Smallholder Agricultural Productivity Enhancement and Commercialization (SAPEC) Project

Baseline Survey in the Rice Sector Development Hubs of Liberia

Final Report

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Prepared by: Dr. Rasheed Adeola (Extension Agronomist)

Africa Rice Center, Bong County, Liberia

E-mail: r.adeola@cgiar.org adeola20022000@yahoo.com

www.AfricaRice.org

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

EXECUTIVE SUMMARY

Rice is the main staple food in Liberia and formed a more significant (33%) part of Liberian food consumption and accounting for about 50% of the adult calorie intake. The Liberian Ministry of Agriculture is implementing smallholder Agricultural Productivity Enhancement and Commercialization (SAPEC) Project with the funding from Global Agriculture and Food Security Program (GAFSP), the African Development Fund (ADF), and the Government of Liberia. Reducing rural poverty and household food insecurity is the main goal of the SAPEC project while its objective is to increase the income of smallholder, farmers and rural entrepreneurs, especially women, youths and the physically-challenged. The main objective of the baseline survey is to provide independently assessed information based on which to evaluate the achievements and the project's progress and effectiveness during implementation and after project completion.

The survey was conducted using a semi-structured questionnaire and Focus Group Discussion (FGD). It covered eleven (11) counties out of targeted 12 project counties. The counties included in the survey are Margibi, Montserado, Grand Bassa, River Cess, Bomi, Gbarpolu, Grand Cape Mount, Grand Gedeh, River Gee, Grand Kru, and Maryland. Sinoe County was not covered in the survey due to some unforeseen logistics. A total of 330 households were surveyed from eleven project counties.

The mean age of the interviewed household members was 44.6 years while 54.2% of the respondents were male and 45.8% were female. More than half (52.4%) of the respondents were male household heads while only 9.4% were female household heads. Other respondents were related to their household heads in the following categories: spouse (30.9), son/daughter (1.8%), son/daughter in law (0.3%), parent (3.9%), brother/sister (0.6%) and other relations (0.6%). The average household size was 5.

More than three quarters (79.7%) of the respondents were married, with 10.9% being single, 1.2% divorced, 0.9% separated and widowed (4.8%). About half (51.5%) of the respondents had no formal education. While others had one form of education or another ranging from primary to tertiary education. The survey found that membership of farmers' associations or social organizations was not a common feature among rice farmers in the surveyed project counties. About 16% of the respondents belonged to women farmers' group, 13.3% indicated membership in community volunteers, cooperative society (1.8%), and religion association (14.5%), and only 13.3% belonged to farmers' groups.

The majority (78.2%) of the respondents cultivated their rice under rain-fed upland ecosystem and 21.8% cultivated under rain-fed lowland ecosystem with the average farm size of 1.1 hectares and 0.2 hectare

respectively. The mean yield per hectare for upland rice among the sampled household rice farmers was 0.8 ton while the average yield per hectare for lowland rice was 1.1 tons. Regarding land ownership, more than half (55.8%) of the respondents indicated inheritance land ownership status of their land for rice farming, other ownership statuses include communal (21.5%), rent (10.0%), leased (0.9%) and 11.8% were either gifts or purchased.

Land preparation was mainly carried out using simple implements since most of the farmers did not own or have access to modern equipment. They rely mostly on the rudimentary farming implements such as hoes, cutlasses, axes. The survey revealed that only 0.3% of the respondents had access to modern equipment like power tiller through the Ministry of Agriculture office located in their area. The surveyed farmers cultivated both local and improved varieties of rice (upland and lowland). Among the varieties cultivated by the farmers include Suakoko 8 (17.9%), LAC 23 (33.6%), ARICAs (1.5%) and NERICAs (21.2%). The majority (98.5%) of the respondents cultivated local varieties identified with the following names: *Gissi, Soja Du, Ten cent, Jologbo*, among others. The sampled household rice farmers indicated their sources of seeds for rice cultivation as self (62.4% i. e. from the previous season), NGO (10.6), MoA (19.1%), local market (24.5%) and fellow farmers (7.9%). Other inputs used by farmers include herbicide (0.9%), NPK fertilizer (7.0%), and Urea (2.4%). Application of inorganic fertilizers by few farmers was within the range of 50 – 100 kg of NKP/ha and 5 – 50 kg of Urea/ha. Analysis of labor utilization showed that hired labor was employed in the following production operations: land preparation (63.3%), planting (55.7%), weeding (28.2%) and harvesting (29.4%).

Hand-held sickle and hand-held knives were used for harvesting. The study also established that after harvest the rice was threshed through beating with sticks on bare ground or tarpaulin or plastic sheeting. Parboiling is an operation that was rarely done by the interviewed household rice farmers. The majority (87.9%) milled the harvested rice by pounding it in the mortars while only 12.1% of the respondents milled their rice using conventional milling machine provided by NGOs and private enterprises.

The sample households have limited access to agricultural extension services with only 28.2% indicated few visits by government extension worker during last 12 months before the survey while NGO extension workers also visited almost equal proportion (27.6 %) of the respondents during the same period.

The survey found just a few the interviewed households adopted various types of agricultural technologies. Specifically, some of them claimed the adoption of the following techniques in their

production practices: improved rice varieties (20.0 %%), improved nursery techniques (14.5%), water management (8.5%), line planting (10.3%) and use of fertilizer (4.5%).

Among the constraints indicated by the interviewed households include lack of farm tools (87.5%), lack of financial capital to purchase agricultural inputs (93.7%), lack of access to modern processing facilities (87.2%), high labor costs (95.6%) to perform different farm operations, inadequate information on improved technologies (76.3%) that can be employed in rice productions and lack of motorable roads (86.2%).

Focus Group Discussion (FGD)

Results of FGD indicated that majority (96.5%) of the participants, cultivated local varieties of rice such as Mai, Gissi, Black deer, Sasa, among others. Cultivation of LAC 23 and Suakoko 8 was widespread among the participants and have become local varieties and subsequently tagged as "country rice". Participants cultivated rice on farm sizes ranging from 0.4 to 2.0 hectares with resultant low yields. Only a few of them planted improved varieties like NERICAs. The participants indicated that the seeds they planted were obtained from friends and relatives or the left-over from the previous season. Most of the participants used the number of tins/buckets filled with seeds to determine the size of the land planted with rice. It was found that about 2 tins/buckets filled with seeds could approximately plant one acre of land. A large proportion of the FGD participants grew rice at a subsistence level whereby most of the harvested rice was consumed within the households and even supplemented it with imported rice purchased from the open market.

Other food crops which the FGD participants cultivate include cassava, maize, fruit and leafy vegetable, sweet potato, cocoyam while some of them plant cash crops like rubber, oil palm, sugarcane, banana and plantains.

The survey noted that the use of inputs like fertilizers and herbicides were not popular among the participants. Some of them claimed lack of adequate knowledge on how to use them while the majority of them said that these inputs were not available in their areas.

Participants from all the project counties that took part in the discussion also confirmed rice as Liberia staple food and indicated their consumption of rice between two (2) to three (3) times on a daily basis. FGDs also revealed that rice farmers were not operating in groups and this had debarred them from group formation advantages. However, few of them indicated their associations with social groups known as "Esusu" (a social capital group) to take care of their financial needs.

Harvesting activity was carried out using both hired and family labor as reported by the FGD participants and the hired laborers were paid in kind using part of the harvested rice. Harvested rice was tied into bundles of various sizes with a package equivalent to 2 – 5 kg of rice grains when threshed.

Majority of the FGD participants processed their harvested rice using traditional methods such as beating with sticks or trampling on it (threshing) while milling was done by pounding it in a mortar. Only a few of them had access to modern milling equipment in their areas. However, the majority of the participants that have milling machines in their area do not use it because they only mill small quantity of rice for household use as the need arises. Most of the milled rice was consumed within the household of the participants. Just a few (1.5%) of the participants reported having enough rice for household consumption before the next harvest season. It was probably due to low yields realized through the planting of local varieties coupled with the non-use of improved technologies and post-harvest losses. The study found that post-harvest losses have been very considerable and regarded as one of the main factors constraining rice productivity and threatening food security in the country.

Among the constraints highlighted by the rice farmers that made up the FGD participants include:

- Lack of financial capital to purchase implementing tools, inputs and pay for high labor cost.
- Lack of technical knowledge to carry out rice farming operations.
- Lack of access to modern equipment to go into mechanization of rice production.
- High crop damage and losses due to pests (birds, rodents, grasshopper, termites etc.) infestation.
- Inadequate access to agricultural extension services.
- High level of post-harvest losses due to poor processing techniques (traditional methods) and lack of appropriate storage structures.

Only a few rice millers were able to attend the FGDs from three (3) counties (River Gee, Grand Cape Mount and Grand Gedeh) while, only the FGDs conducted in both Montserado and Margibi counties had agro-input dealers as participants. Rice traders were among the participants in the FGDs conducted across the counties.

The rice millers operate on a small scale using diesel engines to power their machine at capacity within the range of 1 – 1.5 tons/day. However, the milled rice has to be further processed to remove some unwanted materials like rice husks and bran. Some of the participants reported the percentage of broken

rice in the range of 35 – 45% probably due to the rice paddy that was not properly dried or inadequate knowledge or skill of the mill operators. Most of the rice millers themselves were rice farmers that used paddy from their farms to feed their mills. Majority of their customers are rice farmers in their areas who paid for services rendered to them either in cash or kind. Some of the rice millers cited the following as constraints to rice milling operations:

- High milling breakages due to improperly dried paddy.
- Lack of machine spare parts and repair kits.
- High level of contaminated paddy with foreign materials (e.g. stone).
- Inadequate supply of paddy due to less patronage by the farmers.

The agro-input dealers that participated in the FGDs reported their engagement in the sale of agro-chemicals like, herbicides and insecticides. They, however, reported less patronage from the rice farmers due to their inadequate knowledge on the importance and usage of the inputs. They also complained about the insufficient capital to do significant business. Most of the rice traders that participated in the FGDs engaged mostly in the sale of imported rice but expressed their willingness to patronize rice farmers for locally produced rice as soon as the quality improves. Difficulty in securing foreign currency (United States dollars) for rice procurement and poor road conditions were the challenges highlighted by rice traders during the FGDs.

Based on the constraints raised by all the concern stakeholders along the rice value chain in Liberia through this survey; the implementation of SAPEC project already in progress is a promising approach that will alleviate the constraints.

1:0 INTRODUCTION

1.1 Background Information

Rice is the most important staple food in Liberia and formed a more substantial (33%) part of Liberian food consumption and accounting for about 50% of the adult calorie intake (GFSR, 2009). The Liberian Ministry of Agriculture is implementing smallholder Agricultural Productivity Enhancement and Commercialization (SAPEC) Project with the funding from Global Agriculture and Food Security Program (GAFSP), the African Development Fund (ADF), and the Government of Liberia. Reducing rural poverty and household food insecurity is the main goal of the SAPEC project while its objective is to increase, on a sustainable basis, the income of smallholder farmers and rural entrepreneurs, particularly women, youths and the physically-challenged.

1.2 Objectives

The main objective of the baseline survey is to provide independently assessed information based on which to evaluate the achievements and the project's progress and effectiveness during implementation and after project completion. The study seeks to facilitate the evaluation and analysis of the changes to be observed in the reduction of rural poverty and household food insecurity, an increase in the income of smallholder farmers and rural entrepreneurs among participating counties. Specifically, the objectives of the study were to:

- Provide baseline information against which project's progress and targets identified in the SAPEC log-frame can be measured
- Collect related data on Objectively Verifiable Indicators (OVIs) as specified in the SAPEC log-frame

1.3 Baseline Survey Questions

1. What are the existing technologies in rice production?

2. What are the constraints and opportunities that determine the technology needs of small-scale farmers in rice production?

3. What type of rice are available in the market for general consumption of the public

4. What has being the experience of the small-scale farmers through interaction with both the MOA technicians and NGOs toward their efforts in rice production?

5. What have been farmers' sources of information on rice production techniques?

6. What has been their experience in having access to seeds from CBSS in their communities?

7. What are the training needs of both the MOA technicians and CBSS members?

8. Have technicians received training on IRM and rice value chain analysis in recent times?

9. Have there been trainings for centre management staff on IRM, fertilizers and seed handling and marketing?

10. Do farmers have access to rice processing equipment in their communities?

11. Has there been training for women farmers in rice processing?

12. The identified entrepreneur would be asked whether they have received training on marketing strategy (pricing, packaging and collecting)

13. Identified artisans would be asked whether they have received any training on fabrication and maintenance of processing equipment as well as equipping them in their counties.

2.0 METHODOLOGY

2.1 Survey Design and Collection Methods

The baseline survey was carried out in eleven (11) counties out of the 12 project counties. The counties included in the study are Margibi, Montserado, Grand Bassa, River Cess, Bomi, Gbarpolu, Grand Cape Mount, Grand Gedeh, River Gee, Grand Kru, and Maryland. Sinoe County was not included in the survey due to some unforeseen logistics.

A purposive and multi-stage sampling procedure was used to select the respondents. It was purposive in the sense that only households growing rice were targeted for interview. Three (3) districts were randomly selected from each of the 11 project counties. Most of the households growing rice in all the selected districts were sampled with the assistance of the project Extension Technicians based in those districts. A sampling frame of 660 households was obtained from which 50% (330) of the households were randomly selected to form the sample for the study. Both qualitative and quantitative methods were used to collect the data. The data collection techniques involved the use of a semi-structured questionnaire developed to obtain information from the respondents and Focus Group Discussions (FGDs)) conducted with various stakeholders (rice farmers, processors, traders) along the rice value chain. Thirty-three (3) enumerators and eleven (11) supervisors were identified and trained for the exercise. In each county two (2) Focus Group Discussions (FGDs) were conducted (one male FGD and one female FGD).

2.2 Data Entry and Analysis

Data were coded into excel spreadsheet by trained entry personnel and analyzed using IBM SPSS Statistics V23 package. Data analysis involved descriptive statistics such as mean, standard deviation, frequency and percentage distributions.

3.0 FINDINGS and DISCUSSION

3.1 Personal Characteristics

The mean age of the interviewed household members was 44.6 years, an indication that rice cultivation in the study area was dominated by young farmers who were young and in their working age. It is likely to have a positive implication on the adoption of rice production technologies as young farmers would be willing to take to modern methods of practising agriculture.

The result indicates that rice farming is dominated by male (54.2%) while, 45.8% of farmers were female. More than half (52.4%) of the respondents were male household heads while only 9.4% were female household heads indicating that women's involvement in the decision making that affects rice production will be very low. Other respondents were related to their household heads in the following categories: spouse (30.9), son/daughter (1.8%), son/daughter in law (0.3%), parent (3.9%), brother/sister (0.6%) and other relations (0.6%). The majority (62.1%) of the interviewed households had a household size within the range of 5- 10 while the average household size was 5. This household size may have a positive impact by serving as family labour on rice farmers' farms and enhance productivity.

More than three quarters (79.7%) of the respondents were married, with 10.9% being single, 1.2% divorced, 0.9% separated and widowed (4.8%). It is an indication that most of them are likely to settle down with their families and concentrate on rice production activities. About half (51.5%) of the respondents had no formal education. While 18.2% had some primary education only 5.5% completed their primary education, 12.1% had some secondary education and only 1.5% completed their secondary education. About 7% had higher secondary (AA) education while 0.6% of the respondents had vocational and university education. This level of education may have a positive implication on their receptivity to changes regarding the adoption of rice production technologies. The literate farmers may serve as models to the less educated farmers and motivate them to be receptive to the dynamics of rice value chain.

Table 1: Personal Characteristics of Rice farmers

Characteristics	Frequency	Percentage
Age Group (Years)		
Below 30	22	6.7
30 – 39	86	26.1
40 -49	114	34.5
50 – 59	73	22.1
Above 59	35	10.6
Mean	44.6 years	
Gender		
Male	179	54.2
Female	151	45.8
Relationship with Household Head		
Male Household head	173	52.4
Female Household Head	31	9.4
Others (Spouse, Son/daughter in law, Parent,	126	38.2
Household size		
< 5	16	4.8
5 – 9	205	62.1
10 – 14	75	22.7
> 14	34	10.3
Mean	5	
Marital Status		
Married	263	79.7
Single	36	10.9
Divorced	4	1.2
Separated	3	0.9
Widowed	24	7.2
Education		

No formal education	170	51.5
Primary	78	23.7
Secondary	45	13.6
Higher Secondary	33	10.0
Vocational	2	0.6
Tertiary	2	0.6
Membership of Association		
Member	189	57.3
Non-member	141	42.7

The survey found that membership of farmers' associations or social organizations was not a common feature among rice farmers in the surveyed project counties. About 16.0% of the respondents belonged to women farmers' group, 13.3% indicated membership in community volunteers, cooperative society (1.8%), and religion association (14.5%), and only 13.3% belonged to farmers' groups. Non-membership of social or agriculture-related association by the majority of the interviewed farmers may have a negative implication on their access to information on improved rice production technologies. They are likely not to enjoy the group advantage of having access to credit facilities that can enhance rice production as most organizations implementing intervention programs prefer dealing with groups or associations rather than individuals.

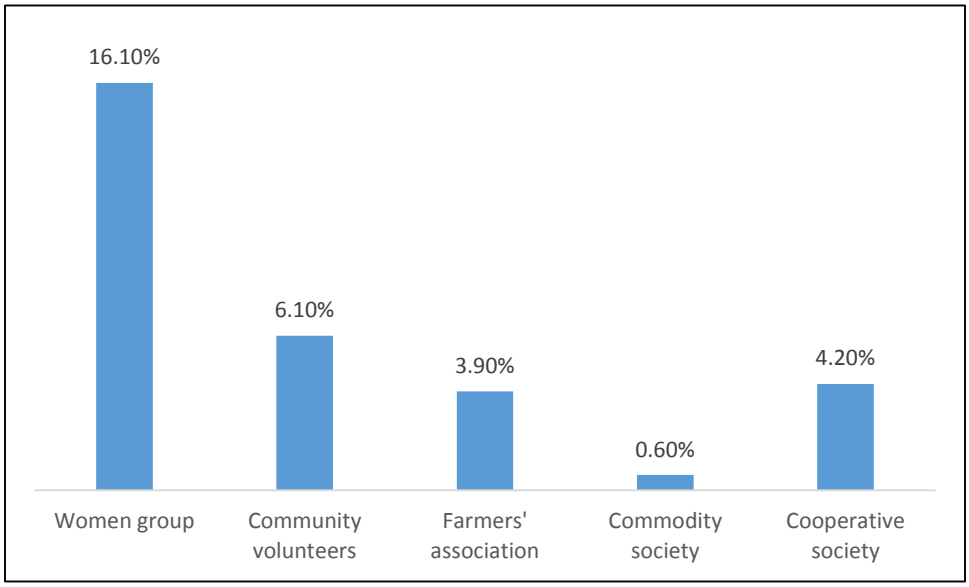

Figure 1: Farmers' Association Membership Classification

Land is an essential factor in rice production. The result indicates that 55.8% of the farmers acquired their farmland through inheritance. Other means of land acquisition reported by farmers include rent (10.0%), lease (0.9%) and communal (21.5%). The pattern of land ownership status found in the surveyed area is likely to be advantageous to farmers regarding rice production expansion.

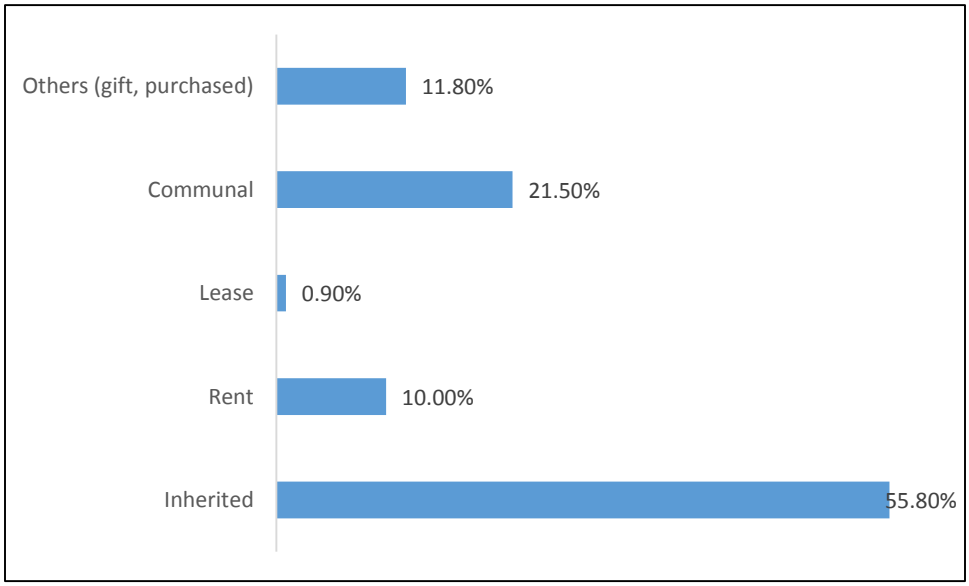

Figure 2: Land Ownership Status

3.2 Farm Characteristics

The majority (78.2%) of the respondents cultivated their rice under rain-fed upland ecosystem and 21.8% cultivated under rain-fed lowland and ecosystem with the average farm size of 1.1 hectares and 0.2 hectare respectively. Many of the farmers were small size holders and fell within the range of less than 0.5 hectare to 1.0 hectare of land for rice production under rain-fed upland ecosystem. Only 7.3% were cultivating rice on farmland greater than 2 hectares under rain-fed upland ecosystem (Table 2). The mean yield per hectare for upland rice among the sampled household rice farmers was 0.8 ton while the average yield per hectare for lowland rice was 1.1 tons. The low yields may be due to several factors including failure to adopt the improved technologies, use of low yielding varieties, inadequate input and modern machinery that can enhance rice production.

Table 2: Farm Characteristics of Rice Farmers

Characteristics	**Frequency**	**Percentage**
Rice cultivated and type		
Upland	258	78.2
Lowland	72	21.8
Farm Size (hectares) Upland		
0.0 (No upland)	86	26.1
< 0.5	27	8.2
0.5 – 1.0	112	33.9
1.5 – 2.0	81	24.6
> 2.0	24	7.3
Mean	1.1Ha.	
Farm Size (hectares) Lowland		
0.0 (No lowland)	229	69.4
< 0.5	42	12.7
0.5 – 1.0	44	13.3
1.5 – 2.0	14	4.2
> 2.0	1	0.3
Mean	0.2Ha.	

Average yield (ton/ha. (Upland)		
0.0 (No upland)	86	26.1
< 0.5	149	45.2
0.5 – 1.0	54	16.4
1.5 – 2.0	11	3.3
> 2.0	30	9.0
Mean	0.8 ton/Ha.	
Average yield (ton/ha. (Lowland)		
0.0 (No lowland)	229	69.4
< 0.5	20	6.1
0.5 – 1.0	24	7.3
1.5 – 2.0	12	3.6
> 2.0	45	13.6
Mean	1.1 ton/Ha.	

Regarding the varieties of rice planted by the farmers; about one quarter (33.6%) of the farmers engaged in the cultivation of LAC 23 (a popular and an age-long upland variety in Liberia) followed by NERICAs (21.2%), Suakoko (17.9%) and ARICAs (1.5%). Nearly all the farmers engaged in the cultivation of local varieties of rice. The majority (98.5%) of the respondents cultivated local varieties identified with the following names: *Gissi, Soja Du, Ten cent, Jologbo,* among others.

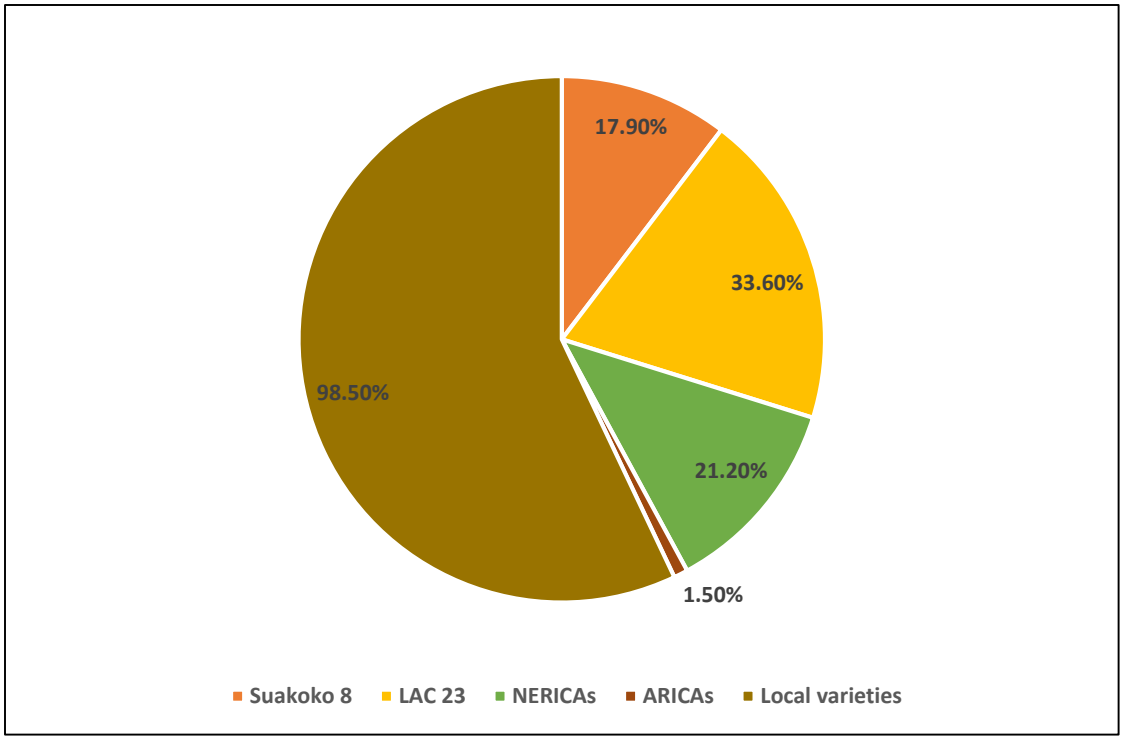

Figure 3: Rice varieties planted by farmers

The majority (62.4%) of the farmers sourced their seeds through the left over from the previous season harvest while about 25.0% obtained their seeds from the open market (local) and 19.1% got their seeds from the ministry of agriculture. Other sources of seeds include private/NGOs (10.6%) and fellow farmers (7.9%). The practice of seeds recycling of the same variety of rice year after year as indicated by farmers may cause such variety to lose its original traits.

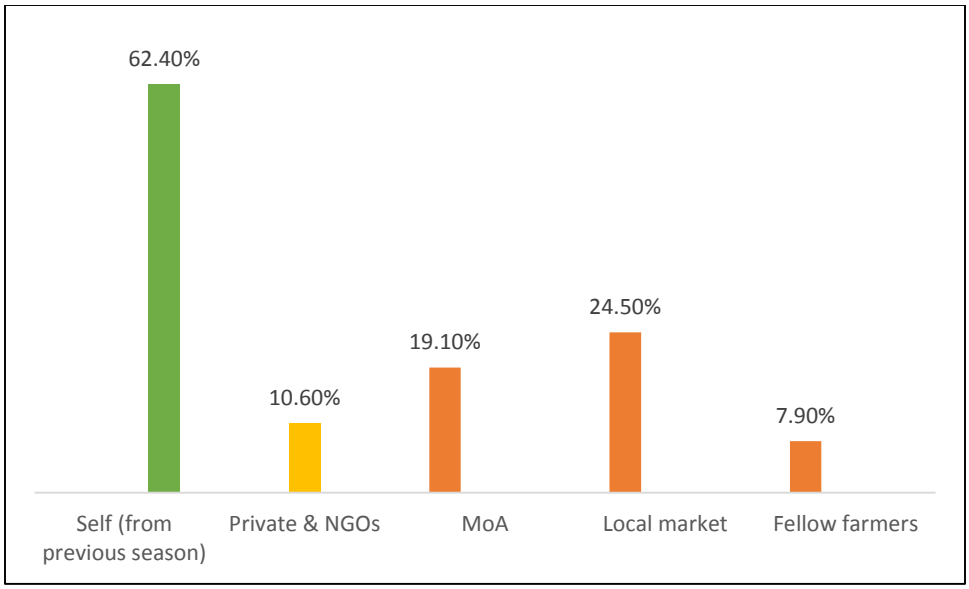

Figure 4: Farmers' Sources of Seeds

3.3 Rice Production Practices

Land preparation was mainly carried out using manual method since most of the farmers did not own or have access to modern equipment. Farmers were still using the rudimentary farming implements such as hoes, cutlasses, axes. The survey revealed that only 0.3% of the respondents had access to modern equipment like power tiller through the Ministry of Agriculture office located in their area.

The surveyed farmers were asked to indicate the input used on their farms. The input investigated were herbicides, insecticides, animal manure, NPK/mixed fertilizers, urea and compost. The results show that 89.7% did not use any of the investigated input on their farms. The input used by farmers include herbicide (0.9%), NPK fertilizer (7.0%), and Urea (2.4%). Application of inorganic fertilizers by few farmers was within the range of 50 – 100 kg of NKP/ha and 5 – 50 kg of Urea/ha. The non-use of these sustainable inputs may have a negative impact in their bid to realize self-sufficiency in rice production.

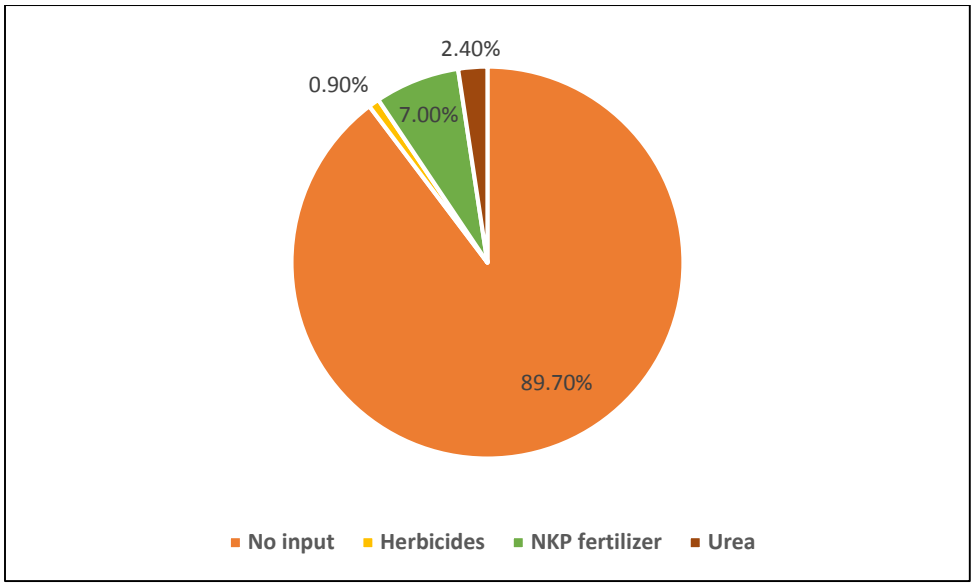

Figure 5: Use of Agricultural Input

Analysis of labor utilization showed that hired labor was employed in the following production operations: land preparation (63.3%), planting (55.7%), weeding (28.2%) and harvesting (29.4%). It implies that these operations are labor intensive and hired labor need to be employed for these operations irrespective of the scale of operation.

3.4 Harvesting and Processing

Harvesting was done by hand-held sickle and hand-held knives. The survey also established that after harvest the rice was threshed through beating with sticks on bare ground (98.6%) or tarpaulin or plastic sheeting (1.5%). Parboiling (1.2%) is an operation that was rarely done by the interviewed household rice farmers. The majority (87.9%) milled the harvested rice by pounding it in the mortars while only 12.1% of the respondents milled their rice using conventional milling machine provided by NGOs and private enterprises.

3.5 Access to Agricultural Extension Services

The survey results indicate that the farmers have limited access to agricultural extension services as only 28.2% of them were visited by government extension agent during the 12 months before the survey. NGO extension workers visited almost equal percentage (27.6%) of farmers during the same period. The

implication of the poor access to extension services by farmers is that farmers may not obtain information on improved rice production technologies through the extension workers. The topics covered by the extension workers during their visits to the farmers range from modern production to processing techniques.

3.6 Use of Improved Agricultural Technologies

The adoption rate of rice production technologies correlated with access to agricultural extension services as revealed by the following results. About 20% of the farmers indicated the adoption of improved rice varieties while 14.5% used the improved nursery techniques followed by line planting (10.3%), water management (8.5%) and fertilizer (4.5%).

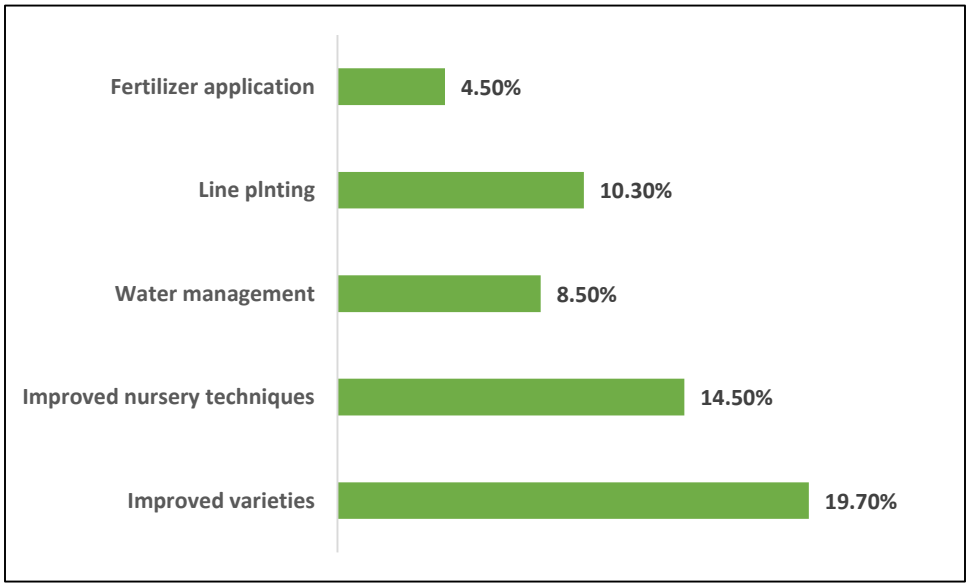

Figure 6: Use of Improved Technologies

3.7 Farmers Constraints in Rice Production

Among the constraints indicated by the interviewed households include lack of farm tools (87.5%), lack of financial capital to purchase agricultural inputs (93.7%), lack of access to modern processing facilities (87.2%), high labor costs (95.6%) to perform different farm operations, inadequate information on

improved technologies (76.3%) that can be employed in rice productions and lack of motorable roads (86.2%).

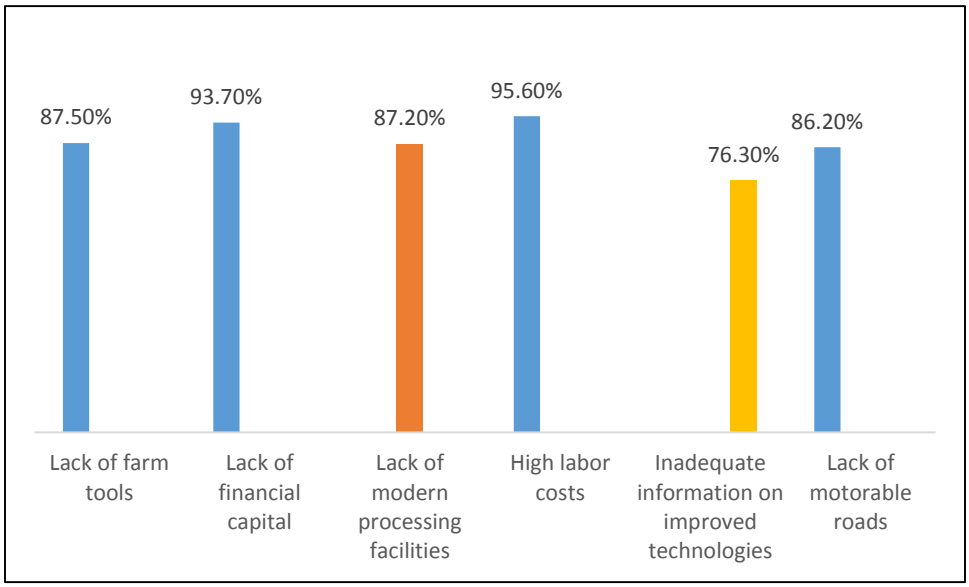

Figure: 7 Constraints in Rice value chain among the farmers

3.8 Focus Group Discussion (FGD)

3.8.1 Production systems

Results of FGD indicated that majority (96.5%) of the participants, cultivated local varieties of rice such as Mai, Gissi, Black deer, Sasa, among others. Cultivation of LAC 23 and Suakoko 8 was widespread among the participants and have become local varieties and subsequently tagged as "country rice". Participants cultivated rice within the range of 0.4 to 2.0 hectares with resultant low yields. Only a few of them planted improved varieties like NERICAs. Sources of seeds planted by the participants reported that the seeds they planted were obtained from friends and relatives or the left-over from the previous season. Most of the participants used the number of tins/buckets filled with seeds to determine the size of the cultivated land and 2 tins/buckets filled with seeds could approximately plant one acre of land. A large percentage of FGD participants cultivated rice at a subsistence level whereby most of the harvested rice was consumed within the households and even supplemented it with imported rice purchased from the open market. It was noted that the use of inputs like fertilizers and herbicides were not popular among the

participants. Some of them claimed lack of adequate knowledge of using them while majority of them reported that these inputs were not available in their areas.

Participants from all the project counties that took part in the discussion also confirmed rice as staple food and indicated their consumption of rice between two (2) to three (3) times on a daily basis. FGDs also revealed that rice farmers were not operating in groups and this had eluded the advantages of group formation. However, few of them claimed the membership of social groups known as "Esusu" to take care of their financial needs.

Harvesting activity was carried out using both hired and family labor as reported by the FGD participants and the hired laborers were paid in kind using part of the harvested rice. Harvested rice was tied into bundles of various sizes producing 2 – 5 kg of rice grains per bundle when threshed.

3.8.2 Post-harvest activities

Majority of the FGD participants processed their harvested rice using traditional methods such as beating with sticks or trampling on it (threshing) while milling was done by pounding it in a mortar. Only a few of them had access to modern milling equipment in their area. However, the majority of the participants that have the milling machine in their area do not use it because they only mill small quantity of rice for household use whenever the need arises. Most of the milled rice were consumed within the household of the participants. Only a few (1.5%) of the participants reported having enough rice for household consumption before the next harvest season. It was probably due to low yields realized from production by planting local varieties coupled with non-use of improved technologies and post-harvest losses. According to the participants post-harvest losses have been very considerable and one of the main factors constraining rice productivity and threatening food security.

3.8.3 Post-harvest activities constraints

The following are the constraints highlighted by the rice farmers that participated in the FGDs.

- Lack of financial capital to purchase implementing tools, inputs and pay for high labor cost.
- Lack of technical knowledge to carry out rice farming operations.
- Lack of access to modern equipment to go into mechanization of rice production.
- High crop damage and losses due to pests (birds, rodents, grasshopper, termites etc.) infestation.
- Inadequate access to agricultural extension services.

- High level of post-harvest losses due to poor processing techniques (traditional methods), birds and rodents attack and lack of appropriate storage structures

3.8.4 Other stakeholders

Only few rice millers were able to attend the FGDs from three (3) counties (River Gee, Grand Cape Mount and Grand Gedeh) and agro-dealers participated in the FGDs organized for both Montserado and Margibi counties. Rice traders were among the participants in the FGDs conducted across the counties.

The rice millers operate on a small scale using diesel engines to power their machine at capacity within the range of 1 – 1.5 tons/day. However, the milled rice has to be further processed to remove some unwanted materials like rice husks and bran. Some of the participants reported the percentage of broken rice in the range of 35 – 45% probably due to the paddy that was not properly dried or inadequate knowledge of the mill operators. Most of the rice millers themselves were rice farmers that used paddy from their farms to feed their mills. Majority of their customers are rice farmers in their areas who paid for their services both in cash and in kind. Some of the rice millers cited the following as constraints to rice milling operations:

- High milling breakages due to improperly dried paddy.
- Lack of machine spare parts and repair kits.
- High level of contaminated paddy with foreign materials (e.g. stone).
- Inadequate supply of paddy due to less patronage by the farmers.

The agro-input –dealers that participated in FGDs reported their engagement in the sale of agro-chemicals like, herbicides and insecticides. They, however, said less patronage from the rice due to farmers' insufficient knowledge on importance and usage of the inputs. They also complained about the inadequate capital to do significant business.

Most of the rice traders that participated in FGDs engaged mostly in the sale of imported rice but expressed their willingness to patronise rice farmers for locally milled rice as soon as the quality improves. Difficulty in securing foreign currency (United States dollars) for rice procurement and poor road conditions were the challenges highlighted by rice traders during the FGDs.

4.0 CONCLUSION AND RECOMMENDATIONS

The baseline survey on rice value chains was conducted to develop benchmark information that can be useful for future impact assessment of the SAPEC project. Both qualitative and quantitative data were collected using questionnaire and Focus Group Discussion (FGD).

Most of the rice farmers operate at subsistence level cultivating small plots of rice farms ranging from 0.5 to 1.0 hectare. Hence, the project's goal of targeting the smallholders in rice farming is an appropriate strategy. It will enhance rice productivity and enable the farmers graduating from subsistent to medium or large scale rice farmers.

The following issues were identified during the survey:

- Use of improved technologies in rice production is very low among the interviewed farmers due to inadequate access to available modern techniques of rice production and processing.
- Most of the farmers cultivate rice under rain-fed upland ecosystem as most of the lowland areas have not been developed to facilitate its use for rice production.
- Use of improved high yielding rice varieties is very low as majority of the farmers plant the local varieties.
- Seeds from the previous season form the major source of the planting material (seeds) for the farmers.
- Farmers have not been exposed to Community Based Seed System (CBSS) that can serve as a reliable and best alternative source of seeds procurement.
- Only the Imported rice are available in the market for general consumption of the public all the year round.
- The majority of the farmers have limited access to extension services. Hence, no significant interaction between the extension technicians of MoA and NGOs and the farmers that could lead to self-sufficient in rice production.
- All the project technicians and most of the MoA and NGOs extension workers have not received training on Integrated Rice Management (IRM) in recent times.
- Almost all the rice farmers did not own or have access to mechanization tools such as power tiller, planters, weeding machine, and processing equipment that can facilitate mechanization of rice production.
- Post-harvest losses have been very considerable among the interviewed rice farmers and happen to

be part of the factor constraining rice productivity.

- Other stakeholders like millers, rice marketers have not received training on pricing, packaging and collection in recent time.
- The identified artisans have not been receiving training on the fabrication of agricultural equipment for the rice farmers before the SAPEC project.

The implementation of SAPEC project already in progress is a promising approach that can be used to address the identified issues and the constraints raised by all the stakeholders along the rice value chain in Liberia.

The following recommendations are made based on the identified issues:

- The project extension technicians, MoA and NGOs extension workers should be adequately equipped through training to enhance effective dissemination of improved rice production and processing technologies.
- The extension worker should improve their activities to sensitize and mobilze all the rice chain actors towards group formation and link them to credit suppliers to improve productivity.
- The issue of seeds is an important factor that needs to be addressed by constituting a functional National Seed board. In the meantime, Participatory Varietal Selection (PVS) should be used to speed up the introduction of the improved rice varieties to the resource-poor farmers. Community-based Seed multiplication Scheme (CBSS) approach should also be employed in the production of selected varieties at PVS trials.
- The implementing partner (AfricaRice) should design, fabricate significant equipment to facilitate the commercialization of rice production and processing to meet the desired quality that cam compete favourably with imported rice in the markets.
- The local artisans should also be trained on how to fabricate these equipment for easy accessibility and future maintenance.
- The Ministry of Agriculture should absorb the project focal persons and technicians at the end of the project to ensure sustainability and enhance productivity.

REFERENCE

Reynolds, Chris, Mike Field. 2009. Global food security response – West Africa rice value chain analysis Liberia rice study, Micro Report #157. USAID, August 2009.

ANNEX 1: BASELINE SURVEY IN PICTURES

Training of enumerators for the Survey

A woman farmer granting an interview

An enumerator with a rice farmer

Focus Group Discussion (Women)

Focus Group Discussion (Men)