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The Experience of Farmers under the Rice Value Chain Programme in the Gambia

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ABSTRACT

This study on the assess the nature of the rice value chain programme; the experiences of rice farmers under the rice value chain programme in the Central River Region of the Gambia. The instruments used for data collection was Focus Group Discussion and in-depth interview. Simple random sampling was used to select sixteen (16) villages out of which three hundred and eighty-four (384) farmers were used for the study. The data collected were transcribed for all the focus group comments, the comments were rearranged to have answers grouped together for each interview protocol. The main ideas were organized into themes to generate an idea or ideas and quotations were identified for each theme. The findings were written in narrative to describe the themes with quotations. Regarding the quantitative analysis, simple descriptive statistics including frequency and percentages were used for the surveyed data collected from the rice farmers and key informants. From the findings it was revealed that, farmers from the study area. From these findings it is recommended that Non-Governmental Organizations and investors should supplement government efforts by providing sufficient and quality inputs (seed/fertilizer/machinery) and credit facilities to the rice farmers at a subsidized rate and on time and strengthen the linkages between farmer groups/cooperatives with buyers (Producer-Buyer linkage) for easy market access.

1. INTRODUCTION

INTRODUCTION AND LITERATURE REVIEW

Rice (Oryza spp.) belongs to the family of Graminae. It is a cereal grain grown in hot countries providing seeds that are used as food. Rice refers to two grass species (Oryza sativa and Oryza glaberrima) and is native to tropical and subtropical south-eastern Asia and to Africa. The plant measures 2-6 feet tall and has long, flat, pointy leaves and stalk-bearing flowers which produce the grain known as rice. Rice is related to other grass plants such as

wheat, oats, and barley which produce grain for food and are known as cereals. Rice is rich in genetic diversity, with thousands of varieties grown throughout the world (IRRI. 2015).

Rice is a dietary staple for at least 62.8% of the earth's inhabitant's and accounts for 20% of the caloric intake for the world population. In Asia, it accounts for 29.3% of caloric intake (Timmer, 2010). A Worldwide paddy (unprocessed) rice production averaged about 706.3 million tons during the period 2009/2011 and grew by about 4% to 736.9 million tons in 2012 (FAO, 2014). In 2012/13 the milled equivalent in a million tons stands at 490.1 and 496.6 in 2013/14; productions have fluctuated in 2014/15 and 2015/16 at 494.3 and 490.3 respectively (FAO, 2016).

It is used in many ways both for food and other purposes. All the parts of rice are of economic importance to man; from rice bran to the grains, leaves, and roots are all of economic value. The grains are quite nutritious when not polished, common or starchy grains are used in various dishes, cakes, soups, pastries, breakfast foods, and starch pastes; glutinous types, containing a sugary material instead of starch, are used in the Orient for special purposes as sweetmeats. Grain is also used to make rice wine, "Saki", much consumed in Japan. In West Africa; countries like Nigeria, Ghana, Senegal, and The Gambia, rice can be prepared in food such as the popular Fried Rice and Jollof Rice. Similarly, in the Senegambia region rice is mixed with groundnut and pounded, then boiled and can also be eaten with sugar and milk. Rice straw is used as cattle feed, used for thatching roofs, filling mattresses, preparation of hats, ropes and as litter material in poultry. The husk is used as animal feed, for paper making and as fuel source. Rice oil is used in soap industry; refined oil can be used as cooling medium like cotton seed oil. Rice bran wax, a byproduct of rice bran is used in industries.

However, global paddy production in 2016 as forecasted by The Food and Agricultural Organization (FAO) reached 751.9 million tons (499.2 million tonnes, milled basis). Based on preliminary prospects for 2017 crops, FAO also forecasts world rice utilization in 2017/18 to expand by an additional 6.2 million tonnes to 506.5 million tonnes.

Rice is currently grown in over a hundred countries that produce more than 715 million tons of paddy rice annually; 480 million tons of milled rice (FAO FaoStat, 2013). Fifteen countries account for 90% of the world's rice harvest (Muthayya, Sugimoto, Montgomery, & Maberly, 2014). China and India alone account for about 50% of the rice grown. Together with Indonesia, Bangladesh, Vietnam, Myanmar, Thailand, the Philippines, Japan, Pakistan, Cambodia, the Republic of Korea, Nepal, and Sri Lanka, Asian countries account for 90% of the world's total rice production (Muthayya, Sugimoto, Montgomery, & Maberly, 2014).

Total rice consumption worldwide for 2008/09 season amounted to about 437,179 Million Metric Tons (MMT) on average (UNIDO). However, there is annual increase in global rice consumption of 437,179 in 2008/09 to 475,637 MMT in 2016/17 season. Similarly, FAO reported that world rice utilization in 2016/17 amounted to 500.3 million tonnes (milled basis), up 1.0 percent year on- year and little changed from December expectations, World rice utilization in 2017/18 to expand by an additional 6.2 million tonnes to 506.5 million tonnes. Consumption of rice as food is again expected to sustain most of this growth, reaching 406.4 million tonnes (FAO, 2017).

Africa produces an average of 14.6 MMT of rough rice per year (1989-1996) on 7.3 million-hectare, equivalent to 2.6 and 4.6 percent of the world's total production and rice

areas, respectively. In 2001-05, rice production has been expanding at the rate of 6% per annum, with 70% of the production increase due mainly to land expansion and only 30% being attributed to an increase in productivity (Fagade, 2000) and (Center, 2007). African paddy production neared the 30.0-million-ton mark in 2016, sustained by gains in Egypt and West Africa (FAO, 2016) compared to 26.0 million in 2012.

However, Africa consumes about 11.6 million tonnes of milled rice per year (FAO, 1996), of which 3.3 million tonnes (33.6 percent) is imported. About 21 of the 39 rice-producing countries in Africa import between 50 and 99 percent of their rice to supplement their annual rice requirements. The distribution of rice importation on a regional basis appears skewed, with the North and Central Africa regions setting the lower (1.7 percent) and upper (71.7 percent) limits. The average consumption of rice in Africa for 2014 to 2016 amounted to 32, 118 MMT (OECD-FAO, 2016).

Rice production in Sub-Saharan Africa (SSA) is dominated by subsistence, smallholder farmers who have limited access to markets, no equipment other than hand-held tools and limited use of inputs. The average rice yield in the sub-continent is the lowest in the world - 1.4 tonnes per hectare compared to Asia's average of 4 tonnes (more than 6 tonnes in China).

Similarly, growth of rice consumption in SSA has been outstripping that of rice production. Between 1961 and 2005, rice consumption in SSA grew at 4.52% annually, compared with growth in production of 3.23% (Center, 2007). Imports increased dramatically to fill the gap, as the self-sufficiency ratio (production/consumption) declined from 112% in 2008 to 60% in 2015. The international market thus supplied 40% of SSA's rice needs, and this share is continuingly increasing.

The West African sub-region is regarded as the biggest rice market in SSA, accounting for two-thirds of the region's rice demand with 50% imports, which represents about 20% of the total volume of rice traded globally (del Villar & Lançon, 2015). In May 2008, world rice prices tripled in just a few months to reach 30-year, inflation adjusted highs. As reported by (Somado, Guei, & Keya, 2008), the total value of rice imports by West African countries alone is estimated at US$1.4 billion per year. According to Country data from the Permanent Interstate Committee for Drought Control in the Sahel (CILSS) meeting and FAS Dakar estimates that rice production has increased in West Africa over the last three years, i.e. 5,100 Million Metric Tons (MMT), 5,978MMT and 6,425 MMT for 2015, 2016 and 2017 respectively. It was also observed that the amount of rice consumed during the same period also increased from 8,714 MMT for 2015 to 9,573 MMT for 2016 and 10, 172 MMT for 2017. All the countries combined intend to import 3.8 million tons in May 2015/16, an 8 percent increase compared to the previous year.

In the Gambia, rice has long been an important food grain and is traditionally cultivated both in upland areas and in the seasonally flooded swamps, which lie adjacent to the river Gambia and its tributaries. Rice production in the country fails to match demand and only some 40-50% of total rice consumption originates from local production, with the balance made up from imports Planning Service Unit (PSU,2013), NASS data revealed that the annual rice imports 2012-2013 rose to 137,000 metric ton and annual consumption in rice was 178,822. In 2014 the country imported 140,000 tons to cover the production deficit (world-grain.com 2017). Thus, the implementation of rice value chain programmes and strategies to combat the importation of rice, the declining yields and the poor living conditions of farmers was

necessary.

A value chain is the full range of activities required to bring a product from conception, through the different phases of production and transformation. A value chain is made up of a series of actors (or stakeholders) from input suppliers, producers and processors, to exporters and buyers engaged in the activities required to bring an agricultural product from its conception to its end use (Kaplinsky & Morris, 2001). The value chain concept entails the addition of value as the product progresses from input suppliers to producers to consumers. A value chain, therefore, incorporates productive transformation and value addition at each stage of the value chain. At each stage in the value chain, the product changes hands through chain actors, transaction costs are incurred, and generally, some form of value is added. Value addition results from diverse activities including bulking, cleaning, grading, and packaging, transporting, storing and processing (Anandajayasekeram & Gebremedhin, 2009).

Rice value chain describes the roles and relationships of the various actors within and along the chain, and how they are linked to existing market system. It also describes the flows of the rice commodity and value-adding activities between the different actors of value chain to the end users. The rice value chain is also an intrinsic network of public and private interactions and responsibilities. The public responsibilities are often in infrastructure (roads and irrigation), policies and regulations (seed laws, use of inputs, export policies, tax incentives, etc.), research and development (variety selection, etc.) and agricultural extension. The private responsibilities are concentrated along the supply chain from provision of inputs through production to processing and trade (Nico & Rajam, 2012).

Value Chains are found at the core of high impact and sustainable initiatives focused on improving productivity. Focus has shifted from agricultural production to consumer demand, marketing and the coordination of product flows from producers to consumers. The Value Chain concept acknowledges that production must be linked to demand and the critical role of organizing the flow from farmer to consumer opportunities (Ngambeki et al., 2010; MAAIF, 2012).

Due to the rice development potentials of the Gambia, the government in 1951 adopted and pursued a policy of rice self-sufficiency and rice value chain programmes and subsequently implemented two projects, namely; (Taiwanese-Gambian Technical Assistance Agreement in 1966 and the International Bank for Reconstruction and Development – International Development Agency (IBRD-IDA). The government of the Gambia aimed at increasing production of rice to curb the increasing importation of rice annually, attain food security and improve the livelihood of the rice farmers. Similarly, introducing irrigated rice production in the swamp lowlands on the levee of the river has been one of the most explicit strategies to increase food production and by this, solving the self-sufficiency problem in The Gambia (Kinteh, 1988). Thus, the study aims to; examine the effects of rice value chain programme on rice production in Central River Region (CRR) of the Gambia from 2014-2018.

1.2 Statement of the Research Problem

Rice is one of the most important food crops in Africa, where rice and the economic activities are related to its production, processing, distribution, and consumption are widely considered a key for economic development, food security, and poverty reduction. During the past three decades the crop has seen consistent increases in demand and its growing importance is evident in the strategic food security planning policies of many countries. In the Gambia, rice

is the main staple crop for the country and has one of the highest per capital consumption rates of 117 kg in the world. Consumption of rice for 2015/2016 stands at 190 MMT and 215 MMT in 2017/2018 periods.

Irrigated rice production has received more assistance and development-oriented interventions from government, non- governmental organizations and donors than any other food or cash crop production system in The Gambia. Support to rice production and the ambition to decrease import dependence go back to the early 1950s when the Colonial Development Corporation introduced irrigated rice cultivation with water control into the Gambian farming system. These schemes aimed at creating surpluses for meeting domestic demand and strengthening household food security. Challenges in irrigation schemes were met with high investment and production costs, imposing rigid production systems on farmers who were traditionally following a seasonal farming pattern (Carney, 2008).

Despite the recent success in raising local rice production through the introduction of 'Nerica' varieties, there remains some doubts about the future of this growth trend as so far, all efforts to boost domestic rice production have been unsuccessful and short lived. Yields in rice farming remain low, at the level of coarse grains, despite the introduction of 'Nerica' and production increases have been based on increased area farmed. In fact, price competitiveness of local rice versus imported rice remains a major question concerning the future of local rice marketing in The Gambia. While at a small-scale local rice marketed by individual farmers seems to be able to compete with imported rice on rural markets, it is less clear whether the processing and marketing of local rice at a larger scale, i.e. grouped sales by a farmers' association would be competitive.

Similarly, several studies on rice production have been carried out in the Gambia for example Ceesay (2004), wrote on Management of Rice Production Systems to Increase Productivity in The Gambia, West Africa, while Sanyang (2016), wrote on Rice Production in The Gambia: Role and Needs of Women Rice Farmers in the CRR.

Therefore, this study has become inevitable due to the fact that literature exist on rice production in the Gambia but I have not come across any on the effects of Rice Value Chain Programme on production in the Central River Region of the Gambia. The paper answers the question of what the experiences of farmers under the rice value chain programme in The Gambia? The objective of this paper is to investigate the experiences of farmers under the rice value chain programme in the Gambia. Thus, a well-designed rice value chain programme can help in increasing rice production in The Gambia. A well-designed rice value chain programme can help in increasing rice production in The Gambia.

Significance of the Study

Value addition to most food products like rice is not limited to processing only, but also by storing (value increasing over time) and transporting it (value increasing over space). The main reason for a Value Chain is to efficiently capture value in end markets to generate higher profits and create mutually acceptable outcomes for all parties involved in the chain process from production to consumption and disposal. However, there exist little information on the effects of Rice Value Programme on rice production in the Gambia, this leads to assumptions that an increase in yields also leads to an increase in income and improvement of the farmers' livelihood. The research will be relevant to the rice value chain projects by highlighting the problems the rice farmers and other value chain actors' encounter in

implementing the programme and this will help them to design and implement impact oriented programme that can tackle the findings of the study and thus increase rice production. The findings from the study will also enable government and its donor partners to invest on issues that are impeding the increase on rice production and other stakeholders like the National Research Institute (NARI) and National Seeds Secretariat will also be able to focus their efforts of providing seed varieties that are of consumer preference.

The study focuses on the effects of rice value chain programme on rice production in Central River region of the Gambia. The study covers from 2014 to 2018 (the period covered is from the beginning of the recent rice value chain programme) and covers the Central River Region of the Gambia.

Experiences of Rice Farmers under the Rice Value Chain Programme

In Japan, farmers experience that Rice Diversion Programme is counter-productive for a farmer seeking to specialize in rice on a large scale. Land prices have also been higher because of the expectation that government subsidies will be available. High land prices make it uneconomic for a farmer to expand farm size permanently through purchasing land.

Similarly, in Cambodia after the global rice prices in 2008 also led to higher prices, thus, it led to the number of net buyers of rice being higher than the number of net sellers. As stated by (Toye, Harrigan, & Mosley, 2013). poverty is higher among net sellers, so higher rice prices in general increases incomes of the poor in the short run, this means that rice growers will experience an increase in income.

According to (Achchuthan & Kajananthan, 2012), they approached an evaluation of development interventions from a beneficiary perspective in Northern Sri lanka, Findings revealed that, while the number of interventions have a positive relationship with beneficiaries' perceptions of the priorities by service providers in agriculture and infrastructure, the number of interventions in relation to basic needs have a negative relationship with similar perceptions. Community perception of priorities varied across the three sectors studied (agriculture, basic needs and infrastructure). The perception of a particular sector as a priority by the recipient coincided with the number of interventions only in the case of agriculture. Respondents perceived that service providers did not consider accessibility to infrastructure and resources as priorities. Also, most of the farmers are of the view that paddy farming is viewed as an inferior occupation by the society.

Anuforo (2010), highlighted that rice farmers and rice processors lament the amount of rice imported in to Nigeria, this they say, has led to major glut in the local rice markets resulting in collapse of price for locally produced rice. Similarly, women engaged in parboiling of rice in Nigeria and other parts of Africa experience exposure to virtually 100% exposure to Tuberculosis by the time they reached 40 years old and will start to lose their vision. There is more sophisticated parboiling equipment available but these may be too expensive to operate and thus will impose higher prices on the consumer that would make it difficult for them to afford the resulting rice. It appears that farmers are often more interested in out-sourcing the value added and concentrating on their agronomic output. This was readily shown by cassava farmers in Benue. Here FAO promoted women's income generation project to convert cassava to gari, appears mostly abandoned to the extent it took half hour to obtain the key for a visit, while across the street and less than 100 m away is a small woman managed gari factory operating at 100% capacity. The couple in charge claimed

they produced some cassava, but were basically drifting into the full-time processing and buy cassava from their neighbours. The same appears to be with rice particularly the labour intensive parboiling. It is highly unlikely that the labour limited farmers will have time for active involvement in the parboiling process. The best that might be hope for would be for farmers, on the rare occasion when they have little to do on their farms or have a short-term need for cash, to serve as a casual labor for the parboiling processors. This was noted previously in rice processing community in Awka, Anambra State. Thus, there might be an advantage in having the rice processing near the rice producing areas so the processing can provide an occasional off farm income opportunity for the farmers.

Some of the prospects for enhancing the rice value chain involved providing farmers or other actors of the value chain access to contract mechanization for such tasks as land preparation, combine harvest, two-stage mills, etc. These machines are too expensive for farmers' direct ownership and thus, the import concern is access to the equipment rather than ownership of it.

A case study in Benin Republic demonstrated that most farmers generate low income from local rice production. Almost 9 out of 10 rice growers (farmers as well as farmer leaders) stated that rice production does not provide them a decent income. For the farmers in Koussin-Lélé, this is a serious problem because they are mainly dependent on rice production (Totin et al., 2012). In Bamè and Zonmon, farmers have additional income activities but still suffer from low incomes, as the following illustrates: "I realized that the income that we get from the rice production is just enough to survive. Since I was producing here, I did not build another house, I just succeeded to buy a motorbike. […] If we could find support to effectively address our problems of production, credits, inputs and especially marketing facilities, we can earn more by producing rice" (Totin et al., 2012).

In Ghana, respondents in a field study indicated that although there were financing schemes available for cooperatives, lack of cooperatives among actors within the chain had prevented them from taking advantage of such schemes. It was observed that in the local rice value chain channel, actors acknowledged each other and exhibited some collaborative behaviour to obtain assistance, but in reality they did not exist as a group (Addison, Sarfo-Mensah, & Edusah, 2015). The field study showed that due to the failure of the government to provide these basic needs of the society, small scale Rice Value Chain Actors (VCAs) were particularly dependent on private services (including provision of infrastructure such as roads, storage and milling facilities) to function due to their limited assets. Respondents reiterated that the inadequate public infrastructure was a critical factor influencing the investment strategies of agribusinesses and their degree of willingness to engage with small-scale actors. Furthermore, respondents pointed out that, producers had got ready market for their produce due to the emergence of the rice value chain initiative and due to the availability of ready market for their produce at a reasonable price; rice production had become a very lucrative business in the district, attracting many people into rice production. However, (Barungi, Odokonyero, & Mbowa, 2016), expressed that women experience disaggregated participation in rice processing. Rice farming should be protected by reducing the importation of rice and helping farmers to diversify by growing other food crops, this strategy will help to steadily build the rice sector over time.

METHODOLOGY

The methodology covered in this study are: research design, the study area, population of the study, sample size determination, sample size and sampling technique, methods of data collection and techniques of data analysis.

Research Design

A cross sectional study design was adopted for the study. Cross-sectional study design was used to enable data collection which can be used to investigate the relationship between the Rice Value Chain Programme and rice farmers' production. The cross-sectional study design is considered relevant to the study as it enabled the study to elicit information from many people through a sample after which findings will be generalized to the entire population.

Study Area

The study was conducted in Central River Region North/South (CRR N/S) of the Gambia. Central River Region was the largest of the five administrative divisions of the Gambia until it was divided into Central River Region/ North and South to form six administrative regions (Gazetteer, 2008). The area of study is located on both sides of the Gambia River with 13034'N 14047'W, as coordinates, it comprises eleven (11) districts: five (5) districts in the north with its headquarters in Kuntaur; Lower Saloum, Niani, Nianija, Sami and Upper Saloum and six (6) districts in the South with its headquarters in Janjanbureh; the six districts are Janjanbureh, Lower Fuladu West, Upper Fuladu West, Niamina East, Niamina West, Niamina Dankunku. The region has a total land area of 2,894.25 and a total population of 226, 018 at a population density of 156.5 and 20, 559 households (Statistical Abstract, 2017) of which about 80% are agrarian.

The agricultural sector is the most important sector of the Gambian economy, contributing 32% of the gross domestic product, providing employment and income for 80% of the population, and accounting for 70% of the country's foreign exchange earnings. It remains the prime sector to raise income levels, for investments, to improve food security and reduce levels of poverty. About 54% of the land area in The Gambia is good quality arable land (5,500 square kilometers), out of which about 39% (1,880 sq. km) is currently farmed by the 41,000 subsistence farmers in The Gambia. About 810 sq. km. (81,000 hectares) are irrigable, all in the Central River Region (CRR) (56%) and (URR) Upper River Region (44%). About 2,300 hectares of this potential area are currently under irrigation. Crop production is quite diversified. Cash crops such as cotton and groundnuts are grown in the upland areas and rice in lowland, riverine areas (rain-fed swamps or under irrigation) for both subsistence and cash. Agriculture is communally organized among Gambian farmers. It is therefore important to develop a basic understanding of Gambian rural families in analyzing the farming systems that have developed over the years.

The farming community begins from the family and in CRR, a family unit consisting of dwellings and a private yard. Smaller sub-divisions of the compound are the Dabada and Sinkiro. Dabada is defined as the farm production unit in which two or more individuals (within the same compound) cultivate farms, outside the communal farm, for their own individual needs, while Sinkiros refers to the cooking and consumption group within or outside the compound. Sinkiros provide basis for the compound's organization of storage, processing, and consumption of foods.

Two types of farm units are common: the communal farm called Maruo and the individual or private farm known as Kamanyango. Maruo consists of a set of fields on which all members of the compound unit, usually men and women separately, cultivate together to provide the bulk of food required for the subsistence of the compound members. The compound head makes allocation of food and produce from the granary to each participating family according to its needs. Kamanyango farm: Individual members (male or female) of the compound can clear land and create private farms (Kamanyango) on which they work to produce food and other crops to provide for the extra needs of their immediate families and to supplement the main portion received from the central pool. The Compound head may assign certain days in the week or hours of the day for communal work, to ensure that both the interest of compound and those of its individual members are catered for.

In The Gambia, each village has an identifiable area of land that falls within the jurisdiction of its own headman (Alkalo). The land is usually not legally registered. Families or individuals in a village establish claim over a piece of land by tracing their decent, more often patrilineal to the first settlers. The Alkalo has the power to allocate land to compounds in the village. Any compound head has the right to clear un-claimed land within the village's area of jurisdiction. The piece of land is thereafter held in perpetuity by the compound that first cleared it. The inheritance laws provide for the transfer of compound land to the next eldest male member of the family in case the compound head dies; thus, stabilizing the degree of land fragmentation that is allowed to occur.

The Gambia lies within the tropical sub-humid eco-climatic zone, with rainfall range between 800 and 1200 mm annually (Le Houérou & Popov, 1981). Gambian climate is characterized by two seasons, a wet season (between June and October) and a dry season (November to May), which is six to seven months of no rains. During the dry season, the climate is dominated by dry and dust-laden winds that originate from the Sahara Desert in the North-east.

In the Same vein, the rainy season in the Gambia lasts 5 to 6 months, with 98% of the rainfall occurring between June and October. August is the rainiest month in the year, when as much as 37% of the annual rainfall occurs. The average annual rainfall has considerable spatial and temporal variation. Higher rainfall is received in the south-west part of the country with an estimated 1200 mm annually. The lowest annual rainfall is received in the north-northeast part of the country. Average number of rainy days range from 54 days in Banjul, the capital city, to 31 days in Basse Santo Su (Njie, 2007).

Average temperatures in the Gambia range from 18 to 28 degrees Celsius in January to 23 to 36 degrees Celsius in June. Higher temperatures are recorded as one travels east, with mean maximum in summer months reaching 43^{o}C around Basse Santo Su. The highest temperature ever recorded in the Gambia was 45^{0}C and the lowest temperature recorded was 90^{C}.

Central River Region, the area of study is largely dominated by the Fula, Mandinka and Wolof tribes. Of the entire farming population only 48.7% are Male. Women are predominantly engaged in farming with a population percentage of 51.9% (Population Housing Census, 2013).

Population of the Study

The target population in the study is stakeholders in Rice Value Chain and the rice farmers.

The total population for the study is 9,341. This includes nine thousand two hundred and seventeen (9,217) registered rice farmers, two (2) extension agents one for each of the Local Government Area, and two (2) agricultural officials, two value chain project staff, two (2) research institute officials, two (2) investors and eight (8) input dealers, four (4) processors, four (4) rice traders and 100 (100) rice consumers both males and females from Central River Region N/South of the Gambia.

Sampling Technique

Central River Region is divided in to eleven (11) districts. Under Kuntaur Local Government Area there are five (5) districts namely: Lower Saloum, Upper Saloum, Niani, Nianija and Sami districts and in Janjanbureh Local Government Area there are six (6) districts; Niamina Dankunku, Niamina West, Niamina East, Lower Fuladu West, Upper Fuladu West and Janjanbureh.

The study selected two (2) of the districts from Kuntaur Local Government Area and three (3) from Janjanbureh Local Government Area using purposive sampling technique. The choice of the districts was due to the high production of rice and the intervention of Rice Value Chain Programme in the area. The selected districts were Niani and Sami of Kuntaur LGA, Niamina East, Niamina Dankunku and Lower Fuladu West of Janjanbureh LGA.

The five (5) districts are all made up of villages; three (3) villages were selected in each of the districts using simple random sampling. The names of the villages in each of the districts were placed in a hat and a lucky dip was done, the names of the villages drawn from the hat were used for study. This brought the total number of villages selected for the study to be fifteen (15).

For the selection of respondents, the sample size of farmers was determined by using (Yamane, 1967) formula for calculation of sample size using the number of registered rice farmers in CRR as provided by the Registry of the Agribusiness Service as 9,217. Thus:

$n= N/1+N (e^2)$

Where;

n = sample size of the study

N= population of the farmers in the study area

e= Margin of error = 0.05

Therefore sample size = $9217/1+9217 (0.05)^2$

Therefore sample size = $9217/1+23.04$

= 383.64

= **384**

The equation shows that 384 rice farmers will be used for the study. In order to determine the farmer respondents per village, the proportional sampling technique was used. The number of respondents per village was determined as:

p/qxr

Where:

p = half of the calculated sample size (192)

q = the calculated sample size (384)

r = total number of members of the registered rice farmers to be surveyed

Table 2 shows the number of respondents across selected villages in the study area.

Table 1 selected Districts and Villages for the study

	Local Government Area	Districts	Total number of villages in the study area	Selected districts for the study	Selected villages for the study
	Kuntaur	Niani	87	Niani	Wassu
					Barajally Suba
					Kuntaur Fula Kunda
		Sami	71	Sami	Jarumeh Koto
					Manna
					Koli Kunda
		Nianija	35		
		Upper Saloum	86		
		Lower Saloum	62		
	Janjanbureh	Niamina Dankunku	27	Niamina Dankunku	Barrow Kunda
					Dankunku
					Jakoto
		Niamina West	34		
		Niamina East	52	Niamina East	Kununku
					Kudang
					Touba Demba Sama
		Lower Fuladu West	76	Lower Fuladu West	Jahaly
					Pachari
					Madina Umfally
		Upper Fuladu west	130		
		Janjanbureh	1		
Total	**2**	**11**	**661**	**5**	**15**

Sample Size Determination Formula

Sampling Procedure

The number of the farmer respondents from each village is shown as in table 2 above. These respondents were selected using purposive sampling. The sample for a focus group will have individuals with general characteristics of the overall population and can contribute to helping the research gain a greater understanding of the effects of rice value chain programme on rice farmers' production. Using the number of respondents generate from the sample size calculation formula per village, the number of focus groups were determined. A total number of forty-two (42) Focus Group Discussions were held which took 6 weeks to accomplish. The number of respondents for each FDG was between 5-10 respondents per group. The groups were formed according to age brackets; 18-35 and 37 and above, this grouping was done where there are more than one FDG. In villages were one FGD was conducted, the groups consisted of all age brackets. Purposive Sampling Procedure was used in selecting one (1) extension agent (focal point) for Local Government Area. This brought the total to two (2) agricultural extension agents. Two (2) government officials were selected;

from the Ministry and Department of Agriculture, Two (2) Rice Value Chain Project officials, two (2) researchers were selected from the research institutes; two (2) main investors were selected and eight (8) input dealers; machinery/equipment, seed suppliers, pesticides and herbicides suppliers, fertilizer suppliers (2 from each LGA), four (4) processors two (2) from each of the LGA), four (4) rice traders [two [2] from each of the LGA] and a hundred (100) rice consumers across the country. The total sample size for the survey is 511 rice farmers and key informants.

Table 2 Number of respondents from each village

No	Name of village	Population of registered farmers	Calculation of the number of respondents per village	Number of respondents
1.	Barajally Suba	48	p = (192/384 x 48)	24
2.	Kuntaur Fula Kunda	100	p = (192/384 x 100)	50
3.	Wassu	110	p = (192/384 x 110)	55
4.	Jarumeh koto	82	p = (192/384 x 82)	41
5.	Manna	30	p = (192/384 x 30)	15
6.	Koli Kunda	14	p = (192/384 x 14)	7
7.	Kununku	10	p = (192/384 x 10)	5
8.	Touba Demba Sama	12	p = (192/384 x 12)	6
9.	Kudang	40	p = (192/384 x 40)	20
10.	Madina Umfally	90	p = (192/384 x 90)	45
11.	Pachari	92	p = (192/384 x 92)	46
12.	Jahally	80	p = (192/384 x 80)	40
13.	Barrow Kunda	10	p = (192/384 x 10)	5
14.	Dankunku	40	p = (192/384 x 40)	20
15.	Jakoto	10	p = (192/384 x 10)	5
Total	**15**	**384**		**384**

Source: Field Survey, 2018

Method of Data Collection

The data for the study was collected through primary and secondary sources which included the use of Focus Group Discussion (FGD) for farmers and key informant interview for government officials, researchers, Rice Value Chain project officials, investors, input suppliers, processors, rice traders and agricultural extension agents.

Focus Group Discussion (FDG)

Focus group interviews with rice farmers at district level were held to collect primary information. Checklists for discussion was developed and used to facilitate the focus grouped interview. The number of respondents for each FGD was between 6-10 per group, this is based on the number of respondent calculated per village, as the lowest village has five (5) discussants and the highest is seventy-one (71), thus the smallest group consisted of five (5) discussants and the highest ten (10) for easier coordination and control of the FGD. In a village where there is more than one group, then the groups was composed based on gender and age brackets (the discussants were grouped within 18-35 in one group and 36 and above in another group, this was done to allow the younger participants (to contribute more freely) to provide variety of responses. The total number of FGD's held was 42 which took 6 weeks

to complete.

Key informant Interview

Key informants (knowledgeable observers of the sub-sector) were also identified and interviewed in order to obtain their views, opinions and suggestions about constraints and opportunities. The key informants interviewed include: Government Officials, Agricultural Extension Agents, researchers, investors, input suppliers processors, rice traders and rice consumers.

Techniques of Data Analysis

The data collected was transcribed for all the focus group comments, the comments were rearranged to have answers grouped together for each interview protocol. The main ideas were organized into themes to generate an idea or ideas and quotations were identified for each theme. The findings were written in narrative to describe the themes with quotations. Regarding the quantitative analysis, simple descriptive statistics including frequency and percentages was used for the surveyed data collected from the rice farmers and key informants. Statistical Package for Social Science (SPSS) version 20.0) was also employed to analyze the data from the socio-demographic characteristics of respondents and on the inputs received from the rice value chain programme and yield from the rice fields. The data analyzed were also tabulated to highlight the frequency and percentage.

RESULTS AND DISCUSSION

This chapter presented the data collected in the field, it also discussed and analyzed findings in relation to the study objectives; the nature of the rice value chain programme, the experiences of farmers under the rice value chain programme, the effects of rice value chain programme on rice farmers production, and the challenges faced by farmers under the rice value chain programme.

Table 3 highlighted the socio-demographic characteristics of 384 respondents in the study area. The table showed that there are (171) 45% males and (212) 55% females, which showed that the population of female respondents was higher than that of the male; a clear manifestation that the women are more active in rice farming than their male counterparts, thus, contributed more to the Gross Domestic Production (GDP) in terms of rice production.

The age distribution of respondents indicated that majority (158) 41% of rice farmers in Central River Region of the Gambia are between the ages of 50 and above. As shown in table 4.1, 64% of farmers fall between the ranges of 40-75years. Only 36% were aged between 17-39 years old. It indicated that there is a low level of youth participation in rice production in Central River Region of the Gambia, thus, leaving the aged and feeble to handle the tedious and laborious farming operations.

Due to the low returns from rice farming and poor decentralization policies in terms of development, the youths, who constitute about 65% of the Gambian population, prefer to migrate to urban centers in search of white-collar jobs or to Europe through the Mediterranean Sea. The implications of the age category of 40 years and above being more involved in rice farming may contribute the low levels of production in the study area.

Table 3 showed the educational level of respondents. It showed that (311) 81% had non-formal education, while only 11% received primary education, 8% and 1% received secondary and tertiary education respectively.

Table 3 Socio-Characteristics of Respondents

S/No.	Attributes of Respondents	Frequency	Percentage
1.	**GENDER**		
	Male	171	45
	Female	213	55
	Total	**384**	**100**
2.	**AGE**		
	17-27	39	10
	28-38	98	26
	39-49	89	23
	50 above	158	41
	Total	**384**	**100**
3.	**EDUCATIONAL LEVEL**		
	Non-formal	311	80
	Primary	41	11
	Secondary	29	8
	Tertiary	3	1
	Total	**384**	**100**
4.	**LAND OWNERSHIP**		
	Rented	48	12
	Self Owned/communal	336	88
	Total	**384**	**100**
5.	**AREA CULTIVATED**		
	less than 0.5ha	101	26
	0.5ha-1ha	206	54
	1ha above	77	20
	Total	**384**	**100**
6.	**FARMER ORGANIZATION**		
	Non-member	77	20
	Member	307	80
	Total	**384**	**100**
7.	**SOURCES OF LABOUR**		
	Family	296	77
	Hired	43	11
	Both	45	12
	Total	**384**	**100**

Source: Field survey, 2018

The level of illiteracy among the respondents was high. The implication of a high illiteracy rate among farmers is that they will find it difficult to read written instructions and apply them to increase rice productivity. Furthermore, only two respondents had a tertiary education, demonstrating that most of the highly educated populace did not actively engage in rice farming. Those with higher education would have been in the position to operate farming machinery, timely application of fertilizer and conducting good agricultural practices to increase production in the study area. Furthermore, farmers' lack of literacy prevented them from developing effective negotiating skills or using modern communication technologies for price information to support commercial decision-making.

Table 3 further showed that 88% of respondents own their own land or through communal system, where the village head called "Alkalo" shared the farmlands among households according to family sizes. Only 13% of respondents said they rented their rice filed plots for the 2018 farming season. The land owners at times were ready to rent out their lands to other farmers or outsiders for a season or two. Some land owners will not rent out their fields nor allow others to work on them allowing the field uncultivated for that season or the next, either as a result of not having the required inputs or sufficient farm labour.

Again Table 3 also showed that majority of the respondents in the study area (205) 54% cultivated on plots ranging from 0.5-1hectares, followed by (101) 26% of respondents who on plots which were less than 0.5hectares. Others (77) 20% farm on plots which were more than 1hectares. This indicated that majority of farmers were small scale farmers who were limited to little or no credit facilities and donor assistance which would have enabled them to have access to improved seed varieties, fertilizer, pesticides and machinery, thus, leading to the rice farmers producing only for consumption with little or none to sell. This is similar to a national survey of the Cambodia Development Resource Institute (CDRI 2008), which revealed that only 35% of Cambodian farm households produce a paddy rice surplus and the rest produce less than enough for consumption needs or just a sufficient amount.

In terms of membership of farmers' organization (Kafoo), 80% of the respondents in table 3 have acknowledged being a member of a farmer group (Kafoo), while 20% reported as being non-members. The evidence of farmer organizations in the region highlights the level of preparedness by farmers to work with the government, donor agents and Rice Value Chain Projects in increasing productivity. Farmers in organization readily receive from the rice value chain programme assistance such as improved seed varieties, fertilizer, machinery and credit. However, farmer organizations are constrained by over-involvement of the Government and the failure to transform these farmer groups into producer cooperatives to increase production.

The study further discovered that (296) 77% of respondents reported to have acquired family labour as their main source of labour from family members and relatives, while (43) 11% of respondents stated that they utilize hired labour. (44) 12% used both family and hired labour for their farming operations. Tedious and laborious task such as tillage and transplanting, they hire tractors or power tillers to do the work and other operations such as weeding, fertilizer application, harvesting and threshing are done by family members. Family labour is more reliable than hired labour, this is as a result of inadequate machinery for hire and even after hiring of a tractor or power tiller for tillage or ploughing the machine can breakdown leaving the farmer with days or weeks of waiting before the machine is repaired. On the other hand,

family labour take a longer time to complete, as such can delay all other farm operations.

Experiences of Rice Farmers under the Rice Value Chain Programme

With reference to rice farmers' experiences under the rice value chain programme, the Focus Group Discussions highlighted that the Rice Value Chain (RVC) programme failed in completing some of their intervention targets. Some respondents reported that under the RVC Programme some projects promised to construct water retention dikes and access road from the village to the rice fields but nothing has been done. This was revealed by one of the discussants as thus:

... water retention …. water retention, they were supposed to construct water retention dikes but still nothing, since last year they have been coming and measuring still nothing they also promised to construct an access from the village to the rice fields and that too has not been done and we are waiting. (A 55-Year-Old Male Rice Farmer/Dankunku/Niamina Dankunku District, 24th June, 2018).

Similarly, another respondent stated thus:

One of the projects promised to construct an anti-hippo dike but they fail to do so and the community is still waiting, the hippos are destroying or produce every year and we are not allowed to kill them. (A 53-Year-Old Female Rice Farmer/Jakoto/Niamina Dankunku, 24th June, 2018).

The above finding was further corroborated by another respondent as thus:

Since last year the government promised to support us with farming machines but still now, we have not seen anything… (A 30-Year-Old Female Rice Framer/Pachari/Lower Fuladu West District, 26th June, 2018).

The finding implied that the RVC programme promised farmers interventions such as; anti hippo dikes, power tillers, construction of causeways and access roads, which would have increased their production and when that fails to be done, farmers are left without fields to cultivate during that season or seasons or even if they do cultivate as in the case of hippo invasions they are left with a low yield.

The study also revealed that the RVC programme interventions such as; rehabilitation of the canals to provide water in to the fields, the flood gates that control the inflow and out flow of water into and out of the canals during low and hide tides, access roads to the rice fields and causeways that allows farmers to access individual plots in the field and also enhances the transportation of inputs and produce from the fields were completed in some of the villages in the study area but the farmers are not satisfied with the works. They stated that the works were below standard and will not serve for a long period of time. This was revealed by one of the discussants as:

The site where Green Impact did the work, the hope we had that this was how the work will be done, it was not done in that way, they work was not done as planned, they have completed the work but we are not satisfied, some fields do not have enough water, while others are flooded year round; the fields are not leveled, there are no gates in the secondary and tertiary canals,... it is just like a highway, the flow of water in the fields, the bunds serving as boundaries to the rice fields are not in good shape (50 Year Old Male Rice Farmer/Touba Demba Sama/Niamina East District, 25th June, 2018).

Majority of the discussants stated that the RVC Programme provided seeds and fertilizers which were of low quality thus leading to low production for the farmers. Some of the

discussants highlighted that they ended up boiling some of the seeds for their meals as they didn't germinate in the nurseries. The seeds provided (Sahel 1, WAAPP 105, and IET 313T) were given to the Regional Agricultural Directorates to be distributed to the different rice farmer organization in the districts. The seeds were delivered to the farmers who will pay back the same quantity received after harvesting their rice. Similarly, fertilizer (Urea and NPK) given to farmers was at a subsidized rate of D950.00 ($20.00) per 50kg bag usually less than the market prices charged by input dealers.

With regards to seeds, we have such an experience here, those who received the seeds (WAAPP 105 and IET 313T) first, we did seed germination test and realized that some of the seeds germinated while others didn't (45-Year-Old Female Rice Farmer/Fulakunda/Niani District, 28th June, 2018).

Similarly, another discussant reinforced the above finding; We were given improved seeds varieties; Sahel 1 but the seeds failed to germinate, we were not able to cultivate all our rice fields that season (A 34-Year-Old Male Rice Farmer/Wassu/Niani District, 28th June, 2018).

Another respondent established that fertilizer given by the government was not of standard, this was stated as thus:

The government gave us fertilizer which was not good, the fertilizer had expired and when we applied it in the fields with the hope of increasing yield not changed (A 70-Year-Old Male Rice Farmer/Medina Umfally/Lower Fuladu West District, 25th June, 2018).

Only one community out of the 15 communities in the study area has not received an intervention from the RVC programme for the period cover during the study. They stated that other surrounding villages had intervention but they are yet to receive any.

SUMMARY, CONCLUSION AND RECOMMENDATIONS

The study surveyed 384 respondents and 128 key informants. Findings revealed that majority of the farmers were women with 55% of the surveyed population. Most of the farmers (64%) were between middle to old ages and less than 36% were aged 17-39. Furthermore, 81% were reported not to have formal education, 11% received primary education, 8% and 1% received secondary and tertiary education respectively.

Conclusion

From the research findings, it was concluded that the rice value chain programme in the Gambia have positive effects on rice production. The effects of the rice value chain programme on rice production according to findings range from availability of inputs (fertilizer, improved seeds, tillage implements and machinery; tractors and power tillers) processing (threshing and milling machines), rehabilitation of rice fields that caused an increase in production.

However, there were certain challenges confronting the realization of the vision of the rice value chain programme, these challenges include; inadequate inputs (fertilizer, improved seeds, tillage implements and machinery; tractors and power tillers), inadequate machinery for tillage, ploughing and processing, invasion of wild life on the rice fields and lack of marketing infrastructure and information. Researchers, input suppliers and processors have been strained by the lack of capital and funding to contribute fully in increasing rice production.

Recommendations

The Rice Value Chain programme and government should provide farm machinery/ equipment (power tillers, tractors, threshers, milling machines) to the rice farmers in order to meet the timeliness of operation which can induce an increase in production.

The rice value chain programme should provide sufficient and quality inputs (seed/fertilizer) and credit facilities to the rice farmers at a subsidized rate and on time.

Rice value chain programme focal points of projects should follow-up with the rice farming communities to rehabilitate the damaged anti hippo dykes around the perimeter of the rice fields, this will reduce the incidences of wild life invasion and destruction of rice crop.

The Soil and Water Management Unit (SWMU) in close collaboration with the RVC Focal Points and the Department of Community Development to conduct a refresher training targeting the Water User Association (WUA) members, this will ensure that water conflicts and distributions are minimized. It will also enable canals to be free of grasses and sediments which will allow free flow water to all the plots in the fields.

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