oyo State Agricultural Input Services Unit (AISU) dated February 1977.
- C. Selected Working Papers, Tables, by IBRD
 - C1. Agriculture - Background.
 - C2. Civil Works, including cost tables.
 - C3. Economic Costs and Benefits - tables.
 - C4. Detailed Project Costs - tables (Excluding Civil Work Costs).
 - C5. Computer printouts (file) for calculating the projects sensitivity to its basic economic assumptions.

NIGERIA
Oyo North Agricultural Development Project
Project Organization





NIGERIA
IBRD Assisted Agricultural Projects
 Existing and Under Appraisal

- Agricultural Development:**
- EXISTING:**
- Lafia (Loan 1454 - UNI)
 - Ayanga (Loan 1455 - UNI)
 - Funtua (Loan 1092 - UNI)
 - Gusau (Loan 1099 - UNI)
 - Gombe (Loan 1164 - UNI)
 - Bida (Loan 1667 - UNI)
 - Ilorin (Loan 1668 - UNI)
- APPRAISED:**
- Ekiti Akoko (Ondo)
 - Oyo North
 - Kaduna State

- Training Project:**
- APPRAISED:**
- Agricultural and Rural Management Training Institute

- Tree Crop Projects:**
- EXISTING:**
- Cocoa I (Loan 764 - UNI)
 - Cocoa II (Loan 1045 - UNI)
 - Ondo Oil Palm (Loan 1192 - UNI)
 - Bendel Oil Palm (Loan 1183 - UNI)
 - Imo Oil Palm (Loan 1191 - UNI)
 - Rivers State Oil Palm (Loan 1525 - UNI)
 - Forestry (Loan 1679 - UNI)
- APPRAISED:**
- Cocoa III (Probably same area as Cocoa I & II)

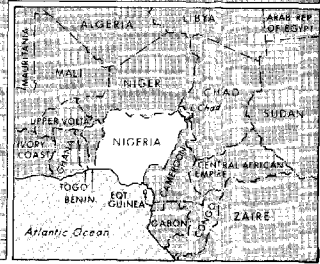
- Irrigation Project:**
- EXISTING:**
- Rice (Loan 1103 - UNI)

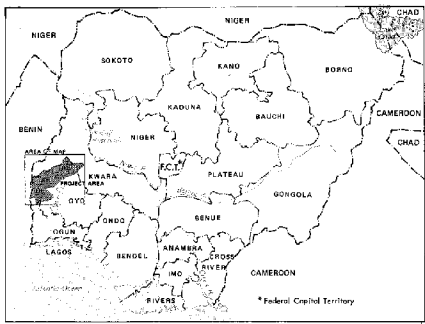
- Livestock Development Project:**
 (Loan 1091 - UNI)
- EXISTING:**
- National Livestock Production Co. Ranches
 - Western Livestock Co. Ranches
 - North-Eastern Co. Ranches
 - Animal / Pasture Investigation Centers
 - Grazing Reserves - Fulani Group Ranches

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NIGERIA

- ⊙ NATIONAL CAPITAL
- STATE CAPITALS
- ▲ AIRPORTS WITH SCHEDULED SERVICES
- MAIN ROADS
- RAILWAYS
- RIVERS
- - - STATE BOUNDARIES
- - - INTERNATIONAL BOUNDARIES





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