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FEDERAL REPUBLIC OF NIGERIA

ACCELERATED RICE PRODUCTION IN THE NIGER RIVER BASIN

TCP/NIR/3303

MAIN REPORT AND WORKING PAPERS

FEDERAL MINISTRY OF WATER RESOURCES

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS – ROME

TECHNICAL COOPERATION PROGRAMME

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Currency Equivalents

(April 2006)

Currency Unit = Naira (NGN)
US$1.00 = 132 NGN

Abbreviations

ADP	Agricultural Development Programme
FAO	Food and Agriculture Organization
FCT	Federal Capital Territory
FGN	Federal Government of Nigeria
FMWR	Federal Ministry of Water Resources
GSTN	Global Satellite Telecommunications Network
LGC	Local Government Council
LNRBDA	Lower Niger River Basin Development Authority
MARD	Ministry of Agriculture and Rural Development
MWR	Ministry of Water Resources
NBA	Niger Basin Authority
NCAM	National Centre for Agricultural Mechanisation
NCRI	National Cereals Research Institute
NEPA	National Electric Power Authority
NGO	Non-Government Organization
O & M	Operation and Maintenance
RBDA	River Basin Development Authority
ROPISIN	Review of Public Irrigation Sector in Nigeria
SME	Small and Medium Enterprises
TCP	Technical Cooperation Programme
WB	World Bank
WUA	Water Users Association

EXECUTIVE SUMMARY

The Nigerian rice production, currently estimated at about three million tonnes of grain per year, does not meet the annual domestic demand of about five million tonnes. The supply gap is being met through rice imports which represent over 25 percent of all agricultural imports and more than 40 percent of domestic consumption.

To reduce the dependence on imported rice as well as develop the local rice industry, Government launched the Presidential Initiative on Accelerated Rice Production. Government also banned milled rice imports and put a 50 percent duty on parboiled rice. In addition, a levy of ten percent was imposed on rice imports to create a dedicated fund for the development of the local rice industry, including processing and marketing.

The existing rice production potential has not yet been realised, as smallholder (small-scale, subsistence and fadama farmers) output is inadequate and paddy processing is sub-standard. To meet this shortfall, Government recognises the potential of large-scale mechanised irrigated agriculture, using improved modern techniques, and wishes to promote further expansion of rice production by the private sector.

Attempts of previous governments to exploit the country's large irrigation potential through investing in large public irrigation schemes, have not met with success. Many of the dams, dating from the years of the oil boom of the 1970s and early 1980s, were built with little or no infrastructure and the water impounded is grossly underutilised. Efforts to stimulate small-scale irrigation were more successful.

In line with its policy framework of market liberalisation, Government fosters public-private partnership in irrigation development. It is aware of the great potentials that lie in large-scale mechanised irrigated agriculture. In consultation with the Food and Agriculture Organization (FAO), the Government has selected therefore a number of public sector irrigation schemes for divestiture to the private sector. These schemes are currently operated by the RBDAs concerned under the purview of the Federal Ministry of Water Resources (FMWR). The Tada Shonga scheme, with irrigable land of about 2 700 ha, and located in Kwara State, was selected to pilot the accelerated rice production programme, and public-private partnership in irrigation development.

Without pre-empting the investor's choice of management and production technology, a probable approach to scheme utilisation has been selected to demonstrate the expected financial results. The scheme would be sub-divided into four blocks of about 500 ha each, and the remainder of about 400 ha allocated to about 400 smallholders in one-hectare units. Fully mechanised rice production/harvesting would be practical on the large commercial plots. The smallholders would be encouraged to aggregate their farms so as to take advantage of the highly mechanised nucleus farms. They could also be employed as farm labour on the nucleus farms, thus enhancing their incomes considerably.

Total project costs are estimated at Naira 6.41 billion (US$ 48.5 million), with the investment costs for the full development of the scheme amounting to Naira 5.2 billion. Major investments, expected to be undertaken over a period of three years, would be a flood protection dyke (Naira 1.0 billion), an access road (Naira 0.6 billion), headworks (Naira 0.3 billion), irrigation infrastructure (Naira 2.2 billion) and farm machinery and

equipment (Naira 0.3 billion). Government has agreed to provide funding for flood protection, the access road, extension of the electric power line and drainage for a total of an estimated Naira 1.8 billion. Private sector funding would be required for irrigation development, establishment and operation of services centres, vehicles and equipment, storage and rice milling (Naira 3.4 billion).

FGN would hold an oversight and quality assessment role, setting standards and monitoring to ensure these are met. The private sector would build the headworks, irrigation farms, service centres, and provide machinery and equipment as well as operation and maintenance of the scheme.

The expected role of LNRBDA would be to monitor the project and ensuring good relationship between the large and small-scale farmers. It would also act as facilitator in providing an interface between the private investors and the communities.

Only rice would be produced under the project. To get maximum benefits, double cropping would be practiced. It is estimated that in the first year of production, rice crops would yield 5.5 tonnes/ha in dry season, and 4.7 tonnes/ha in wet season. This would increase to 6.5 tonnes and 5.5 tonnes/ha, respectively in the 4th year, after farmers have improved their technical skills and knowledge of the variability in soil conditions to adjust their crop management practices.

The project is expected to have a strong impact on the livelihood of the population in the villages surrounding the project by generating additional income opportunities for at least 1000 rural households. The project would contribute to the balance of payments deficit in the rice sector by substituting approximately 20 000 tonnes of rice imports per year with a total value of close to Naira 600 million at current prices.

Financial analysis shows that the proposed investments would be very attractive to private investors. The financial rate of return results as a robust 40 percent. The economic rate of rteturn, expressing the viability of the project proposals at the level of the economy, is calculated at an accepptable 12.9 percent.

1. INTRODUCTION

The Accelerated Rice Production Programme in the Niger River Basin is part of an initiative by the Federal Government of Nigeria (FGN) through the Federal Ministry of Water Resources (FMWR), to promote rice production in Nigeria, and in particular along the Niger River Basin.

In line with its policy framework of market liberalisation, FGN intends to privatise some of the public sector irrigation schemes. In this connection, it had asked the Food and Agriculture Organization of the United Nations (FAO) to provide assistance under its Technical Cooperation Programme (TCP) in the selection of two schemes, which would lend themselves to serve as pilot projects for the accelerated rice production programme with private sector participation.

Based on a set of FMWR- approved criteria, and consideration of the potential for commercial crop production, twelve schemes were initially selected that showed the largest economic potential and could respond quickly to intervention for rehabilitation and expansion. This was further pursued to include a review of the schemes with potential for rice production, and for privatisation in compliance with stated government policy. The schemes considered for rice production were reviewed with a view to their location (i.e. those on flood plains and in particular those on the Niger River), soil type and fertility status, the possibilities for expansion, mechanisation and agro-processing (see Working Papers 1 and 2).

An FAO field mission, assisted by Enplan Group, visited and assessed the pre-selected schemes, considering the availability of land, market distance, possibilities for management as one unit (with satellite-farmers/out-growers or contract farmers) and potential for expansion. Two schemes (Tada Shonga and the Edozhigi Wuya) in Kwara State were selected for feasibility studies which eventually could serve as models for further development of the Niger River Basin.

From the initial assessment and field review, it emerged that the Edozighi Wuya scheme should be excluded from further consideration as it had never been developed beyond its initial identification in 1981. Consequently, the Tada Shonga scheme, operated by the Lower Niger River Basin Authority (LNRBDA), was selected to pilot the Accelerated Rice Production Programme and public-private partnership in irrigation development.

The scheme offers excellent opportunities for irrigated rice production, once an access road, basic canal and farm road infrastructure are in place. It would allow almost immediate cultivation of the available irrigable land of about 2 700 ha (gross). When fully developed, the scheme would be particularly suitable for large-scale commercial rice production in two seasons.

The Tada Shonga scheme has the great advantage that the Government holds the land title and concomitant water rights. Moreover, Government is prepared to make further substantial investments in scheme infrastructure, and grant some incentives in consultation with potential investors to ensure optimal start-up conditions.

2. BACKGROUND

A. GENERAL

Nigeria covers an area of 924,000 sq km. From the Atlantic Ocean in the south extending to the fringes of the Sahara desert, the climate is characterised by relatively high temperatures throughout the year. It is arid in the north, becoming increasingly humid moving towards the south. Except for the coastal zone, where it rains all year round, rainfall is seasonal with distinct wet and dry seasons. The country has extensive groundwater resources located in seven recognised sedimentary hydro-geological areas together with local groundwater in shallow alluvial (fadama) aquifers, adjacent to major rivers.

Close to 60 percent of the population, currently estimated at a total of 127 million (2004), live in rural areas. The Government operates as a federation with responsibilities shared among three tiers: The Federal Government with the Federal Capital Territory (FCT), 36 state governments and 774 local government councils (LGCs). The civil service structure follows the three tier structure with federal ministries/agencies at national level, individual state institutions in each of the states, and LGCs at the local level.

B. ROLE OF AGRICULTURE AND IRRIGATION

Although Nigeria's economy relies heavily on the petroleum sector which generates over half of government revenues and more than 90 percent of foreign exchange earnings, agriculture continues to play an important role in the economy. The sector currently contributes close to 20 percent to the GDP (2004), with crop production accounting for an estimated 85 percent of this total. It employs about one third of the labour force and provides a livelihood for the bulk of the rural population.

Almost the entire cropped land is rainfed, and can support crop production for only 3 – 6 months of the year. Mixed, small-scale family farming is the predominant form of production. In the dry north, sorghum and millet, the basic food staples, are the most important crops. Paddy, yams and maize dominate the middle belt. In the south, the main crops grown are roots and tubers, maize, as well as vegetables and tree crops.

Although it has long been recognised that water is a limiting factor to agriculture in much of Nigeria, especially in the dry north, the country has not yet made significant use of its irrigation potential.Though potential is estimated to be between 2 and 2.5 million ha, the area under irrigation is about 220,000 ha, or less than one percent of the total area cropped. Irrigation is significant only in the production of wheat and sugarcane, and to a lesser extent in rice and vegetable production.

Attempts of previous governments to exploit the country's large irrigation potential through investing in large public irrigation schemes, have not met with success. Many of the dams, dating from the years of the oilboom of the 1970s and early 1980s, were built with little or no infrastructure and the water impounded is grossly underutilised. Efforts to stimulate small-scale irrigation were more successful. A series of World Bank-funded agricultural development projects introduced low-cost tubewell drilling and irrigation by pump into the traditional fadama farming areas with encouraging results.

The River Basin Development Authorities (RBDAs) are the main bodies in charge of administering and developing the country's water resources. Set up during the mid-1970s, they were originally independent entities with a high level of administrative and financial autonomy. Based on the concept of the river basin as a logical unit for integrated development, the area of operation of an RBDA is determined by the extent of the river basin that it serves, and all of the 12 RBDAs operate in at least two states, and some in three or more.

C. RICE PRODUCTION AND MARKETING

The Nigerian rice production, currently estimated at three million tonnes of grain per year (FMARD), does not meet the annual domestic demand of about 5 million tonnes. The per caput consumption which went up from about 5 kg during the 1970s to about 30 kg at present, continues to increase. The supply gap is being met through rice imports which now represent over 25 percent of all agricultural imports, and more than 40 percent of domestic consumption. During the last five years, Nigeria has become one of the largest importers of rice, second only to Indonesia. Its import bill for rice increased from US$100,000 in 1970 to US$800million in 2005.

To alleviate the drain on foreign earnings caused by the large scale importation of rice, the recent Presidential Initiative stipulates accelerated production of rice and some other crops, including cassava and oilseeds. It is recognised that accelerated production cannot be attained by semi-subsistence farming which is predominant in Nigeria. Hence FGN's promotion of private sector participation and commercial farming.

In the past, mechanisation in rice production had ben introduced by a number of State Development Authorities, such as the Upper and Lower Niger River Basin Development Authorities. While such efforts have not led to the desired increase in production, they have enhanced the technical skills in mechanised farming in the project sites concerned.

To reduce the dependence on imported rice, as well as to develop the local rice industry, Government banned milled rice imports and put a 50 percent duty on imports of parboiled rice. In addition, a levy of 10 percent was imposed on rice imports to create a dedicated fund for the development of the local rice industry, including processing and marketing. Marketing of imported rice is solely handled by the private sectors. There is no intervention by the government other than to set rules regulating rice imports.

3. PROJECT RATIONALE

The proposal to allocate resources to the development of the rice sub-sector recognises that:

- The domestic consumption of rice has increased significantly in recent years;
- National rice production does not meet the rapidly growing demand;
- Smallholder output is inadequate and paddy processing is sub-standard;
- Rice imports currently represent a quarter of total agricultural imports;
- Nigeria's import bill for rice continues to increase rapidly; and
- The recent Presidential Initiative aims at promoting domestice rice production and improve processing.

Based on the foregoing, the arguments for defining an approach for helping to narrow the deficit in national rice production, would appear to be the following:

- Rice is grown in most of Nigeria's agro-ecological zones;
- Past production increases depended largely on an expansion of area planted rather than on increasing average yields which at 1.9 t/ha continue to be low by international standards;
- A variety of rice production systems and technological levels co-exist;
- Irrigated rice encompasses lowlands with good water control, enabling two crops per year; the yield obtained (3.5 t/ha) is generally higher than in other systems;
- The country has not yet made significant use of its irrigation potential;
- Attempts of previous governments to exploit the country's large irrigation potential through investing in large public irrigation schemes have not met with success;
- Government wishes to foster private sector, large-scale mechanised farming, using improved modem production and milling techniques;
- Under the Accelerated Rice Production Programme, rice production is to be promoted in particular in the Niger River Basin.

In answering the question how to bring about accelerated rice production, account should be taken of the prevailing economic conditions of Nigeria which no longer favour a situation in which public irrigation and drainage scheme management is entirely in the hands of government and its agencies. The civil service type mentality, typical for RBDAs, would not be compatible with the concept of efficient private sector management. For accelerated rice production therefore, a public/private sector partnership would appear to be the most suitable approach, with the RBDA concerned to play an enabling and regulatory function, such as allocating water to the schemes, representing government in selecting schemes for rehabilitation, and performing a monitoring role once the private sector becomes involved.

Among the schemes considered for rice production on the basis of their location, soil type, offering scope for expansion, mechanisation and agro-processing, the Tada Shonga Scheme would appear to be the most suitable. The scheme, located in the flood plains of the Niger River in Kwara State, offers excellent opportunities for large-scale mechanised irrigated rice production once an access road, basic canal and farm road infrastructure are in place.

4. THE PROJECT AREA

A. LOCATION

Tada Shonga Irrigation Scheme is located in Edu Local Government Area of Kwara State at about 110 km North East of Ilorin, the Kwara State Capital. The project sites can be reached either through Bacita or Shonga. The proposed gross area of 2 700 ha for the irrigation scheme lies to the right bank of River Niger within the flood plain down stream of Jebba, and is suitable for the cultivation of rice.

The project area is linked to Ilorin by a major road which is under rehabilitation between Kpatizuru and Shonga. Another 20km earth road linked Shonga with Bacita. Other roads in the project site that require periodic maintenance are:-

- Shonga – Kpatarigi – 4km
- Kpatarigi – Tada – 5km
- Tada – Tchji – 4km

These roads are usually submerged by floods but with the envisaged construction of the dyke, this submersion will cease. The project area has the Global Satellite Telecommunication Network (GSTN) of MTN and Globacom which allows easy communication with the outside world.

B. CLIMATE AND HYDROLOGY

The climate in the project area is tropical continental with pronounced wet and dry seasons and steady high temperatures. The nearest meteorological stations are Jebba, Bacita and Bida. Maximum rainfall is during the month of September and drops to zero in December. The rainy season with a duration of about 218 days, starts in April and ends in October (Working Paper 3).

The main hydrological feature of the Tada Shonga area is the Niger River which flows north-south and then west-east bisecting the area from the Nupe sandstone uplands.

Prior to the establishment of Kainji and the Jebba dams, flooding occurred once in seven to ten year intervals. However, after the construction of these dams, flooding became perennial with very high discharges of River Niger and its tributaries in September and December, causing rise in levels and overflow of river banks at few places within the Tada Shonga project site. This is due to the downstream releases of water by the hydropower generation of these dams.

River Niger has a total catchment area of 631,800 square kilometres above Jebba which is about 35km from Tada-Shonga project. In addition, there are about five tributaries between Kainji and Jebba dams, they are rivers Kontagora, Mandi, Ohi, Eku and Teshi. Their discharges into River Niger increases the average outflow at Jebba.

C. LAND CAPABILITY AND SOILS

The Tada Shonga project area comprises of three landform units viz: floodplain, river alluvial plain and piedmont alluvial plain. The floodplain occurs on both sides of the Niger River but major parts lie on the left bank of the river. The plain on both sides of the river is almost flat and has very gentle slope of 0.5 percent.

The soils of the area are generally fairly moderate in inherent fertility status. However, when the dyke construction is completed, the regular flooding that normally supplies nutrient to the soil through silt deposition, will stop. Thus, there is the need for an integrated approach to soil fertility management to forestall a rapid fall in nutrient content of the project area (Working Paper 4).

The natural vegetation predominant in the area is the savannah, with heavy growth along the river streams (riverside forests). In the floodplains, mostly rice is grown, followed by sugar cane, while cassava, maize, yams and guinea corn prevail in the sandy uplands.

D. POPULATION AND AGRICULTURE

The people living in the project area, depend mainly on rainfed agriculture and fishing (see Working Papers 5 and 6).The living conditions are characterised by lack of health facilities, low quality housing, and poor educational facilities. Only Shonga enjoys electric power supply from the national grid. Efforts are ongoing to extend supply to Dumagi. Water for domestic consumption is lifted from River Niger and creeks. Some of these conditions are expected to improve when the project takes off with more improved facilities, including higher services for agricultural machinery and better inputs supply.

The total population of the Tada Shonga project area is about 25 000. The land tenure system is characterised by communal ownership but held in trust by families for generations. Land is customarily inherited by male except when there is no male child. The Tada Shonga scheme site was transferred from Kwara State Government during the 1970s, and belongs to LNRBDA. The introduction of intensive irrigation farming in Tada Shonga is expected to result in the influx of farmers from outside the area. Such migration should be beneficial for the project in the areas of cross experience with migrants from the north who have had irrigation farming experience for decades.

Traditional farming, rainfed and/or with supplementary irrigation, continues to be practiced by the majority of small-scale farmers in the project site using local tools such as hoes and cutlasses.. Main crops are maize, millet, rice, sorghum, cassava, yams, groundnut and others. Rice is the dominant crop during wet season. There has been some exposure to mechanised farming in the past through the activities of LNRBDA. These however, were discontinued due to lack of funding.

There are a number of research and other relevant institutions in close proximity to the project area these include: (i) National Cereals Research Institute, Badeggi (NCRI); (ii) National Centre for Agicultural Mechanisation, Ilorin (NCAM); (iii) National Storage Processing Research Institute Ilorin (NSPRI); (iv) University of Ilorin, Ilorin; (v) Kwara State ADP, Ilorin; (vi) Kwara State Ministry of Agriculture, Ilorin; (vii) Kwara State Commercial Farms, Shonga; and (viii) VeeTee Seed Multiplication Farms, Ilorin.

E. THE EXISTING TADA SHONGA SCHEME

The Tada Shonga scheme as designed includes a network of 7 km of main canals and 192 km of distribution channels. The scheme also includes flood dykes to arrest perennial flooding emanating from water releases from Jebba and Kainji dams, and a drainage buffer. There exist a number of studies for the scheme, the latest being the Haskoning study of 2002, which included the design and preparation of tender documents for the scheme.

The recent Review of Public Irrigation Sector in Nigeria (ROPISIN) confirmed that part of the project area was developed in the past, however ROPISIN could not ascertain the extent of this development, as there were no kept records. Remnants of miscellaneous hydraulic structures in the form of damaged canals and intake works, that have experienced flooding for many years, were found in different places on the project site.

The flood protection dyke was commenced by LNRBDA under direct labour, however only 12 km out of the 26 km could be completed, and even parts of the completed dyke had since

been breached. Some of the facilities that were put in place when LNRBDA took over the scheme, are still in place. A 30-unit estate complex, comprising offices, warehouses, staff quarters as well as a building intended for an agricultural training school, are all located at Shonga. The majority of the buildings have been overgrown by weeds, but could be rehabilitated.

Agriculture is the primary source of employment of the indigenous population accounting for about 94 percent of the active labour population. In the past, LNRBDA have conducted irrigation activities at the project site covering about 30ha of land. Most of the participants are migrant farmers from Jebba, Ajasse, Sokoto and Kebbi. These participants pay N6500 per hectare for water and land preparation. Mainly vegetable crops are grown in the site.

The scheme land had been acquired by the Kwara State Government and handed over to LNRBDA which paid compensation to indigenous land users. Land ownership at the project site is unambiguous and would remain as is. Investors would enter into a renewable lease agreement of 50years with LNRBDA.

5. THE PROJECT

A. GENERAL DESCRIPTION

The project, conceived as a pilot public-private partnership, would contribute to sustainable improvement of national food security through opening a new dimension in the more efficient use of the country's irrigation potential. The partnership would be based on the expertise of each partner (Privat Sector/FGN/State Government) that best meets clearly defined public needs through the most appropriate allocation of resources, risks and awards.

The major thrust of the project would be on the rehabilitation of the Taga Shonga Scheme, involving the development of mechanised, large-scale private nucleus farms, together with smallholder farms. The scheme is designed as a lift irrigation system, involving the direct lifting of water from the River Niger and delivery through a network of canals. The scheme also includes flood control dykes to prevent perennial flooding and a drainage buffer.

The project with an investment period of three years, is divided into four distinct Sectors of about 500 ha each, and the remainder of about 400 ha allocated to about 400 smallholders. Each of the Sectors would have individual headworks (intake works). Fully mechanised rice production/harvesting would be practiced on the large commercial plots. The smallholders would be encouraged to aggregate their farms so as to take advantage of the highly mechanised nucleus farms.The main investment items of the project include (i) Flood Protection Dyke; (ii) Access Road (iii) Main Drain (iv) Headworks (Pumping Stations); (v) Irrigation Farms (vi) Service Centres (vii) Vehicles, Machinery and Equipment; and (vii) Storage and Processing.

Total project base costs, excluding any contingencies, are estimated at Naira6.4 billion (US$48.5 million), with investment in Irrigation Development accounting for 35 percent of the total, followed by Flood Protection (15 percent) and Access (nine percent), with the balance made up mainly by investments in Headworks (Pumping Stations), Machinery and Equipment, and the Main Drain. Recurrent costs, mostly operation and maintenance costs,

represent 19 percent of total base cost. The bulk of total project cost, more than 60 percent, would be generated through private sector investments.

The FGN, through FMWR, would hold an oversight and quality assessment role, setting standards and monitoring to ensure these are met while the private sector shall build, operate and manage the infrastructure and deliver services to the small- scale farmers upon their request. The LNRBDA would, inter alia, assume responsibility for the development of a suitable lease agreement, acceptable to investors that seeks to optimize the efficient utilization of the investments financed by FGN (i.e. double cropping of rice over the full area developed would be compulsary).

Within Govemment, overall responsibility for project implementation would rest with the Department of Irrigation and Drainage of the Federal Ministry of Water Resources, which would delegate this responsibility to LNRBDA. A Project Advisory Committee, to be chaired by the Governor of Kwara State, and with representatives of relevant state ministries and LGC as members, would provide overall guidance.

B. DETAILED FEATURES

The Flood Protection Dyke (N 975.5 million)

Since flooding may occur from the Niger at locations where the banks are low, and also from the streams that pass within the project area, a flood protection dyke is proposed around the project area. The protection dyke would be an earth embankment with a total length of 35.5km, crest width of 3m and the outer slopes are 3:1 and inner slopes 2:1 (h:v). The height of the dyke is based on a return period flood of 1:100 years.

Access (N 603.0 million)

The road network would consist of a scheme access road and a perimeter road. The access road would be an all-weather motorable road with asphalt pavement, 14.4km long and 6m wide, with 2m shoulders on either side. It would provide the only access to the project area. The road would be raised above the surrounding area with a number of culverts to allow for cross drainage. The culverts would vary in size and include a 3x3.5m 8-barrel culvert for crossing the Kpati – Rinji River and three 2.1x2.6m 2-barrel culverts for crossing the main drain. The perimeter road, 24.5km long and 6m wide, would circumvent the project area.

Extension of NEPA Power Line (N 8.4 million)

The existing electric power line from the potable water supply tubewell of the Public Health Engineering Department would be extended to the four envisaged service centres.

Main Drain (N 180.4 million)

The main drain of 10.3km in length and 7.41m^3/s capacity, is aligned along the south- eastern side of the project area would connect natural depressions and ponds. To allow the farms to drain during the peak of the rainy season, a drainage buffer would be provided and fitted with pumps. The capacity of the main drain is based on a 1:5year frequency. The main drain runs

from the north- eastern corner of the project along the project boundary to the south- eastern corner where it can discharge into the Niger River.

The Niger River is normally above the waters of the drain, and an outfall structure with pumps of a combined total capacity of 7.5m^3/s would be installed. The outfall structure would be located at the crossing of the flood protection dyke, and would prevent inflow from the Niger River.

Headworks /Pumping Stations (N 338.2 million)

Each Sector would be provided with a pumping station located along the Niger River. The pumping stations would be on high grounds where the Niger has defined embankment. The intakes would be located in areas where the river is deep and should have protection using a floating beam to prevent floating debris entering the intake.

Each pumping station would comprise a building, housing a workshop, stores and offices for operation and maintenance (O&M) and paved storage areas. The stations would be equipped with the necessary hoisting devices. The layout of the pump stations is such that they can easily be connected to the access road. Floating pump stations (pontoon) to reduce suction energy requirements also merit consideration. The generator house would be located in such a way as to allow easy access from the main access road.

The pump stations would house 4sets of pumps each. Sectors 1 and 4 would be served with 1000l/s capacity electric pumps and Sectors 2 and 3 with 700l/s capacity electric pumps. Energy would be supplied to Sector 1 by two generators with capacity 200 kVA each, the same also applies to Sector 4 while Sectors 2 and 3 would each be supplied by two generators of 180 kVA capacity each. The installed pumping capacity is adequate to meet the peak water requirements during the dry season and is designed to supply 73million cubic metres of irrigation water per annum.

Irrigation Development (N 2,214.9 million)

The irrigation system to be provided for the project would depend on the methodology chosen by the private sector. For the purpose of project preparation and analysis, it is assumed that the feeder canal conveys water from the pump outlet to the irrigation main canals which then convey water to the secondary and tertiary canals. The feeder and main canals are designed as unlined trapezoidal channels. Hydraulic structures on the canals include cross regulators, sector turnouts, field turnouts, drop structures, spillways, division boxes and drain crossings.

The secondary canals are unlined trapezoidal channels with side slopes of 2:1 (h:v) and convey water both to the tertiary and field canals. In order to allow the optimum use of machines and equipment, the nucleus farms shall not have field channels, instead the irrigation farms shall be made up of 25 ha blocks. It is proposed that the small- scale farmers aggregate their holdings in multiples of 25 ha to allow the private sector offer similar facilities and services.

It is foreseen that the entire cultivable area would be laser-controlled levelled at the onset, to allow optimal water utilisation and drainage. The layout of the farm takes into consideration the topography of the project area which assists with the division of the project into Sectors.

There are four Sectors with gross areas of 700 ha, 600 ha, 600 ha and 800 ha, respectively, giving net areas of 664 ha, 576 ha, 545 ha and 785 ha, respectively.

The maximum levels are found along the river embankment whilst the lowest are along the natural depressions within the irrigation area. These natural depressions have been excluded from the irrigation lands and would be used as drains.

Service Centres (N 84.0 million)

Service Centres would be developed to provide ancillary services to the farms. They would consist of workshops, fuel store, equipment and machinery yard, and some limited accommodation for farm staff.

Vehicles, Machinery and Equipment (N 395.5 million)

The type of machinery and equipment proposed, as well as the quantity required per sector to achieve optimum performance, is presented in Table 1 below.

Table 1 - Machinery and Equipment Requirements

Equipment	Sector 1	Sector 2	Sector3	Sector4
4WD Vehicles	3	3	3	3
Motorbikes	5	5	5	5
Disc Harrow	6	5	5	7
Rice Drill	6	5	5	7
Boom Sprayer	1	1	1	1
Fertilizer Spinner	1	1	1	1
Tractor 60 HP	8	7	7	9
Trailer	8	7	7	10
Combine Harvester	4	3	3	4
Rice Thresher	5	5	5	5

Engineering and Procurement Services (N 200.0 million)

Consultant engineering and procurement services would be provided for the development of farm business plans acceptable to the private banks involved, as well as technical advice on the procurement of agricultural machinery and equipment.

Storage and Processing (N 168.0 million)

The size of the storage silos and of the milling plant has been based on the expected output of 20 000 tonnes of milled rice annually. The storage and processing facilities would include the following:

Modular Milling Plant in modules of 5tonnes/hr (to reach15tonnes in Year 4).
Parboiling Plant
Paddy Silos
Rice Silos
Bagging Line incl. Handling Equipment

The required processing capacity of the proposed milling plant is presented in Table 2 below:

Table 2 - Required Processing Capacity - Milling Plant

	Unit	Sector I	Sector II	Sector III	Sector IV	Total
Quantity to be processed (Paddy) - Dry Season [1]	Mt	5,146	4,431	4,179	6,129	19,885
Quantity to be processed (Paddy) - Wet Season [1]	Mt	4,316	3,711	3,498	5,148	16,672
No. of processing days - Dry Season	day	90	90	90	90	
No. of processing days - Wet Season	day	90	90	90	90	
Hours per processing day - Dry Season	hr	12	12	12	12	
Hours per processing day - Wet Season	hr	12	12	12	12	
Min. required throughput per hour - Dry Season	**Mt/hr[2]**	**4.8**	**4.1**	**3.9**	**5.7**	**18.4**
Min. required throughput per hour - Wet Season	**Mt/hr[2]**	**4.0**	**3.4**	**3.2**	**4.8**	**15.4**

[1] in PY 20, assuming all sectors start production in PY 2.

[2] Paddy.

C. PHASING

The land of the scheme would be developed in four sub-divisions with gross areas of 800 ha, 700 ha, and two blocks of 600 ha each. The divisions are based on the natural topography of the area. Each of these four blocks would include 100 ha for smallholder development which would allow the establishment of four nucleus farms as a private enterprise.

The main development is planned to be carried out in stages over a period of three years, with some additional investments in storage infrastructure in year 4. Due to the incessant flooding of the project area, it is proposed that the flood dyke be built first. During the construction of the flood dykes, the access road can be completed as well as Sector 1, which would then have the protection given by the flood dyke. This Sector can be cultivated while the other Sectors are being developed.

Stage I - Flood dykes, access roads, intake works for Sector I, and Sector I farm development comprising a total net area of 664 ha, including 100 ha allocated to small-scale farms and the establishment of a 5 tonnes per hour capacity rice mill;

Stage II - Intake works for Sector II and III and Sectors II and III farm development, comprising a net area of 576 ha and 545 ha, respectively, including 100 ha each for the small- scale farms and a 8 tonnes per hour capacity rice mill;

Stage III - Intake for Sector IV and Sector IV farm development, comprising a net area of 785 ha, including small- scale farms and a 6 tonnes per hour capacity rice mill.

D. PROJECT COSTS AND FINANCING

The total base cost of the project, excluding any contingencies, is estimated at Naira 6.4 billion (US$ 48.5million). These cost estimates are based on the detailed bill of quantities modified to suit the large scale mechanized farm. The rates used are current rates for such items as earthmoving and concrete works.

The investment costs for the different Stages are as given in Table 3 below. These stages are expected to be carried out in three consecutive years.

Table 3 - Cost of Project Stages (Base Cost)

Description	Cost (N Billion)
Stage I: flood protection dyke, access road, main drain, power line, RBDA PIU; Sector I field development and pumping station, service centres, machinery, equipment and vehicles.	2.640
Stage II: Power line, RBDA PIU; Sector II and Sector III field development and pumping station, service centres, machinery, equipment and vehicles; Sector I: milling and storage facilities.	1.458
Stage III: Power line, RBDA PIU; Sector IV field development and pumping station, service centres, machinery, equipment and vehicles; Sectors II-IV: milling and storage facilities.	1.079
Remaining storage facilities (PY 4)	0.034
Total	**5.210**

The Recurrent costs include the annual costs for wages, operation and maintenance, and miscellaneous costs including insurance. Annual estimates for these costs, from Year 1 until after the full development of the whole irrigation area in Year 4, are provided in Table 4. Thereafter the recurrent cost is estimated to remain the same.

Table 4 - Estimates of Requirements for Recurrent Costs (Base Cost)

Description	Amount (Naira Million)			
	Year 1	Year 2	Year 3	Year 4
Salaries and Wages	19.575	57.975	77.925	77.925
Operation & Maintenance	108.923	156.714	193.634	193.634
Miscellaneous (Insurance)	1.775	4.684	8.365	8.365
Total	130.273	219.373	279.924	279.924

The project is conceived as a public-private joint venture. The government would provide the essential upfront infrastructure at the estimated cost of Naira 1.8billion. It is expected that the private investor would contribute to cost recovery through a land lease, the level of which would be subject to negotiation of the government and the lessee.

It is assumed that the group of leaseholders would sublease approximately 400 ha to small-scale holders. All costs related to smallholder land development would be recovered from the smallholders through deductions from crop sales for whom the main leaseholder would act as the buying agent.

Detailed project cost estimates are provided in Working Paper 9 (Appendix 1, Table 10). They are summarised in Table 5 below:

Table 5 – Summary Project Costs by Year (Base Cost)

	(Naira '000)						
	PY1	**PY2**	**PY3**	**PY4**	**PY5**	**Total**	**%**
INVESTMENT COST							
A. Flood Protection	975,520	0	0	0	0	975,520	15%
B. Access	602,987	0	0	0	0	602,987	9%
C. Extension of NEPA Power Line	2,800	2,800	2,800	0	0	8,400	0.1%
D. Drain	180,417	0	0	0	0	180,417	3%
E. RBDA Project Implementation Unit	14,000	14,000	14,000	0	0	42,000	1%
F. Irrigation Development	549,491	898,158	767,207	0	0	2,214,856	35%
G. Headworks (Pumping Station)	88,304	161,608	88,304	0	0	338,216	5%
H. Service Centres	21,000	42,000	21,000	0	0	84,000	1%
I. Vehicles	16,500	33,000	16,500	0	0	66,000	1%
J. Machinery and Equipment	88,732	145,464	95,332	0	0	329,528	5%
K. Engineering and Procurement Services	100,000	60,000	40,000	0	0	200,000	3%
L. Storage and Processing	0	100,800	33,600	33,600	0	168,000	3%
Subtotal Investment Cost	**2,639,751**	**1,457,830**	**1,078,743**	**33,600**	**0**	**5,209,923**	**81%**
RECURRENT COST							
A. Salaries	19,575	57,975	77,925	77,925	77,925	311,325	5%
B. Operation and Maintenance	108,923	156,714	193,634	193,634	193,634	846,539	13%
C. Miscellaneous	1,775	4,684	8,365	8,365	8,365	31,554	0.5%
Subtotal Recurrent Cost	**130,273**	**219,373**	**279,924**	**279,924**	**279,924**	**1,189,418**	**19%**
TOTAL BASE COST	**2,770,024**	**1,677,202**	**1,358,667**	**313,524**	**279,924**	**6,399,341**	100%
% of Total Base Cost	43%	26%	21%	5%	4%	100%	

The project costs by financier are provided in Table 6 below (see also Working Paper 9, Appendix 1, Table 2).

Table 6 – Summary Project Costs by Financier (Base Cost)

	(Naira '000)					
	Government		**Private Investor**		**Total**	
INVESTMENT COSTS						
A. Flood Protection	975,520	100%	0	0%	975,520	15%
B. Access	602,987	100%	0	0%	602,987	9%
C. Extension of NEPA Power Line	8,400	100%	0	0%	8,400	0%
D. Drain	180,417	100%	0	0%	180,417	3%
E. RBDA Project Implementation Unit	42,000	100%	0	0%	42,000	1%
F. Irrigation Development	0	0%	2,214,856	100%	2,214,856	35%
G. Headworks (Pumping Station)	0	0%	338,216	100%	338,216	5%
H. Service Centres	0	0%	84,000	100%	84,000	1%
I. Vehicles	0	0%	66,000	100%	66,000	1%
J. Machinery and Equipment	0	0%	329,528	100%	329,528	5%
K. Engineering and Procurement Services	0	0%	200,000	100%	200,000	3%
L. Storage and Processing	0	0%	168,000	100%	168,000	3%
Subtotal Investment Cost	**1,809,324**	**35%**	**3,400,600**	**65%**	**5,209,923**	**81%**
RECURRENT COSTS						
A. Salaries	0	0%	311,325	100%	311,325	5%
B. Operation and Maintenance [1]	403,556	48%	442,983	52%	846,539	13%
C. Miscellaneous	0	0%	31,554	100%	31,554	0%
Subtotal Recurrent Cost	**403,556**	**34%**	**785,862**	**66%**	**1,189,418**	**19%**
TOTAL BASE COSTS	**2,212,879**	**35%**	**4,186,461**	**65%**	**6,399,341**	**100%**

[1] Government absorbs maintenance cost of flood protection, access and drain, to be recovered by land lease.

The FGN has begun a drive for loans totaling about N50Billion for the agricultural sector through the commercial banks (see Working Papers 7 and 8). The standard eligibility criteria for obtaining loans from the commercial banks include:

- Credibility of lender;
- Proposed business plan;
- The lender's contribution to the project, minimum of ten percent but treated on a case by case basis;
- Provision of collateral;
- Government guarantee; and
- Need to have an operational account with the bank for at least 6 months.

6. ORGANISATION AND MANAGEMENT

A. ORGANISATION

FGN, through FMWR, would hold an oversight and quality assessment role, setting standards and monitoring to ensure these are met while the private sector would build the head works, irrigation farms, service centres, and provide machinery and equipment, as well as operation and maintenance of the scheme. The private sector would deliver services at cost to the small-scale farmers when so requested by them.

The critical challenge would be the determination of an arrangement that would bring about the optimum mixture, methodology and mechanism to adopt in reaching acceptable levels of service at the quality and at the optimum cost. This could be achieved by utilising a management option that favours both parties (Working Paper 11). For this project, the Concession Management option is recommended. This allows full transfer of responsibilities to the private partner, who will also provide the financing for investment. The government, remaining the owner of the assets (land and water), would ultimately be responsible for the small- scale farmers, and ensure that the assets are well utilised. To make the scheme attractive to private investors, FGN will provide the financing for the common facilities (protection dyke,access roads etc.).

For the purpose of this assessment, the following project organization has been tentatively chosen for each Sector.The private investor would be free to choose a management structure that would best suite his style of operation and management. The structure could include the following: (i) Farm Manager; (ii) Agric. Officer; (iii) Agronomist; (iv) Cultivation Officers (Supervisors); (v) Extension Officer; (vi) Workshop Supervisor; (vii) Accountant; (viii) Store Keeper; (ix) Administrative Assistant; (x) Office Assistants (Clerks); (xi) Mechanics; (xii) Security and (xiii) Drivers.

C. MANAGEMENT

The FGN would be responsible for the provision of the flood protection dyke, the main access road, the main drain and the extension of power supply to the project area for domestic use. The private sector would be responsible for the management of the scheme. This would include operation and maintenance of the scheme, including the flood protection dyke, the access road and main drain to be built by FGN. The components of the pricate sector investments requiring operation and maintenance include: irrigation infrastructure, head-works infrastructure, head-works equipment, service centres, vehicles, machinery and equipment and milling/processing facility.

Research Institutions in close proximity to the project area (see Chapter 4D and Working Paper 8) would be closely aligned to the private sector and farmers, and carry out research as well as periodically test and assist with developing methodologies for improving yields and reducing cost of production.

Cooperative societies in the area would be encouraged (through rural savings and credit services emenating from improved incomes and small and medium enterprises (SME) opportunities) to create a readily available credit source to the farmers, who claimed that credit is a serious impediment to purchase of farm and fishing inputs.

The expected role of LNRBDA would be to monitor the scheme and ensuring good interelationship between the large and small scale farmers. LNRBDA would also act as facilitator to provide an interface between the private sector and the communities.
Formal training in community development and private public partnerships would be supported by FGN.

Under the project, funds would be provided for the establishment and maintenance of a small Project Implementation Unit (PIU) within LNRBDA, and with staff seconded from that authority. It would be staffed with a Project Coordinator, who would be assisted by a Programme Officer and an Accounts Assistant. Staffed with an agronomist, two enumerators/tabulators and a secretary, a Monitoring and Evaluation Unit would be attached to the Project Coordinator's office. Apart from the preparation of a baseline survey of the scheme area, to be conducted by LNRBDA staff, the M&E unit would also periodically monitor the progress of project implementation. Key performance indicators, apart from those related to project works, would refer to changes in average rice yields, production and net returns.

7. PRODUCTION, MARKETS AND FINANCIAL RESULTS

A. YIELDS AND PRODUCTION

Only rice would be produced on the project. To get maximum benefits from the project, double cropping would be practiced. Varieties with growth duration from 120 to 130 days would be optimal, as they would leave adequate time (three to four months) for operations such as land preparation, harvest and others.It is envisaged that the rice crops in the wet

season would be ready for harvesting between 20th October to 10th December, and in dry season from 20th April to 30th May.

Records and results of on-farm experiments have shown that paddy yields of up to 6.5 tonnes/ha were obtained from irrigated rice planted around the project area. Recently, the results of the on-farm test of the R-box, (a new package of production technologies for irrigated rice production developed by NCRI), indicated that yields of up to 7 tonnes/ha can be obtained in the country (Working Paper 6).

It is estimated, that under optimum crop management in the first year of production, rice crops in the project sites would yield 5.5 tonnes/ha in dry season and 4.7 tonnes/ha in wet season, and increase to 6.5 tonnes/ha in dry season and 5.5 tonnes/ha in the 4th year after farmers improve their technical skill and knowledge of the variability in soil conditions in the field to adjust their crop management practices. The 4-year period is also needed for the scheme to become more uniform after land levelling .

From year 5 onwards, it is estimated that crop yields will gradually increase by about 1.5 percent annually due to technological progress and improved management practices, reaching about 8 tonnes/ha in the dry season at full development. Smallholder yields are projected to be some 2 tonnes/ha lower due to lower input use, they will exhibit however, similar growth pattern.

For this project, the following two farm models have been developed:

- Farm Model 1 Mechanized Large Scale Nucleus Farm
- Farm Model 2 Small Scale Farm

Based on these models, the anticipated yields and the improved technology to be applied for the rice production were incorporated into both crop budgets that were developed. (Working Paper 10, Appendix 1, Tables 5 and 6).

B. MARKETS AND PRICES

It is envisaged that packaged rice would be sold ex-mill to wholesalers who would collect on site for transportation to the main consumption centres with subsequent retailing to the general public. No marketing problems are expected for project output.

The flow of locally produced paddy rice is usually from the farmers to the wholesalers onward to the millers. The paddy wholesalers serve as a link between the farmers and the processors. Milled rice flows through rice wholesalers to the retailer, from where it eventually gets to the consumers.

There are ample marketing opportunities for locally produced rice as Nigerians have a distinct preference for local varieties. Unfortunately, this rice is often sold at a discount as a result of quality flaws in milling, polishing, destining and presentation. To overcome this problem, scheme development would include a modern milling and processing plant. By controlling the entire produce chain, high quality outputs would be secured, resulting in high value- added for the scheme as a whole.

The current price for paddy produced in the project area is N 35/kg. In urban areas, high-quality imported rice sells at around N 150/kg. The project output ex-mill is assumed to be sold at N 70/kg and the farm gate paddy price, as a result of the value addition on farm, is estimated at N 44/kg (see Working Paper 10).

C. FINANCIAL RESULTS

To test the financial viability of the proposed scheme, the financial internal rate of return (FIRR) has been calculated on the basis of two farm models, "Large-Scale Nucleus Farm" and "Small-Scale Farm" (Working Paper 10, Appendix 1, Tables 5 to 7) representing total cultivated areas of 2,170 and 400 ha, respectively. The following assumptions have been made: (i) Farm operations are fully mechanised, with a distinction made between wet and dry season; (ii) The only crop produced is paddy; (iii) As the land is currently not farmed, all production would be incremental; (iv) The area and yield build- up is assumed as shown in Tables 8 and 9, Working Paper 10, Appendix 1.

The analysis shows that the proposed investment would be financially very attractive to private investors as the investment costs for flood protection, access road, extension of power line, and main drain would be borne by FGN. The FIRR would be a robust 40 percent .

The sensitivity of the FIRR was tested against adverse changes in costs and benefits. An increase in costs, for example by 20 percent, without increase in benefits, would reduce the FIRR to 30 percent. A decrease in gross revenues by 20 percent would reduce the FIRR to 28 percent. A delay by two years in achieving benefits would still give an FIRR of above 20 percent (see Working Paper 10, Table 2).

9. BENEFITS AND JUSTIFICATION

A. BENEFITS

The project's main direct benefits would be the incremental production of rice, which is estimated to reach 19 000 tonnes by year five of the project. The project would thereby contribute to reducing the balance of payment deficit in the rice sector by substituting rice imports with a total estimated value of around Naira 590 Million.

Some 400 farm families would comprise the direct beneficiaries, while it is estimated that incremental income opportunities would be created for at least 1 000 rural households. In addition, the population in the villages surrounding the project (25 000) would enjoy some benefits from the project's infrastructure and marketing arrangements.

The proposed project would supplement the ongoing smallholder rice production activities under the National Programme for Food Security by piloting private, larger scale mechanised rice production in conjunction with smallholder outgrowers.

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B. JUSTIFICATION

To demonstrate the viability of the project proposals at the level of the economy, an economic

analysis has been conducted for the project as a whole. The result is acceptable. The Economic Rate of Return (ERR) for the entire project is 12.9 percent. The following assumptions have been made:

- The time frame for the analysis is a period of 20 years;
- The cost stream includes physical contingencies;
- Flood protection, access road and minor electrification infrastructure are considered public goods and cannot exclusively be attributed to the scheme as they also serve to protect villages in the project area and the public in general. For the purpose of the economic analysis, only 50 percent of flood protection costs and 80 percent of access road costs (investment and recurrent) have been charged to the project;
- The analysis is based on economic prices for paddy and fertilizer (import parity prices) and on economic project costs, which exclude taxes and duties and price contingencies, but include physical contingencies (see Working Paper 10).

The sensitivity of the ERR was tested against adverse changes in projct costs and benefits. An increase in costs by ten percent for example, while keeping the benefits constant, would reduce the ERR to 9.9 percent . A decrease in gross revenues by ten percent would lower the ERR to 9.5 percent. A delay by two years in achieving benefits would reduce the ERR by almost half, to 6.4 percent, suggesting that the project would be more sensitive to delays in achieving benefits than to adverse changes in costs.

C. RISKS

Given the limited experience with public-private partnerships in large-scale irrigation schemes in Kwara State, the project necessarily involves a number of risks. Since the thrust of the project is on the rehabilitation and improvement of an existing irrigation scheme, the overall risk of project delays and failure to achieve objectives is relatively low. Scheme selection and project design have been made in such a way as to minimise these risks. The principal objective of the proposed infrastructure improvements is, in fact, risk alleviation through greater resistance of structures to floods and increased water diversion and distribution efficiencies. The risk that the required O&M level for irrigation may not be attained, is considered small since the schemes would be under private sector management. The risk that the private investors would not be able to access sufficient amounts of credit for their operations, is considered remote. Under the Presidential Initiative on Accelerated Rice Production, Government is actively promoting lending for agriculture through private banks. The risk of being unable to procure the required quantities of seeds and other agricultural inputs, is small because of adequate sources of supply in the vicinity of the project site.

D. ENVIRONMENTAL IMPACT

The study of chemical composition of groundwater shows that all samples are neutral in reaction and will not produce salinity and alkali hazard when used for irrigation. They contain a fair amount of calcium and magnesium, which have beneficial effects on acidic soils of the project areas. Analyses of water collected from the Niger River at different locations show that the water is neutral with very low conductivity values. The residual sodium carbonate

value is far below the harmful limit of 1,25meg/l. This shows that for the purpose of irrigation, all crops may grow satisfactorily, except some boron sensitive crops. The water is thus suitable for the purpose of irrigation of rice.

Some of the aquatic plants inhabiting the stagnant pools and ponds may diminish in population with the disappearance of these water bodies to pave way for rice irrigation. However, terrestrial weeds may flourish for the benefit of animals (herbivores). Some weeds are likely going to remain along the canals. Thus, they would have to be continuously cleared in order not to constitute barrier to the free flow of water in the irrigation canals. Aquatic vegetation is inimical to the development of irrigation by reducing the velocity of the current along irrigation channels thus increasing the rate of siltation.

Fish found in the project area are similar to those in the River Niger. The ponds and many other stagnant water bodies formed due to the perennial flooding provide natural niches for some hardy fish species such as protopterus, hemichromis, and polypterus. These fish species may diminish in population with the disappearance of these water bodies as a result of the flood protection dyke.

9. ISSUES AND FOLLOW-UP

A. ISSUES

Nigeria has large potential and resources for sustainable rice production and eventually export which can be tapped through a private sector led programme on rice production and processing. The success of the Tada Shonga project is dependent on govemment investing and putting in place the common facilities, including the flood protection dyke, main access road and main drain.

The agro-ecological environment and the existing expertise on rice production would ensure the possibility of obtaining yields of 7 tonnes/ha of paddy rice in dry season and 6 tonnes/ha of paddy rice in wet season from irrigated rice in the project sites, provided that (i) the Presidential Initiative ensures adequate policy and infrastructure support for input and output distribution and marketing, and (ii) there is a continued build- up of capacity through training of extension workers and farmers on rice production technologies.

Given the critical role rice quality plays in determining price and marketability of rice, the milled rice should be of outstanding quality and be branded.

The ban on the importation of milled rice and the levy on the importation of parboiled rice should remain unchanged and extended in the medium term (5 to 7years).

There is an urgent need for all the enabling policies to be put in place and to ensure protection of land and water rights for the private sector involved.

B. FOLLOW-UP

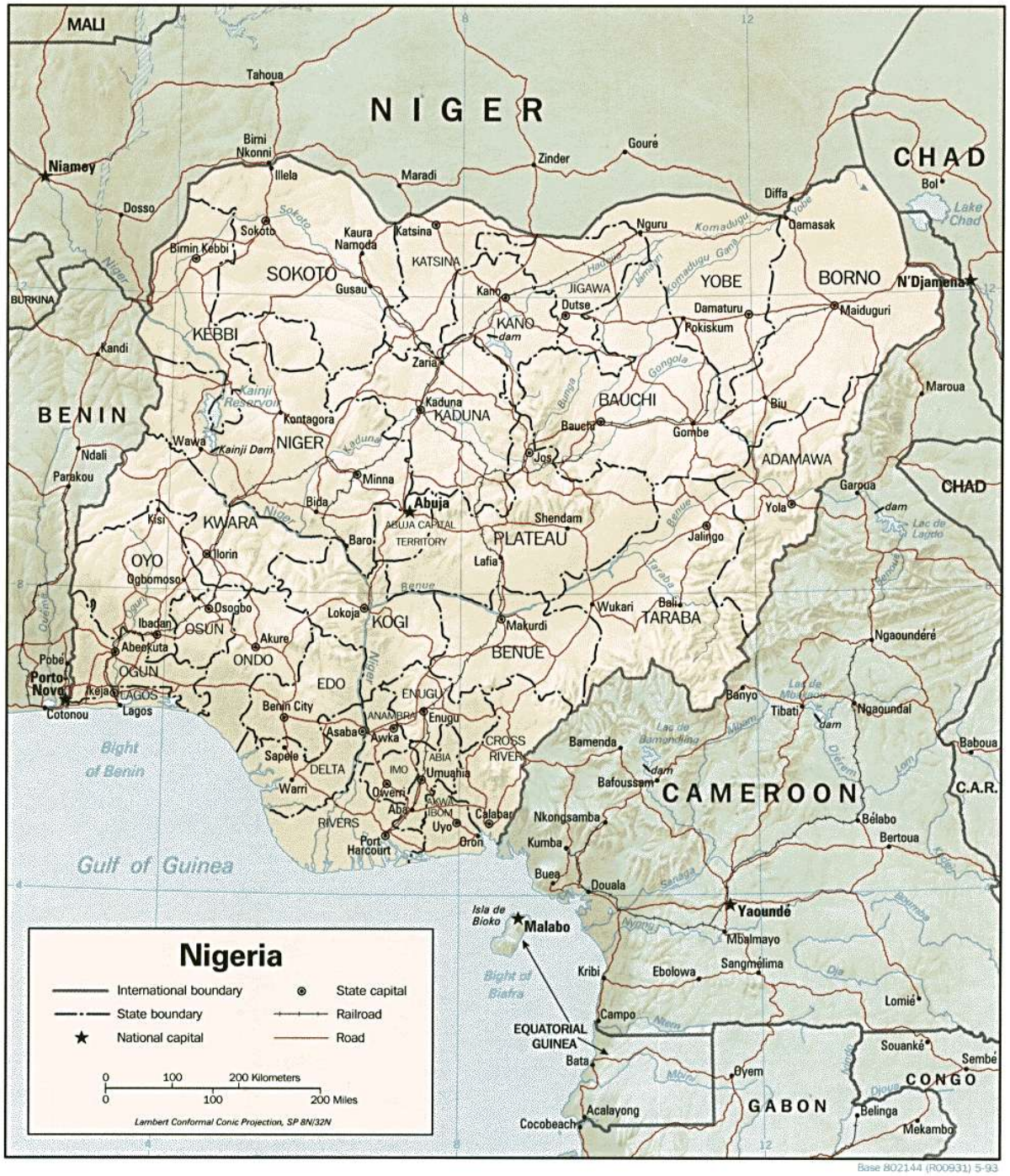
The irrigation lands should be leased to the private sector through a long-term lease agreement strong that includes penalties for failure to utilise the land for each cropping

season. The lease should be at least for 20 years but its value renegotiated every five years to allow adjustment for inflation.

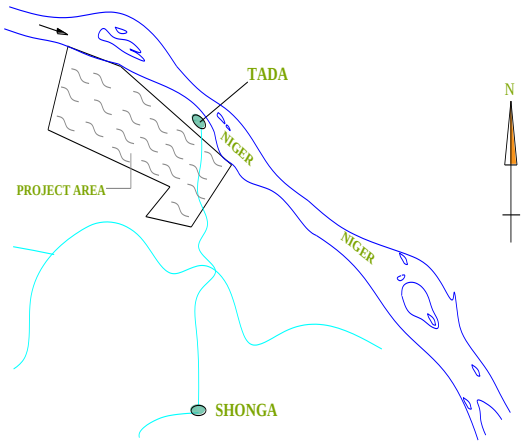
The small- scale farm areas should be incorporated and integrated into the nucleus farms. This should be backed up in the Agreement with the lessee.

The Naira 50 billion agricultural development fund, set up by government for loans to the agriculture sector through the commercial banks, should be disbursed as quickly as possible and investors in the Tada Shonga should be able to accede this fund when qualified.

MAP 1 – Nigeria Location Map



MAP 2 – Location of the Tada Shonga Scheme



LOCATION OF THE TADA SHONGA SCHEME

Figure 1 – Tada Shonga Scheme Boundary System