ANNEX IV

COMPETITIVENESS OF NIGERIA'S RICE AND ITS CONTRIBUTION TO POVERTY REDUCTION.

Draft Report

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Table of contents

COMPETITIVENESS OF NIGERIA'S RICE AND ITS CONTRIBUTION TO POVERTY REDUCTION.

1.0 Introduction

1.1 Dynamics of the global rice production and trade

Rice is one of the most important food crop known to have fed a great number of people for a longer period than another crop (FAO, 2000). Over half of the world's human population use rice as staple food and its importance to national food security has increased over time even in countries of Africa, Latin America and else where, where traditionally it is not a major food crop. Statistics show that while about 5.8 billion people in 176 countries consumed rice in 1996, it has become an important food for 40 million Africans, 1.3 million Americans and 2.9 billion Asians (FAO, 2000). The relevance of the crop in relation to food security, socio-economic development, religious and social ceremonies is evident through history in many countries particularly in Asia and Africa. Hence it is being estimated that annual rice production needs to increase from 586 million metric tonnes in 2001 to 756 million metric tonnes by 2030 to meet the increasing global demand for the commodity. The challenges however faced by countries in attaining this target is bound to differ from one country to another as determined by factors like population, preference attached to rice consumption by households, natural endowment for expanded production, and the productivity of the rice farms (Roy and Misra 2002, Saka *et al* 2005).

However, global rice economy has in recent times been characterized by a lot of trade dynamics arising from changes in production and trade policy scenarios in the notable producing and consuming countries of the world. Generally, world rice prices has witnessed steady increase in the last five years (Figure 1) arising from increase in import demand notably from Africa. This is in the midst of reported declining (FAO 2006) prospect for increased production owing to persistent drought problems, monsoon floods, typhoons, and incidence of diseases and pest ravaging Asia. Latest forecast has it that global paddy production would decline by one million and possibly a further pressure on the price situation in the rice market. The direction of the twist however differs between regions and between countries as an indicator of the complexities of the world rice trade dynamics. The bulk of these complexities arise from high level of variance in the production and trade policy

scenarios among nations even within region as shown in summaries of projections given by FAO (2006).

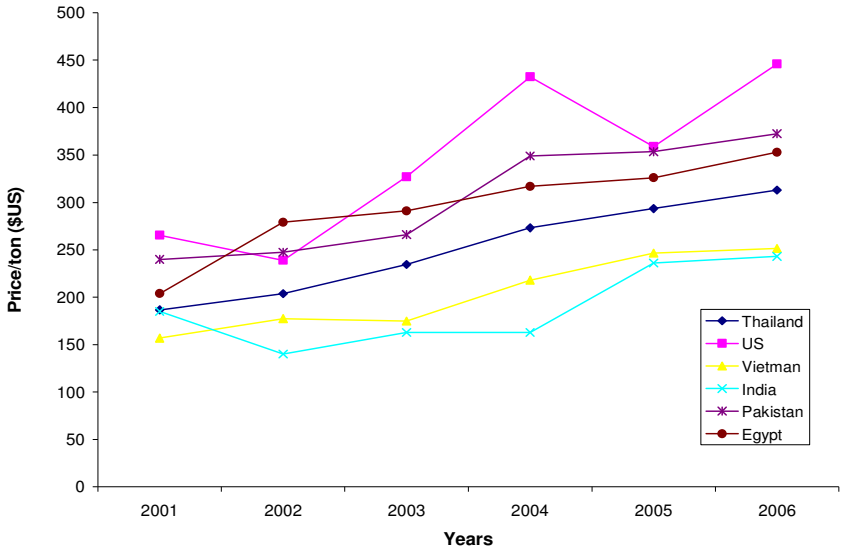

Fig 1: Trend in Export Price for Rice in Major Producing Countries

Because rice is a lifeline for many poor farmers but also a major food staple for large segments of the population, governments in many developing countries have intervened actively to stabilize domestic prices and promote self-sufficiency. High degrees of external protection have also been established in a number of higher-income countries, to preserve producer's incomes and the environmental benefits arising from rice cultivation.

Rice is fast becoming a critical crop for food security and a mainstay for the rural population of many countries, thus, it has become necessary for governments to be active involved in the sector. Since only a relatively small volume of rice production is traded internationally, high levels of self-sufficiency is generally pursued as the preferred strategy to secure adequate supplies, particularly in countries relying on rice as the main staple. Governments have accordingly supported the sector, through research in new varieties and the provision of irrigation, subsidized credit, basic inputs and extension. Also, as rice is one of the few commodities still widely subject to market stabilization measures, such as state procurement and minimum producer prices, governments in many developing countries have intervened actively to stabilize domestic prices thereby limiting the transmission of depressed international prices on to domestic markets. High degrees of external protection have also

been established in a number of higher-income countries, to preserve producer's incomes and the environmental benefits arising from rice cultivation (Concepción Calpe, 2004).

Rice has traditionally been an important basic food commodity for certain populations in Sub-Saharan Africa, and West Africa in particular. Structural increase in rice consumption in the sub-region has been due to recent major changes. Regional demand has grown at an annual rate of 6% since 1973, driven by a combination of population growth and substitution away from traditional coarse grains. The consumption of traditional cereals, mainly sorghum and millet, has fallen by 12 kg per capita, and their share in cereals used as food decreased from 61% in the early 1970s to 49% in the early 90s. In contrast, the share of rice in cereals consumed grew from 15% to 26% over the same period. Growth in regional rice consumption remains high as projected estimates of the FAO indicates an annual growth rate of 4.5 % through the year 2000. The implication is that the total volume of rice consumed in West Africa is likely to increase by 70% over this decade. However, catering for the rising demand requires that aggressive moves be made by countries within the sub-region to expand rice supply through production.

Concerns over scarcity of supplies have often led to the imposition of rice export limitations, including export bans, ceilings, taxes, minimum prices, etc by governments in the sub-region even while pursing the self-sufficiency objective to achieve food security. In contrast the rice sector of several high-income countries has been isolated from external competition through high border protection, in the form of outright import prohibitions, state trading monopolies, minimum import quotas, high tariffs or variable duties. Rice in those countries is also subject to export subsidies, credit guarantees and food aid. Several instances of trade liberalization since the 1990s which had tended to making rice markets more open to foreign competition, have failed to materialize due to the protectionist attitude of many of the high-income countries. This paper therefore aims at assessing the competitiveness of Nigeria's rice and its contribution to poverty reduction. Specifically the paper is structured into five sections. Accordingly, Section 2 overviews Nigeria's rice sector- its trends and features, challenges, policy impacts etc, while Section 3 presents the competitiveness of Nigeria's rice production systems. Section 4 addresses the contribution of Nigeria's rice sector to poverty reduction and opportunities for short and medium term policy. Section 5 concludes the paper.

2. Nigeria's rice sector

2.1. Overview of the rice sector

Nigeria's rice sector has witnessed some remarkable developments over the past three decades and a half in terms of a vast increase in both rice production and consumption during the period. Notwithstanding, the production increase has been insufficient to match the growing demand (about 5 million Mt in 2005), with rice imports making up the shortfall (Daramola, 2005 and David, 2007). A combination of various factors seems to have triggered the structural increase in rice consumption. Like elsewhere in West Africa, urbanization appears to be the most important cause of the shift in consumer preferences towards rice in Nigeria. Compared to other traditional cereals, rice is easy to prepare due to its reducing chore of food preparation and so fits more easily in the urban lifestyles of rich and poor alike. Also rice has become a major source of calories for which the poorest third of urban households obtain 33% of their cereal-based calories, and its purchases represent a major component of cash expenditures on cereals (World Bank, 1991). Indeed rice is no longer a food of luxury in Nigeria as its availability and prices have become a major welfare determinant for the poorest segments of the countries' consumers who also are least food secure.

The fact that rice has, become a strategic commodity in the Nigerian economy, have prompted government's interference in the rice sector over the past few decades. Since the objective of self-sufficiency in rice has become a major government agenda as witnessed by the previous import ban, the effective duty on imported rice estimated at 115% (USDA FAS, 2003) and stated goals of the Presidential initiative on rice, the expectation is that the agenda is likely to contribute positively (or otherwise) to the three fundamental objectives: efficient generation of income; equal distribution of income; and security (Pearson et al, 1981:4-5). With rice now being a structural component of the Nigerian diet and rice imports making up an important share of Nigerian agricultural imports, there is considerable political interest in increasing the consumption of local rice. This has made rice a highly political commodity in Nigeria. However, past policies have not been successful in securing the market share because of their erratic tendency. For instance, from 1986 to the mid 1919s rice imports were illegal. In 1995 imports were allowed at a 100 percent tariff. This was later reduced to 50 percent in 1996. In 2002 and 2003 the tariff was again increased to 100 percent and 110 percent respectively. This erratic policy reflects the dilemma of both securing cheap rice for consumers and ensuring a fair price for producers. Given the current globalisation trend and an increasingly competitive world economy, Nigeria faces some strategic choices in relation to the rice economy.

2.2. Trends and features that characterise the rice sector

Rice has become an important cereal in Nigeria with demand soaring at a very fast rate over the years. Of all the staple crops, rice has risen to a position of pre-eminence. Since the mid-1970s, rice consumption in Nigeria has risen tremendously, at about 10% per annum due to changing consumer preferences. In addition, the share of rice in cereals consumed increasing from 15% in the 1970s to 26% in the early 1990s (Akpokodje, Lancon and Erenstein, 2001). Evolution of the share of the main staples in Nigerian (on average food consumption in calories terms) indicates the rising importance of rice over time in the country (see Figure 2). Per capita consumption rose from 24.8 kg of rice per year in 2001 to 39 kg of rice per year in 2004 representing about 14% of total caloric intake (RiceWeb, 2001 and Hussein, 2004). Also projections from the FAO indicate rice consumption growth rates of 4.5 percent per annum through the 2000s period, which will represent a 70% increase in total rice consumption by the end of the decade.

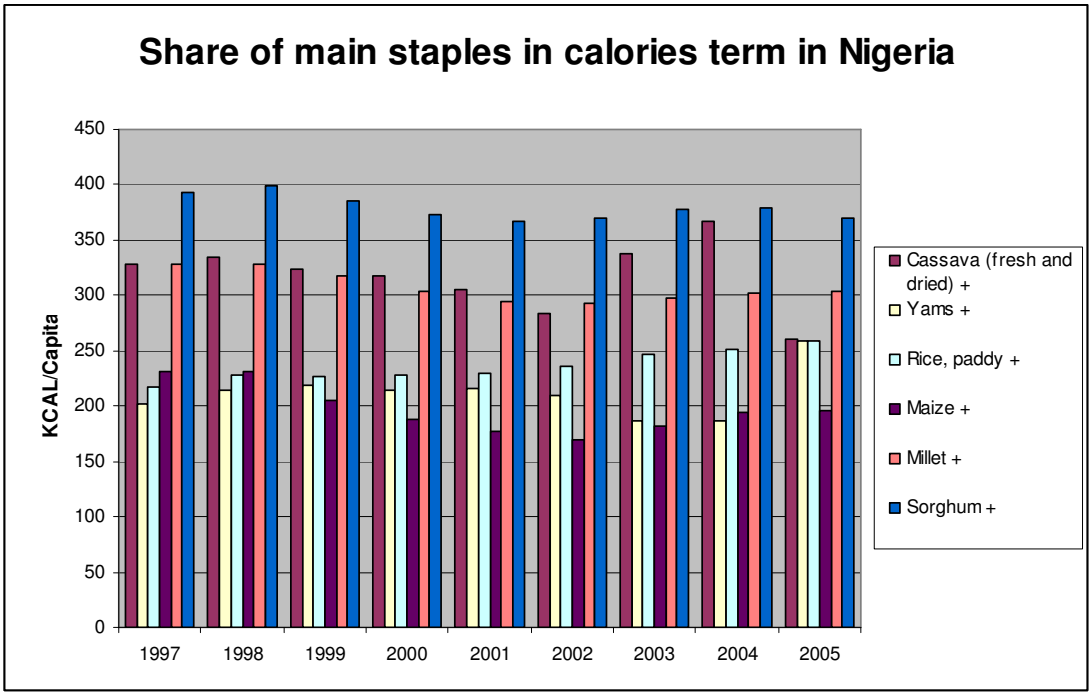

Fig 2: Share of main staples in calories term in Nigeria

Compared to other West African countries, the demand for rice in Nigeria has been on the increase at a much faster rate (Tables 1 and 2). Whereas Nigeria's per-capita annual consumption of rice in the sub-region (average of 3 kg) was the lowest during the 60s, it has however grown significantly at 7.3% per annum. Consequently, per-capita consumption during the mid 1990's averaged 22 kg and reached 39 kg in 1999-2005 (Table 1). Nigeria's consumption

levels in recent time slightly outweigh that of the rest of West Africa by 1kg (38 kg in 1999-2005). Given the aforementioned the obvious is that above average growth rates in Nigerian per capita rice consumption are likely to continue for some time.

Table 1: Rice production, imports and consumption trends in Nigeria

Indicators	Trend 61 - 75	Trend 75 - 83	Trend 83 - 95	Trend 95 - 99	*Trend 99 – 2005/6	Means 61 - 75	Means 75 - 83	Means 83 - 95	Means 95 - 99	*Means 99 – 2005/6
Nigeria										
Production	8.8	22.0	8.6	2.1	1.8	332, 800	806, 222	2, 306, 794	3, 189, 833	3,662,857
Import	7.4	53.6	-2.2	24.6	21.5	2 036	420 756	334 974	525 307	4,211,023
Self-reliance ratio	0.0	-2.3	2.9	-3.3	1.4	99%	54%	77%	79%	47%
Total consumption	9.8	21.6	6.4	15.7	4.6	178, 199	833, 640	1, 599, 609	2, 248, 113	7,873,880
Per capita consumption	7.0	18.3	4.6	12.8	3.5	3	12	18	22	39

Source: FAO

* (Note): Figures in this column are projected estimates and should be interpreted with caution.

Table 2: Rice production, imports and consumption trends in the rest of West Africa

Indicators	Trend 61 - 75	Trend 75 - 83	Trend 83 - 95	Trend 95 - 99	*Trend 99 – 2005/6	Means 61 - 75	Means 75 - 83	Means 83 - 95	Means 95 - 99	*Means 99 – 2005/6
West Africa without Nigeria										
Production	3.7	-0.8	3.6	5.2	6.8	1779376	2344073	2822635	4 041 384	5 326 414
Import	3.0	21.6	4.2	6.3	7.9	416183	894073	1760884	2 107 146	3 008 090
Self-reliance ratio	0.0	-7.4	0.0	3.3	2.7	65%	56%	42%	50%	47%
Total consumption	3.8	7.5	3.8	5.8	5.6	1178753	1950821	2973885	3 985 721	5 414 860
Per capita consumption	1.3	4.7	0.6	1.7	2.2	21	27	30	34	38

Source: FAO

* (Note): Figures in this column are projected estimates and should be interpreted with caution.

Although total rice production has increased over the last two decades, the increases have not been sufficient to meet the increasing demand from the rapidly growing population. Mean annual paddy production increased from 332,800 metric tons during the period 1961-1975 to 3,189,833 metric tons during 1995-1999 with most of this increase attributed to expansion in land area. The inability of satisfying national rice requirement through domestic production has resulted in considerable imports which today stand at about 800,000 metric tons yearly (RIFAN, 2006). Rice imports increased from 2036 to about 687,925 metric tons in the periods 1961-1975 and 1995-1999 respectively (Maclean et al., 2002). Nigeria is spending annually about US$300 million on rice imports alone which she procure on the world market. For instance in 1998 the value of rice imported into Nigeria was estimated at US$ 259 million. Trend figures (Figure 3) also indicates that rice imports which where less significant in the 60s and early 70s took a dramatic turn in 1977 as more than 300, 000 metric tons were imported. There was a significant drop from 1985 when rice imports was banned. This was however short lived as rice imports began to rise again in 1991 though through illegal means (or routes). Major importation of the commodity did not occur until after the lifting of the ban in 1995. In addition, Nigeria's self sufficiency profile has varied over the years. The share of domestic production which accounted for nearly 99 percent of rice consumption between 1961 and 1975 continued to decline as imports increased. The import expenditure tends to follow the trend in imports over the years. In the last few years Nigeria spent about US $4.9 million annually on rice imports alone.

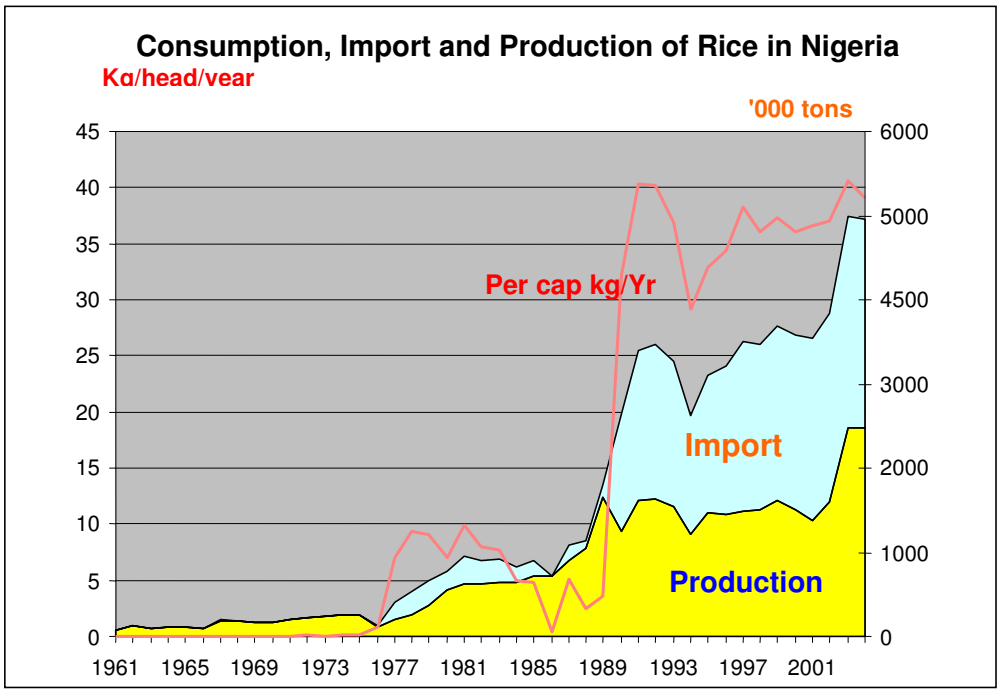

Fig. 3: Consumption, import and production of rice in Nigeria

2.3 Nigeria's rice economy and challenges in a competitive world

Nigeria is the world's second largest rice importer, spending annually for the last three decades over US$170 million on rice imports alone. It imported about 2.1 million tons of rice in 2004 and 2.3 million tons in 2005. Beyond its large volume, the Nigerian rice market is said to be more attractive than other West African markets because it imports rice of high value (parboiled rice) against rice of lower quality in the other countries of the sub-region. Considering its agricultural potential, why then should Nigeria import such vast quantities of rice?

Several factors can be (have been) adduced as limiting Nigeria's rice agricultural potentials. In the domestic front, poor quality and unreliable supply of local rice are the two major problems faced by rice consumers in Nigeria, where rice consumption over the last three decades has grown at an unprecedented rate of over 10% per annum—faster than anywhere else in the world. Although rice production in Nigeria has boomed at the rate of over 9% per annum over the last three decades, largely as a result of expansion in rice area, the production cannot match the soaring demand. The shortfall is overcome by large-scale imports. In spite of several policies formulated by government over the years to govern the course of rice, decisions have remained inconsistent, oscillating between open to protectionist policies. For example, there was an effective ban on rice imports from 1986 to the mid-1990s. Since 1995, rice has been allowed to be imported, but with varying ad-valorem duty, ranging from 50 to over 100%. Akpokodje et al. (2003) opined this policy inconsistency to be counterproductive as it hinders the capacity of all stakeholders to develop a long-term strategy for rice.

Further compounding this issue is the trade policy impact of the U.S rice industry. According to Oxfarm journal () the U.S. market for imported rice is virtually an open-border market, with U.S. tariffs on rice imports almost non-existent. The U.S. rice industry supports the elimination of all rice duties in other importing countries, and equitable tariff treatment for all types of rice. Despite the general continuing trend towards market liberalization, rice outside the United States has remained among the most protected agricultural commodities. The level of government intervention in the international rice market through trade barriers, producer supports, and state control of trade, is unprecedented and substantially higher than for any other grains or oilseeds. For example, about 75 percent of rice grown (long grain) in the US is backed by heavy subsidies and it is dumped into many developing countries of Africa, East

Asia, and Latin America, which are seeking to promote their own viable domestic sectors. Notwithstanding its position as the third biggest rice exporter in the world, the U.S has 14 percent of the international market, but exports almost half of its production, a far higher proportion than other major exporters which is an ironic (significant) achievement for the USA. Available comparative data show that between the periods 1999 – 2000 – the most recent years, the average costs of growing one tonne of rough rice in Thailand and Vietnam were $70 and $79 respectively while in the US, it cost $188, two and half times as much. In 2003, the nation's crop of 9 million tonnes of rough rice cost farmers $1.8 billion to produce, but they received only $1.5 billion from rice millers in payment for it thus revealing a farm gate price of $140 per tonne for a crop costing $191 per tonne to produce. Additional figures from the Department of Agriculture further show that the U.S. paid its 9,000 rice farms $780 million of subsidies in 2006 (Von Reppert-Bismarck, 2006). The sustenance of this absurd situation has only been made possible through government subsidies to the rice sector. Also between 2000 and 2003, it cost, on average, $415 to grow and mill one tonne of white rice in the US. However, this rice was exported around the world for just $274 per tonne, dumped on developing country markets like that of Nigeria at a price 34 percent below its true cost. Such dumping reduces prices for developing country exporters and for small holders in importing countries, in addition to deepening and prolonging depressions in world market prices.

The collapse of the 2006 summer global talks at the WTO have reduced the chances that rich countries will cut agricultural subsidies and that others, will reduce their import tariffs thus darkening the outlook for agriculture in the developing countries of Africa, Latin America and Asia. The fact of the matter is that subsidies are a scourge for poor farmers in developing countries like Nigeria because they make it more difficult for poor farmers to compete, increasing poverty and in some instances, driving migration out of the agricultural sector. Critics say U.S. and European subsidies depress world rice prices and make it harder for Africans farmers to compete. This is one of the key reasons why a successful conclusion of trade talks is so important. Defenders of farm payments say U.S. rice farmers, faced with rising exports from Thailand and Vietnam, would go out of business without subsidies. U.S. aid also helps poor consumers buy cheap staples.

Rising world price of rice also poses a serious challenge to Nigeria's rice sector as the country is likely to spend more of its foreign exchange earning on rice imports if it has to overcome the shortfall. Except something drastic is done, to reduce rice import to the barest minimum

the continued dependence on imported rice stands as another key constraint to development in the rice sector. Available statistics indicates that price of rice is on the rise in recent time and it is likely to double in value to almost US$20 per 100 pounds from US$9.90 over the coming years. Prices have jumped 48% in the past years, outpacing the 19% increase in wheat futures and the 8.3% gain in corn. The New Zealand Herald (2006) identified certain factors as being the cause of the recent phenomenon. Firstly, China, the biggest consumer, and Vietnam, among the biggest exporters, have continued to plough under their paddies because of on gong developments in these countries to build roads, apartments, factories, and towns. Thus, the world's supply of rice is likely to shrink. A survey conducted by China's Ministry of land and resources found that China has lost eight million hectares, or 6.6 per cent, of its farm land in the past decade, and that growth in harvests are curbed by the cost of fuel and shortage of land. Secondly rice inventories worldwide are already near a 26-year low and will drop further, as acknowledged by US Department of Agriculture. According to the departments' forecasts, the quantity of unsold rice in year 2006 was barely half the level of 2000's surplus, reducing the buffer against a crop failure. In addition, fertiliser and irrigation costs are rising with energy prices, and farmers are turning to cheaper-to-grow grains, fruits and vegetables. Whereas the world's population is increasing, yields are not rising as quickly as the increase in population. This is an indication of the tightness of the world stock of rice. Even in the US, the demand for bio-gas as alternative fuel is causing most farmers to replace their rice field with maize crop- a prime source of bio-gas thus compounding further the reduce stock of rice. Lastly with the resurgence of El Niño, a large-scale abnormal warming of the sea surface off the South American coast, major weather fluctuations are under way or imminent in many parts of the world. These weather fluctuations which expectedly could lead to sizable food production shortfalls also threatens to reduce rice harvests and deterioration in food security in many parts of the world. The last strong El Nino in 1997 and 1998 led to record imports by Indonesia, the third-biggest producer and consumer. Weather conditions in recent time have continued to vary unpredictable with most rice exporting countries experience one weather disaster (floods drought) or the other which is bound to have a negative impact on world production. The prospect of reduced production threatens to spur inflation in rice-importing nations from the Philippines to Nigeria, while driving up costs for manufacturers. Therefore, it is necessary that policies and technologies should be developed to effectively prevent or counter the negative productivity effects of aforementioned seniors especially on the Nigeria rice sector. Failure by the public sector to act, and failure by the market and the private sector to respond, could result in significant long-terms effects on domestic rice supply.

2.4. Rice production systems in Nigeria

Rice is grown over a wide range of edaphic and ecological conditions which are present in all of Nigeria's four major agro-ecological zones - The forest, Guinea and Sudan savannah and Sahel zones- but at varying degrees with rainfall diminishing along a South-North gradient (Adedipe et al., 1996). To formulate a national strategy and action plan for increasing rice production, due cognizance of the wide varying conditions across agro-ecological zones must be made. Types of rice production systems prevalent in Nigeria include rainfed upland, rainfed lowland and irrigated lowland (see Table 3). Other less common rice production systems include deep water and mangrove rice (Singh et al., 1997). Rice farms tend to be small-scale, averaging one to two hectares

Rain fed upland rice accounts for 30% of the total rice growing area in Nigeria. Rice under this system is directly seeded in non-flooded, well drained soil on level to steeply sloping fields. Because the system relies on rain as the only source of water, production is generally limited to areas with more than 1,300 mm of annual rainfall. Compared to the north, yields are said to be slightly higher in the south (where upland rice is mostly predominant) due of better rainfall (UNEP 2005) and the average yield of the rainfed upland rice is 1.7 tons/ha (see Table 2). Upland rice is typically intercropped with vegetables, maize, yam or cassava various among others while farming operations are generally manual. Ofada is the traditional variety cultivated by broadcast and harrowed in with a hoe at the onset of rains in early April after land preparation between the months of December and March. Areas were the bulk of upland rice cultivation occur include-Ogun, Ondo, Oyo, Edo and Delta states repetitively.

As the most significant rice production system, the rain fed lowland rice accounts for approximately half of Nigeria's total rice area. Expansion in the lowland rice system appears to have been a major source of the rapid increase in paddy production in recent years (FAO, 2001). Under this system, rice is seeded directly or transplanted in the soil on level to slightly sloping fields with variable depth and duration of flooding depending on rainfall. The system is found mainly along the flooded river valleys of Niger Basin, Kaduna Basin, Benue Basin of the Northern states and some areas in the Southern (Eboyin and Cross Rivers States) part of Nigeria. Most of these areas are often characterised by flooded river banks and Fadamas during the rainy seasons which last for 4-5 months with no water control. Only one crop is

planted each year and the average yield is about 2.2 tons/ha. Fertilizers and improved seeds are among the new technological innovations being introduced into the production system.

Table 3: Main Features of Nigerian Rice Production Systems

Production systems	Major states of production	Estimated share of national rice area	Average Yield (ton/ha)
Rainfed upland	Ogun, Ondo, Osun, Ekiti, Oyo, Edo, Delta, Niger, Kwara, Kogi, Sokoto, Kebbi, Kaduna and Benue states	30%	1.7
Rainfed lowland	Ondo, Ekiti, Delta, Edo, Rivers, Bayelsa, Cross River, Akwa Ibom, Lagos, all major river valleys, e.g., shallow swamps of Niger basin, Kaduna basin and inland swamps of Abakaliki and Ogoja areas	47%	2.2
Irrigated	Niger, Sokoto, Kebbi, Borno, Benue, Kogi, Anambra, Enugu, Ebonyi and Cross River states	16%	3.5
Deep water / floating	Flooded areas of Rima valley-Kebbi state and deep flood areas of Ilushi, Delta state	5%	1.3
Mangrove Swamp	Ondo, Ekiti, Delta, Edo, Rivers, Bayelsa, Cross River, Akwa Ibom Lagos	1%	2.0

Source: Akpokoje et al (2003)

Irrigation rice systems account for 16% of total rice area in Nigeria and include both large-scale irrigation schemes in the north and small-scale developed inland valley bottoms in the south (Akpokoje et al 2003). The system covers lowlands with good water control, enabling two crops per year and yield's an average of 3.5 ton/ha. Other forms of rice production systems include the deepwater flood plains and the mangrove swamp. Two types of deepwater flood rice production systems are found in Nigeria and they include the deepwater rice growing system with flooding of 60 -100cm deep and floating rice growing system with flood exceeding 100cm. These increasingly marginalized systems (limited area and production figures) are found along the Sokoto-Rima valleys and some other flood plains (Fadamas) in the northern part of Nigeria. On the other hand, the mangrove swamp rice production system found on coastal areas where the ocean inundates the land is said to have a salt-free growing period especially during the rainy season when freshwater flooding washes the land and displaces the tidal flows (Akpokoje et al 2003 and UNEP 2005). Areas where this system is commonly found include the Niger Delta – particularly in the deep flooded

areas of Lagos, Ondo, Cross Rivers and Rivers states. While this system holds a great potential for rice cultivation in Nigeria (has higher soil fertility compared to other ecologies), high labour costs associated with clearing and potential negative environmental impacts arising from oil exploration activities pose major constraints to further area expansion.

2.5. **Nigeria's rice policy and its impacts on the rice sector**

Over the past two decades and a half, Nigeria has employed various policy instruments chief of which is the trade policy in tackling the poor state of her rice industry. Instruments such as tariff, import restrictions, and outright ban on rice import have often characterized Nigerian rice policy at various times in an inconsistent fashion that shows, shifting between open and protectionist trade policy (see Table 4). Such changes hinder the ability of stakeholders to develop long-term strategies. While trade policy has been viewed as the only option for developing the rice sector, there has been a lack of policy to take advantage of the protection and enhance the domestic sector's efficiency (see Akpokodje et al. 2001, Daramola, 2005 for detailed documentation of various policy issues and trends). To address this issue therefore, the federal government in 2001 came up with an initiative called the presidential initiative. The initiative which was designed to bring about increased rice production, processing and export has four components, namely:-

i. Production, inputs and crop protection;
ii. Irrigation and land development
iii. Processing and marketing; and
iv. Project management.

One major drive to the accomplishment of the presidential indicative has been the employment of the tariff mode of trade policy instrument by government. Emerging evidence in the rice industry indicated how the recent rice policies adopted by Nigeria as part of the Presidential Rice Initiative have boosted the country's rice sector. For example, the increase in awareness, productivity per hectare and area under rice cultivation, through the introduction of high yielding varieties of rice and the R-Box technology resulted in Nigeria producing almost 4 million tonnes of rice in 2006, 10% above the 2005 level (WARDA, 2007). Moreover, Nigeria was able to reduce its rice imports in 2005 by over 800,000 tonnes, thanks to the strong measures taken by the government to increase domestic rice production and decrease rice imports. The government protectionist policy of 100% increase in tariff and

10% surcharge has also helped in tow ways- making the price of imported rice higher, while the local rice remains relatively cheaper and thus more favoured by low income groups. The Central Bank of Nigeria had informed earlier in a RIFAN/CBN-organized seminar, that 578 million US. Dollars worth of rice was imported in 2002. However, the pattern which has been in existence for long, is fast changing as can be seen in improved agronomic practices and increased farmer-awareness regarding economic benefits inherent in rice production: using new improved rice varieties and applying modern techniques of rice production for which local rice farmers now boast of not less than 4-5 tons per ha (RIFAN, 2006). The latest figure released during the first national conference on '*harmonization for sustainability of self-sufficiency in rice production'* held in Abuja, show that by November 2005 locally produced rice stood at 4.2 million metric tons leaving a gap of 800,000 metric tons to fill the vacuum created by domestic demand (see Table 5). This pattern of development is a positive achievement as it reflects on the reduced drain on the nation's foreign reserve.

Table 4: Nigeria's trade and fiscal policy on rice 1966 – 2006

Sub-periods	**Policy measures**
1966 - 1978	- Producer Price support - Strategic Grain Reserve Scheme - Fertilizer subsidies seeds, inputs - 66.6% tariff (1974) - 10% -20% tariff (1975-78) - Imports in containers under 50kg were banned and Imports under
	restricted license only by government agencies; Six months ban on all rice imports (1979)
1979 - 1983	- Imports under restricted license only (both for restricted and non-restricted quantities:-1979, 1980) - PTF commenced issuing of allocations to customers and traders in addition to those issued by NNSC
1984 - 1998	- PTF disbanded. Rice importation placed under general licence restrictions (1984) - Importation of rice (and maize) banned (1985) - Introduction of SAP and the abolition of Commodity Boards to provide production incentives to farmers through increased producer prices - Fertiliser subsidy removed (Akinsorotan (2000) and Idachaba, (2000) - 100% tariff (1995) - 50% tariff (1996-98)
1999 - 2006	- 50% tariff (1999) - 50% tariff (2000) - 85% tariff (2001) - 100% tariff (2003) - 115% tariff (2004) - 150% tariff (2006) and multiplication and distribution of certified rice seed (N1.5 billion) project

Table 5: Rice production in Nigeria 2002-2004

Year	Local Rice Demand in Metric Tonnes	Local Milled Rice Production I Metric Tonnes	Imported Rice in Metric Tonnes	Exportation of Local Rice to West Africa Sub-Region (MT)
2002	5,000,000	3,000,000	2,000,000	Nil
2003	5,000,000	3,800,000	1.200,000	Nil
2004	5,000,000	4.200,0000	800,000	Nil

3. Competitiveness of Nigeria's rice

3.1 Competitiveness of Nigeria's rice production systems

Although most studies (Dramola, 2005; Erenstein et al, 2004; Akpokodje et al, 2001) have indicated that Nigerian rice industry is not competitive, closer looks at the production systems within the industry have proved otherwise. More often than not the failure or incompetence of a sub-sector within the rice industry is used to generalize for the entire industry. Some of the reasons often advanced for the poor competitiveness of Nigeria's rice industry include: high inputs costs like cost of credit, and imported equipments, agrochemicals due to taxes (legal and illegal), tariffs and duties; problem policy instability (ban, unban, tariffs) that makes decision-making and planning highly uncertain and put investments at great risk; and the serious effect of the `Dutch disease' within the Nigerian economy dating back to the oil boom of the early 70s and the consequential `crowding out' of investments and `out-migration' of production factors from Nigerian agriculture. All these factors combine with discriminatory policies against agriculture to make the environment for agricultural production and agribusiness unfavorable and uncompetitive. Other unattractive conditions include low technology base (mechanization), decaying infrastructure, high interest rates, weak institutions (such as poorly-funded research institutes, public extension system, and seeds certification), and corruption-ridden fertilizer distribution system and low public sector investments in agriculture. These constraints notwithstanding, Nigeria's rice industry seem to show some level of competitiveness (especially the production systems) when compared with major producers both within and outside Africa. The following section critically examines the competitiveness of the different rice production systems in Nigeria and their competitiveness relative to major world producers.

3.2 **Profitability of rice production systems in Nigeria**

One of the hallmarks of marginal analysis is its use in comparing marginal benefits and costs for the purpose of achieving goals. The approach is employed in investigating resource allocation problems in order that better economic decisions can be made about investment in any income yielding activity. A major economic criteria of any production system is it the profitability. Consequently the profitability assessment of the various rice production systems in Nigeria will be most ideal in setting the stage for a proper investigation of competitiveness of the different rice ecologies. Because rice is a lifeline for several rural and urban poor families it is therefore necessary to assess if returns made by producers in rice production is sufficient to help them live above the country's poverty line status or not and the implications for future production of the commodity.

Several studies (Olagoke, 1991; Okorji and Onwuka, 1994; Nwoye, 1997; Kebbeh et al. 2003; Lançon et al. 2003 and Akpokoje et al 2003) have carried out the estimations on the profitability of rice production systems in Nigeria. This paper draws from results of these studies to assess the competitiveness of the different rice ecologies and production systems. Necessary adjusts (i.e. for inflation) were however made on the various cost and return values of production systems obtained from these studies to reflect the true situation of the commodity in recent time. The average national yield given by Akpokoje et al. (2003) for different rice ecologies was also used to estimate the returns accruing to each production system. Two types of profitability analysis were carried out. The first showed the competitiveness of production across the rice ecologies for unprocessed paddy while the second showed competitiveness of production systems for processed paddy rice. Tables 6 and 7 presents the average production costs, and returns with and without processing for the various rice production systems. Table 6 indicates that the highest net return was obtained from irrigated fields which had average return of ₦ 105, 669 per ha. This was followed by the swamp field, lowland filed and upland field with returns of ₦ 72,743, ₦ 58,966 and ₦ 32,404 per ha respectively. The irrigated production system was also found to be cost effective as the cost of production per ton was much lower than those of the other production systems by about 13 % (lowland field), 33 % (upland field) and 39 % (swamp field). Similarly both the returns to investment and net returns per capita for the irrigated ecology were higher than those of the other production systems. All the production systems however have positive returns to investment thus indicating that the various ecologies are profitable. The same trend in returns and costs

(although higher) was also observed for the production systems on Table 7 which included processing cost. However the table shows a drop in returns per farm for various rice ecologies due to the inclusion of processing cost. Whereas all the ecologies (except upland ecology) had higher net return than that of national average their costs per ton were lower (except for swamp ecology) of the national average which was about ₦ 41,000 per ton.

Table: 6. Marginal analyses of rice production systems (without processing) in Nigeria (N/ha)

Items	Upland	Lowland	Irrigated	Floating water/Swamp	All ecologies
Output (tons/ha)	1.7	2.2	3.5	2.0	2.3
Output (N/ha)	81,851	105,925	168,518	138,024	122,922
Operating costs (N/ha)					
Material inputs					
-Seed	3,749	3,749	3,852	12,839	6,959
-Fertilizer	4,134	4,134	4,455	10,272	15,872
-Insecticide	1,875	1,875	2,003	2,003	1,939
-Herbicide	5,084	5,084	5,161	5,161	5,123
-Water charges	-	-	2,088	-	2,088
-Machine-hiring	-	-	-	-	-
Labour input					
-Nursery preparation	642	642	668	668	655
-Land preparation	8,217	8,217	9,154	5,521	8,084
-Transplanting	4,160	4,160	4,853	2,344	3,983
-Fertilizer/chemical application	1,746	1,746	1,900	1,385	2,273
-Weeding	4,635	4,635	5,662	3,338	4,707
-Bird scaring	2,247	2,247	2,247	3,410	2,562
-Harvesting	3,903	3,903	3,698	2,440	3,548
-Gathering	1,849	1,849	2,106	899	1,875
-Threshing	514	514	539	514	570
-winnowing/bagging	770	770	1,078	899	969
Total operating cost	43,526	43,526	49,466	51,692	61,205
Fixed costs (N/ha)					
-Land charges	2,568	2,568	15,549	9,058	7,436
-Depreciation	2,979	2,979	3,004	3,004	2,992
-Opportunity cost of capital at 21%	8,833	8,833	12,243	11,476	12,894
Total fixed cost	14,380	14,380	30,796	23,539	23,321
Gross margin	46,784	73,345	136,466	96,282	72,975
Total cost	57,905	57,905	80,262	75,232	84,526
Net return	32,404	58,966	105,669	72,743	49,654
Net returns per capita	5,401	9,828	17,612	12,124	8,276
Cost per ton/ecology	34,062	26,321	22,932	37,616	36,751
Returns to investment	1.56	2.02	2.32	1.97	1.59

Table: 7. Marginal analyses of rice production systems (with processing) in Nigeria (N/ha)

Items	Upland	Lowland	Irrigated	Floating water/Swamp	All ecologies
Output (tons/ha)	1.7	2.2	3.5	2.0	2.3
Output (N/ha)	90,309	105,925	168,518	138,024	122,922
Operating costs (N/ha)					
Material inputs					
-Seed	3,749	3,749	3,852	12,839	6,959
-Fertilizer	4,134	4,134	4,455	10,272	15,872
-Insecticide	1,875	1,875	2,003	2,003	1,939
-Herbicide	5,084	5,084	5,161	5,161	5,123
-Water charges	-	-	2,088	-	-
-Machine-hiring	-	-	-	-	-
Labour input					
-Nursery preparation	642	642	668	668	655
-Land preparation	8,217	8,217	9,154	5,521	8,084
-Transplanting	4,160	4,160	4,853	2,344	3,983
-Fertilizer/chemical application	1,746	1,746	1,900	1,385	2,273
-Weeding	4,635	4,635	5,662	3,338	4,707
-Bird scaring	2,247	2,247	2,247	3,410	2,562
-Harvesting	3,903	3,903	3,698	2,440	3,548
-Gathering	1,849	1,849	2,106	899	1,875
-Threshing	514	514	539	514	570
-Winnowing/bagging	770	770	1,078	899	969
-Processing	6,112	7,909	12,583	7,190	8,267
Total operating cost	49,637	51,435	62,048	58,883	69,474
Fixed costs (N/ha)					
-Land charges	2,568	2,568	15,549	9,058	7,436
-Depreciation	2,979	2,979	3,004	3,004	2,992
-Opportunity cost of capital at 18%	9,933	10,257	14,508	12,770	14,382
Total fixed cost	15,480	15,803	33,061	24.833	24,809
Gross margin	40,672	65,436	123,883	89,092	64,706
Total cost	65,117	67,238	95,110	83,716	94,283
	(512.7)	(529.4)	(748.9)	(659.2)	(742.3)
Net return	25,192	49,633	90,822	64,259	39,897
Net returns per capita	4,199	8,272	15,137	10,710	6,650
Cost per ton/ecology	38,304	30,563	27,174	41,858	40,993
	(301.6)	(240.7)	(214.0)	(329.6)	(322.8)
Returns to investment	1.39	1.74	1.95	1.77	1.42

Note: figures in parenthesis are dollar equivalents of the cost of production per ha and per Ton. (Exchange rate in 2006 was ₦ 127 to $ 1).

Further analysis show that the returns per capita for the various rice ecologies were also positive with the highest return (about ₦ 15,000 per capita) obtained in the irrigated system of rice production and the lowest (about ₦ 4, 000 per capita) form the upland system. Table 7 indicate that returns per capita from the irrigated, swamp and lowland rice production systems were 3.5, 2.5 and 2 times (respectively) that of the upland rice system.

3.3. **Competitiveness of rice production in Nigeria relative to major producers**

Global rice economy has in recent times witnessed a lot of market dynamics so strong that the worlds known traditional leaders in the trade have felt the pressure thus leading to re-assessment of role and positions of such nations in the world rice economy. Hence, for any assessment of rice production potential in Nigeria and indeed the West African sub region to be tenable, the dynamics in the world market needs to be adequately put into consideration. Tables 8 and 10 gives comparative yield and production cost estimates of rice production for Nigeria, the traditional world producers of the commodity and other major rice producers in Africa for periods between the 80s and 90s.

The yield figures in Table 8 indicated that rice productivity in Nigeria rank lowest among the given countries in contrast to the cost of production which rank highest (with the exception of USA). Relatively, rice yield in Nigeria in the period 1997 when all systems are pulled together is about 1.4 time the yield values of Thailand, India and Pakistan; 2.4 times the yield values of Vietnam and Indonesia and 3.9 times the values of China and USA. This perhaps is an indication of the efficiency of some of the prevailing production systems. One could however wonder the justification for the high cost incurred in rice production, which could be attributed to the high dependence for manual labour (especially for land preparation and bird scarring) and consequently higher labour cost characteristic of agriculture dominated by smallholder farmers. Worsening the situation is even the low level of productivity which could in turn be taken as indicative of the level of technological development as strong link has been established between improved productivity and technological advancement in agricultural production.

Table 8: Average yield and cost of rice production systems in Nigeria relative to major world producers (1980-97).

Ecology		Nigeria	Thailand	Vietnam	India	Pakistan	Indonesia	USA	China
IRR	Yield	2.18	3.93	3.51	3.99	2.56	5.85	5.89	5.9
	Cost/ha	560	310	232	304	225	281	879	539.7
	Cost/T	257	79.3	66	77	91.5	48.4	150	91.5
RFL	Yield	1.96	1.39		2.4		3.51		
	Cost/ha	451	122		313		277		
	Cost/T	230	88		135		77		
UPL	Yield	1.71			1.7				
	Cost/ha	430			141				
	Cost/T	252			84				
All	Yield	(1.60)	(2.26)	(3.76)	(2.84)	(2.88)	(4.40)	(7.13)	(6.23)

Source: Adapted from FAO (2000) rice information Vol. 2.
Note: Figures in parenthesis are yield values for the year 1997.

Table 9: Average of land allocated to the different rice ecologies in Nigeria relative to major world producers of rice (1980-97).

Ecology	Nigeria	Thailand	Vietnam	India	Pakistan	Indonesia	USA	China
IRR (%)	14.3	23.1	47.9	43.7	100	56.6	100	92.8
RFL (%)	18.6	66.2	35.0	35.6	-	26.3	-	5.2
UPL (%)	56.3	4.5	7.9	14.7	-	9.1	-	2.1
Others %	10.8	6.2	9.2	6.0	-	8.0	-	-

Source: Adapted from FAO (2000) rice information Vol. 2.

The effect of Nigeria's low level of productivity in rice is reflected in the average cost/ton of about $246, which ranks among the highest, behind USA. Although the cost/ha was highest for rice production in USA, this was however compensated for by the high level of productivity of the American rice fields which consequently brought the cost/ton considerably to $166/ton consequently lower than the Nigeria's figure of $257/ton (Table 8). However recent figures of the world markets and trade data obtained from FAS (2006) an affiliate of USDA seem to indicate a different picture with respect to cost of production per ton of rice for most of the leading world rice producers. The 2006 average freight on board (FOB) prices for India, Vietnam, Thailand, and USA were quoted as being $263 (5%), $265 (5%), $318 (100B) and $379 (long grain #2/3 and $475 for US #1/4 medium grain) respectively. Comparing these figures with Nigeria's 2006 production cost/ton figures for the irrigation production system ($214) and all the ecologies pulled together ($323) in Table 7, the obvious is that Nigeria's rice competes favourably with those of the major world producers. The fact

that the proportion of land used for irrigated rice production is small (see Table 9) compared to other systems is not a limitation to Nigerian's capacity and/or potential of becoming one of the leading producers of rice in the West Africa sub-region and world should all efforts and appropriate policy be put in place.

The trend relative competitiveness of Nigerian rice among producers in the African region show Nigeria's rice as being less competitive in productivity especially with the irrigated system of production but cost (per HA) competitive in comparism with countries like Ivory coast, and Senegal in irrigated rice ecology (Table 10). Table 11 indicate that the proportion of land used by these countries (Nigeria, Ivory Cost, Mali and Senegal) where far less (range between 5 – 30%) than what was used by Egypt (100%). Invariably, the main focus of any strategies for expanded production in these countries and particularly Nigeria should adequately consider most importantly raising the productivity beyond the present level to compensate for the high cost presently been incurred. Raising productivity apart from cultivating high yielding improved variety should also consider appropriate mechanism for minimizing loses through bird invasion. One notable technique used in China is the synchronization of planting among farmer groups such that rice is planted around the same time so that the risk even out more to allow for minimizing loss per field. Another should be increased investment in irrigated rice schemes as major producing countries have capitalized on this technology in increasing yield and productivity.

Table 10: Average yield and cost of rice production systems in Nigeria relative to major rice producers in Africa (1980-97).

Ecology		Nigeria	Ivory Cost	Mali	Senegal	Egypt
IRR	Yield	2.18	3.35	3.93	4.86	5.28
	Cost/ha	560	607	472	841	261
	Cost/T	257	192	134	172	49
RFL	Yield	1.96	1.32	2.4	1.67	-
	Cost/ha	451	369	282	224	-
	Cost/T	230	272	141	124	-
UPL	Yield	1.71	-	-	1.15	-
	Cost/ha	430	-	-	186	-
	Cost/T	252	-	-	142	-
All	Yield	1.60	1.26	1.56	2.14	8.17

Source: Adapted from FAO (2000) rice information Vol. 2.

Table 11: Average of land allocated to the different rice ecologies in Nigeria relative to major producers of rice in Africa (1980-97).

Ecology	Nigeria	Ivory Cost	Mali	Senegal	Egypt
IRR (%)	14.3	5.0	28.9	29.6	100
RFL (%)	18.6	9.8	17.6	50.0	-
UPL (%)	56.3	85.2	3.5	11.4	-
Others %	10.8	0	9.0	9.0	-

Source: Adapted from FAO (2000) rice information Vol. 2.

4. Nigerians' rice sector and transformation for food security and poverty reduction

4.1 Nigeria's poverty status and the likely impact of the rice sector

The issue of poverty has become a significant phenomenon that can not be wished away particularly in sub-sharan Africa where the greatest proportion of the world's poor people reside. Compared to Asia, it is obvious that little, if any progress has been made in reducing poverty in sub-Saharan Africa, where the number of people living on less than one dollar a day (the internationally approved definition of absolute poverty) has doubled over the past 20 years (World Bank, 2004a).

Historically, rates of poverty reduction have been very closely related to agricultural performance – particularly to the rate of growth of agricultural productivity. In simple terms, this indicates that the countries that have increased their agricultural productivity the most have also achieved the greatest reductions in poverty. This wouldn't have come but through better coherence in government policies affecting development. Key policy areas with potentially strong poverty reduction impact include debt relief, trade, investment, agriculture, the environment, migration, health research, security and arms sales.

Nigeria suffers from high levels of poverty and rising inequality in spite of her enormous wealth of human and material resources. Apart from convincing evidence, which suggests that, the country belongs to the group of the lower-income countries (GNP per capita of $US269 at PPP in 2000), the incidence of poverty continues to rise at each passing day. Thus, poverty incidence that was just 28.1% in 1980 rose to 46.3% in 1985. The incidence of poverty dropped minimally to 42% in 1992 only to rise to 68.9% and 70% in 1996 and 2000 respectively (Obadan, ?). The implication of this incidence of poverty for Nigeria is that about

96 million Nigerians are languishing in poverty out of an estimated population of about 140 million (2006 population estimate for Nigeria). The increasing incidence of poverty, both within and among locations, was in spite of various resources and efforts exerted on poverty-related programmes and scheme in the country, thus suggesting that the programmes and schemes were ineffective and ineffectual. In the light of the government's deep concern for the widespread and scourging poverty in recent times, a number of progammes and measures aimed at creating economic opportunities in various forms and reducing poverty have been put in place and well documented in the National Economic Empowerment and Development Strategy (NEEDS) (See IMF, 2007 country report no. 07/270). The conceptual issues on NEEDS/SEEDS are based on four goals including:- poverty reduction; wealth creation; employment generation and value addition. However in pursuance of the NEEDS programme the government came up with the presidential initiative on rice production, processing and export which was designed to reverse the rising import bill, which stood at N96.012 billion in 2002 to meet domestic demand by 2006 and export by end of 2007. By 2007, it is expected that 3.0 million hectares of land would be put under cultivation to produce about 15 million tones of paddy or 9.0 million tones of milled rice (See Nigeria's National report in ICARRD, 2006).

Considering the fact that Nigeria's agricultural sector offers the greatest potential for poverty reduction, job creation, and improvement of the standard of living in the country, it would be of interest to find out how some measure of this could be attained through the rice sector. To do this, estimates on the possible returns per capita for the various rice ecologies were calculated and compared with the value of the countries poverty line status for the period 2004 (NBS, 2006). Although the poverty profile for Nigeria specified three poverty status values for the country which include; ₦23, 733.00 per person per annum for moderately poor (with $1 per day approach this became N21, 608.00); ₦21, 743.00 per annum as absolute poverty line and ₦30, 128.00 per annum for food plus non-food poverty line. This paper nonetheless adopts the ₦23, 733.00 per person per annum for its evaluations.

Despite the positive per capita retunes experienced by the various rice ecologies as shown in Table 7, the obvious is that these returns were well below the one dollar poverty line value approved as minimum survival rate per person in the world. In addition these values were also below the moderate poverty line of Nigeria put at ₦23, 733.00 (based on two-thirds of the average per capita expenditure) per capita per annum. The indications are that the present rice production rates are probably too low to reduce poverty, hence the need to seek alternative

way(s) of bringing about the much expected yield in rice needed to increase the net return per caput above the poverty line.

Several attempts at introducing high yielding rice verities in the country have proved positive, thus showing the likely increasing in rice production that might be achieved if these varieties are adopted by farmers. For instance some varieties such as FAROX 501-B-3-1-2-2, NERICA L36 and L43 and NCRO 48 and 49 have been found to give high grain yield of between 7.9 tons/ha and 8.4 tons/ha in lowland rice PVS gardens in the savannah regions of Nigeria (Nigeria multinational NERICA rice dimension project report, 2006). Similarly varieties like NERICA 12, and 13; and WAB706-12-k2 have also shown high grain yield of between 4.1 tons/ha and 4.4 tons/ha in upland rice PVS gardens in both the savannah and rain forest regions of Nigeria. Given this facts and assuming an average rice yield per hectare of 4.3 ton/ha, and 6.2 tons/ha (average all yield figures) for the upland and the rest of the ecologies respectively, the likely effect is an increase in rice output per unit area. This translates to increase in farmers income and hence reduction in poverty especially in the rice sector. Tables 12 (a & b) and 13 present the simulation results from the assumed yield potential for the three prominent ecologies (upland, lowland and irrigated). Whereas Table 12(a) show the returns for the different ecologies when yields of 4.3 tons/ha and 8.1 tons/ha are obtained by farmers, Table 12(b) gives the returns when adjustments were made on yield (especially lowland). Figures of returns from both tables (particularly Table 12b) indicate that the introduction and/or adoption of the improved rice yielding variety, is likely to significantly increase the net returns per caput of individuals in the rice sector above the value of the poverty line by about 15% to 64% (51% for national average) depending on the ecology practiced (average family size was assumed to be 6 persons per household). Also when cost was increased to accommodate the cost for new technology and its accessories, Table 13 revealed the returns per caput for the different ecologies was still above the values of the poverty line with increases ranging between 6% and 52% (41% for national average). These results are clear indications of the likely impact improved rice variety could have on Nigeria's rice sector. Consequently farmers are bound to experience increases in farm income and hence reduction in poverty.

Table 12(a): Net returns of improved rice production systems in Nigeria (N/ha)

Items	Upland	Lowland	Irrigated	All ecologies
Output (tons/ha)	4.3	8.1	6.2*	6.2
Output (N/ha)	228,430	430,298	329364	361,703
Gross margin	178,793	378,863	267,316	304,463
Total cost	65,117	67,238	95,110	82,049
	(512.7)	(529.4)	(748.9)	(646.1)
Net return	163,313	363,060	234,254	279,654
Net returns per capita	27,219	60,510	39,042	46,609
Cost per ton/ecology	15,144	8,301	15,340	13,234
	(119.2)	(65.4)	(120.8)	(104.2)
Returns to investment	3.51	6.40	3.46	4.41

Source: Derived from Table 4

Note: figures in parenthesis are dollar equivalents of the cost of production per ha and per Ton. (Exchange rate in 2006 was ₦ 127 to $ 1)

** Yield for irrigated ecology is the average of both upland and lowland rice yield (although this could be higher in real sense but for ease of computation we adopt the 6.2 yield value)*

Table 12(b) Adjusted net returns of improved rice production systems in Nigeria (N/ha)

Items	Upland	Lowland	Irrigated	All ecologies
Output (tons/ha)	4.3	4.9**	6.2*	5.1
Output (N/ha)	228,430	260,304	329364	297,530
Gross margin	178,793	208,869	267,316	240,290
Total cost	65,117	67,238	95,110	82,049
	(512.7)	(529.4)	(748.9)	(646.1)
Net return	163,313	193,066	234,254	215,481
Net returns per capita	27,219	32,178	39,042	35,913
Cost per ton/ecology	15,144	13,722	15,340	16,088
	(119.2)	(108.1)	(120.8)	(126.7)
Returns to investment	3.51	3.87	3.46	3.63

Source: Derived from Table 4

** Same as Table 10*

*** Figure for yield of lowland adjusted for case of inefficiency in the system*

Table 13: Adjusted net returns and cost of improved rice production systems in Nigeria (N/ha)

Items	Upland	Lowland	Irrigated	All ecologies
Output (tons/ha)	4.3	4.9**	6.2*	5.1
Output (N/ha)	228,430	260,304	329364	297,530
Gross margin	178,793	208,869	267,316	240,290
+Total cost	76,838	79,341	112,293	96,818
	(605.0)	(624.7)	(884.2)	(762.3)
Net return	151,592	180,965	217,135	200,712
Net returns per capita	25,265	30,160	36,189	33,452
Cost per ton/ecology	17,869	16,192	18,102	18,984
	(140.7)	(127.5)	(142.5)	(149.5)
Returns to investment	2.97	3.28	2.93	3.07

Source: Derived from Table 4

** Same as Table 10*

*** Figure for yield of lowland adjusted for case of inefficiency in the system*

+ Cost was increased by 18% to accommodate cost of new variety

4.2 Nigerians' rice sector and opportunities: a short and medium term policies.

Nigeria's rice sector has gone through a variety of phases, experiencing many development policies and programmes with the advent of various regimes, which paved way for policy instability in the nation. Successive administrations have embarked on several rice policies and programmes with varying degrees of successes and failures. Considering the prime role of agriculture and especially the rice sub-sector in the nation, which among others includes provision of food and fibre, raw materials for industries, market for industrial products, employer of labour and foreign exchange earner, Nigeria can be said to be well endowed as an agrarian nation. Agriculture being the major income source for rural population has however put the rural dwellers in the forefront of most developmental efforts aimed at improving the standard of living of the populace in general. Hence for structural transformation to occur therefore in food security and poverty reduction there must first be successive short run policies of agricultural and particularly the rice sector development to facilitate this transformation. The Presidential Initiative on rice which as launched in 2003, promotes the policy of providing the enabling environment for private sector-led rice production. Rice farmers and processors receive government support through provision of inputs and services at affordable prices as private sector operators. The Presidential Initiative has therefore laying a solid foundation for sustainable rice production and development in Nigeria. However, a lot

still needs to be done in order to make rice production and processing in Nigeria become internationally competitive especially under zero tariff regimes. Since rice production in Nigeria is dominated mostly by small holder farmers with 0.5 - 1.5 hectare per farmer using manual labour for virtually all its operations, the enormity of our national demand, and the need to conserve foreign exchange show clearly that we cannot depend on the level of production by the small holder farmers. Hence, the urgent need to address the production constraints for increasing output to satisfy domestic consumption and even make produce for export become paramount. Making the rice sub-sector more competitive will require therefore a radical transformation in the entire rice chain system. There is need therefore for policy makers to investigate and consider critical issues that hamper the development and advancement of the rice sector. Certain factors/policy issues that could aid and/or enhance the rapid transformation of the entire rice sector are listed as follows for possible investigation and consideration by policy makers.

Trade policy considerations (short term)

There is need to maintain of now some degree of rice protection in order to allow for stability in price structure to facilitate investment decisions of economic agents in rice sector. However protection level should be regularly reviewed and adjusted as necessary based on world price evolution and gain in local productivity and competitiveness from production to processing and marketing. As opined by WARDA (2003), rice imports should not be banned, as they provide a competitive environment needed to continuously mobilize innovation and entrepreneurship for the development of the rice sector.

Input considerations (short term)

Input use also merits further attention. For example fertiliser has long been a highly political input – with varying degrees of subsidy. It remains unclear though how subsidy rates affected actual fertilizer use by farmers – for instance in terms of use rates and availability. Compared to other West African country, fertiliser use still appears relatively widespread on cereals such as rice in Nigeria. Similarly, most poor women lack access to formal markets for credit, agricultural insurance as well as current and reliable environmental information, including extension services, providing advice on ways and means of mitigating and/or ameliorating risks that are associated with agricultural activities. There is the urgent need to address these issues.

In addition some level of intervention (subsidy) over input procurement (e.g. improved seed) is needed to enhance domestic production even if it might be agued that such policy induces some levels of market distortion, thus less preferred to trade policy instruments.

Irrigation considerations (medium term)

The future of lowland systems is in their potential for evolving into (semi-) irrigated systems with considerable yield increases; until some degree of water control is gained. There is a need to assess the viability of irrigated systems especially the small-scale irrigation schemes which might be useful in transiting rain-fed rice systems (especially the lowland) into semi-irrigated systems. Kebbeh et. Al (2003) had earlier observed that in addition to problems with maintenance and operation of large irrigation schemes, there is widespread underutilization of irrigation infrastructure. This observation has important implications for increasing irrigated rice productivity and production in the country. Irrigation development policy should focus not only on improving the performance and efficiency of existing irrigation infrastructure, but on also placing investments on smaller schemes which may be better maintained in terms operational costs.

Uniform varietal seed considerations (short term)

At the farm level, rice varieties cultivated is not high quality or uniform. Hence emphasis should be on promoting domestic rice production with new high yielding improved varieties such as NERICA in order to increase productivity by about 65% (Daramola, 2005). Hence there should be regular dissemination of improved variety to increase yield. This should be supported with advocacy for the cultivation of uniform variety to achieve uniform grains.

Geographical/ecological rice production considerations (medium term)

The present diversity in rice production suggests that there difference in both biophysical conditions and agronomic practices. Hence interventions must be geographically targeted (lowland, upland, irrigated) and strategically structured to respond to major management constraints of current practices, while assisting farmers to transit to higher levels of production and intensification. In addition, there should be dissemination of improved cultural practices and appropriate labor-saving technologies to enhance yield and reduce production costs.

Raising productivity apart from cultivating high yielding improved variety should also consider appropriate mechanism for minimizing loses through bird invasion. One notable technique used in China is the synchronization of planting among farmer groups such that rice is planted around the same time so that the risk even out more to allow for minimizing loss per field. Also the use of bird net may be considered as an alternative technique in reduce loss arising from bird infestation. However the cost implication of such technology will be what investigating to ascertain its cost effectiveness especially for large scale rice farms.

Rice quality considerations (medium term)

Due to multiplicity of rice variety cultivated, there is poor uniformity and low quality of rice produced. This is further exacerbated by poor on-farm parboiling and threshing equipments. There is a complete absence of modern technology for drying the parboiled paddy. Often, drying is done on the roadside, which accounts for the presence of foreign bodies such as stones in the final product. Sun drying in the open does not allow for drying during the rainy season, which also accounts for the low level of milling during that same period. There is need for improved varietal purity and threshing, including low technology options such as hand threshing on a plastic tarp that can significantly improve the quality of paddy, and improved parboiling and drying technologies. This will go a long way in introducing grading and standards for which farmers can be paid higher on the basis of the quality of rice produced. In addition, grading and standards should be linked to the market and should be applied to both domestic and imported rice to help establish nationwide quality benchmarks for the consumers. Although this alone will not create demand for high quality, domestically produced rice, it may gradually replace imported rice over time.

Processing considerations (short/medium term)

The poor state of commercial rice processing in Nigeria has been the bane of obsolete and inefficient processing technologies being used. At the moment, most small rice mills operate at about one ton per hour. This is due to insufficient paddy for processing. In some cases however, the final product contains a high percentage of broken grains and thus sells for a lower price. Another major problem with processing is the non-availability of destoning machines. Even when available, farmers do not commonly use them because of the small volumes they produce. Improving processing can be done through more efficient parboiling

and milling technologies, and establishing clear market grades and standards that are effectively linked to price differentials for higher quality rice. Processors will be able to work with producers and buyers to successfully upgrade, brand and broadly market product at a level similar to that of imported rice.

Stakeholders' considerations (short term)

Lastly there is a need for sensitization of producers, processors, traders and consumers not only on quality (including quality aspects/management and quality rewards) aspect of the domestic rice but on benefits derived by encouraging self-sufficiency in rice production both to the country and the West African sub-region as a whole. The objective therefore will be: (i) to promote Nigerian rice and enhance its trade image; and (ii) to enhance quality management along marketing chain. It is expected that if well organized and executed, this particular strategy is bound to bring about the much desired reduction in poverty.

5. Conclusion

Considerable opportunities to revitalize the Nigerian rice sector abound and the current level of protection of the domestic rice sector provides an opportunity for such development. However, such protection should be seen as a temporary transient measure as it comes not without a considerable measure of social cost. The most sustainable and socially acceptable way forward is to enhance the competitiveness of local rice against imported rice – both in terms of quality and price. This calls for improving quality management and increasing efficiency along the entire marketing chain. The already established Presidential Initiative on rice is a step in the right direction. In view of the fact that the development of the rice sector offers potential opportunities for the Nigerian economy particularly in the areas of income generation and employment in rural and urban areas and thereby revitalize local economies, there is need therefore to carefully balance the interests of rice producers and rice consumers so as to come up with the most socially efficient and acceptable solution for the nation.

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