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FOOD AND ENTERPRISE DEVELOPMENT (FED) PROGRAM FOR LIBERIA

SUB-TITLE: FED STRATEGY TO ADDRESS PERCEIVED GAPS IN THE LIBERIAN RICE SECTOR

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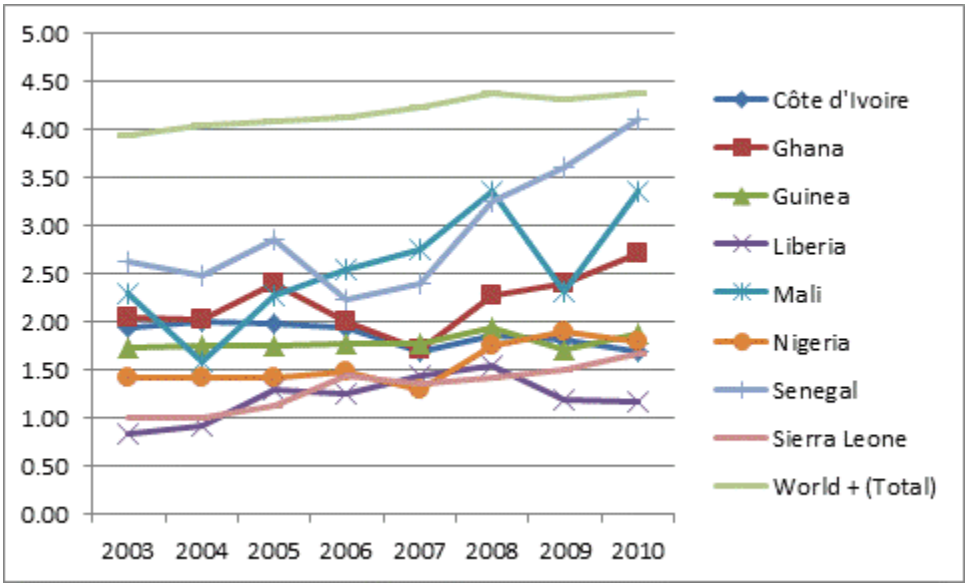
The fundamental objectives of the FED program include:

1. Increase agricultural productivity and profitability and improve human nutrition
2. Stimulate private enterprise growth and investment
3. Build local technical and managerial human resources to sustain and expand accomplishments achieved under objectives 1) and 2).

The Liberian rice economy is extremely important to the diets of the population. According to FAOSTAT (2007) the Food Balance Sheet for Liberia indicates that 33% of per capital caloric intake is from milled rice, followed by 21% from cassava. Liberia relies heavily upon rice imports for 69% of annual consumption (2011 imports of 300 thousand metric tons (MOCI) for estimated 2011 consumption of 437 thousand metric tons (USDA, PSD).

Domestic rice output is predominantly produced under upland (slash and burn) production system. Average yields in Liberia are low by global standards (Figure 1). Most of the domestic rice output only sustains the farm household consumption. Very little surplus of domestic production enters into the commercial market, although accurate data on this flow are not available.

Figure 1. Yield comparisons, West African countries and the world (MT/ha paddy).



Source: FAOSTAT

Enabling Environment

Clearly one of the major constraints facing enterprise development in Liberia for the rice sector is the presence and level of activity in rice by relief donor agencies and NGOs. While efforts by these groups have certainly assisted Liberia address food security concerns following the civil strife, their dominant presence in donating seeds, tools, etc. has the effect of suppressing private enterprise development.

Another major constraint is the gap in agronomic and economic research on rice. This gap constrains the ability of the project to promote meaningful farm level extension activities, timely and useful sales of output enhancing purchased inputs that translate research into improvement in productivity at the farm level. There are now credible estimates of the costs of producing rice under rain-fed upland, lowland or irrigated lowland. This is a major challenge for the project as it will need to benchmark progress not only in terms of enterprise development but also in terms of helping to reduce costs per unit of output. From the labor budgets available, (see USAID report b

A constraint also exists in terms of labor supply and increases in unskilled wage rates. According to price statistics collected and reported by LISGIS, wage rates have risen over the past two year although a cursory examination of the data suggests that labor markets are not well-integrated across counties.

Recommendations for FED activities for the rice sector:

Priorities:

1. Seed sector development. This should be the primary focus in the initial year of the project. There are improved varieties for both upland (Nerica 1, 2, and 14 and LAC 23 (red and white)) and lowland rice (Suakoko 8 and Nerica L 19) which can be produced and demonstrated for rice farmers. The project needs to go big with this activity by engaging as many leading farmers in each town/village to produce this year, even a demonstration plot of improved lowland rice variety, for seed production. Ideally this program should be identified with a name (slogan that the MOA/extension component should help to develop) that will be an identifier of the activity. While the project appears to be limited/focused on enhancing lowland rice, I recommend that where possible that farmers be enrolled to also develop a seed production plots with an improved upland variety.
2. Develop support for manufacture or assembly of farm tools. The 2010 Agricultural Survey reported that the most important constraint among rice farmers was lack of farming tools (Figure 2.2, p. 8). Additional rationale for this recommendation is that wage rates have risen dramatically (nearly doubling) over the past two years (LISGIS price statistics). While lack of farm labor was identified in the 2010 survey as only the

fifth most important production constraint, as the mining sector and tree crop sectors siphon off farm labor away from rice production, labor supply will to produce rice access to farming tools and ultimately mechanization will be critical to improving productivity of rice in Liberia.

3. Support basic research trials on varietal selection and response to fertilizer application and timing. Continue research on varietal screening for tolerance to iron toxicity. Support research trials on weed and pest controls on improved varieties. Conduct partial budgeting on such trials.
4. Support a National Workshop on Constraints to Increasing Rice Production in Liberia: Insights from Liberia Rice Farmers, Ministry of Agriculture, and approaches being pursued in Other African Nations, by the Africa Rice Center and by the International Rice Research Institute.
5. Develop support for improved harvest and post-harvest crop management, including: developing private enterprises to supply tarpaulins, build cooperative/village drying facilities, assisting in the development of private enterprises to build more efficient rice hullers/milling equipment such as the Freedom Mills. Assist in the design of procurement systems with either current rice trading firms that engaged in importation of rice or existing rice millers such as Fabrar Rice Mill that can facilitate pooling of surplus production for sale to rice mills.
6. Promote the financing for purchase of inputs by working with micro finance and commercial banks through established input suppliers such as Weinco and other firms, as identified by Jean Nyemba and Mary Miller.

Rice research:

Rice research has not been conducted in Liberia since the beginning of the civil strife in 1990. Prior to that time, Liberia rice research was a leader for the West African region and was the initial research station host site for the West Africa Rice Development Association (WARDA), currently known as Africa Rice Center. The Central Agricultural Research Institute at Suakoko was functioning at a high level with a full complement of agricultural researchers before 1990. With the civil strife, the station fell into ruin. Today, the UN military still occupies much of the station. However, rice varietal screening trials have been initiated and the groundwork to rehabilitate the research station has begun.

The lack of research on rice breeding and variety adaptation, agronomy, fertility, pest management, irrigation management, socio-economic analysis, harvest and post-harvest management has serious consequences for the likelihood that Liberia can achieve the goal of rice self-sufficiency within the timeframe expressed in the National Rice Development Strategy by the Ministry of Agriculture.

Rice production:

Rice and cassava are the primary staple food crops in Liberia. According to the 2010 Agricultural Survey, there are 209,740 rice producing household, 73.7% of total agricultural households, with 74.1% male-headed households and 25.9% female-headed (2010 Agricultural Survey Fact Sheet p. iv). Among other crops, rice has the highest percent of female-headed households. In 2010, paddy (rough rice) output was estimated to 296 thousand metric tons, 1.1% higher than in 2009.

As a measure of how far behind Liberia has fallen since the civil war, production in 2010 was nearly 1% less than the pre-war year of 1988 (2010 Survey, Table 2.1). Area under rice production increased by 6.6% above the 1988 level, however, yields were more than 7% lower in 2010 compared to 1988 and nearly 6% lower compared to 2009.

The following gap analysis discusses specific issues, current situation and proposed actions for the FED project.

Liberia Rice Sector Gap Analysis - FED Project		
Future State	**Current Situation**	**Actions/Proposals**
Increased productivity of rice sector	Average yield is 1.205/ha ((2008-10) LIPSIS). Average total production is 289.6 thousand MT (2008-10). Compares to pre-war of 1.27 MT/a hand production of 298.6 thou MT Low land productivity reflect dominance (>90%) of upland production system in Liberia.	Production campaign: A systematic and staged development of technology research, demonstration, extension and adoption is needed. This campaign should be developed so that it is viewed as a program package that will have a signal name and series of stages to improve enterprise development among Liberia rice producers. Institutionally this needs to be developed in concert with CARI and the MOA Extension service at the national and county levels of administration. Institutional development of rice producer organizations should begin so that farmers can be developed as leaders, and farm-level enterprises that commercialize their rice production.

Liberia Rice Sector Gap Analysis - FED Project		
Future State	**Current Situation**	**Actions/Proposals**
Adoption and diffusion of appropriate agricultural production technologies	2010 Liberia Agriculture Statistics reports that major rice production constraints perceived by farmers (in order of importance) are: lack of farming tools, pests, untimely rainfall, lack of seeds, lack of farm labor, lack of extension service/training, plant diseases, poor soil fertility, poor quality seeds, access to land. (Fig. 2.2 p. 8)	A Liberian Rice Research and Extension conference should be developed and held at the end of the first year, based on: 1) presentation of previous year's Liberian rice production and status of food security, production constraints and gap analysis, 2) experiences of rice sector development of other West African countries, 3) Africa Rice and IRRI participation to have them identify contributions they can make to closing research gaps, and 4) NGO participants whose agendas include improving food security, technical assistance and enterprise development. This conference should be held in every subsequent year of the project to 1) assess project progress and rice sector development on research, extension, enterprise development and progress on cross-cutting issues such as improvement in access to program by women, enterprise development including financing, business training, and investment 2) to present and discuss research and extension plans for the subsequent year, and 3) to promote awareness of the project to local, national and international

Liberia Rice Sector Gap Analysis - FED Project		
Future State	**Current Situation**	**Actions/Proposals**
		stakeholders. Financial support for the national rice conference should be sought from Bioscience companies, International organizations (World Bank, FAO, IRRI, etc.), and NGOs. Develop with extension, local and county level rice production meetings with farmers to discuss production problems and constraints. These meeting should be held during the dry season of each year to reflect on problems of the previous year and introduce new production information for producers for the upcoming production season.

Liberia Rice Sector Gap Analysis - FED Project		
Future State	**Current Situation**	**Actions/Proposals**
Production using higher yielding improved varieties	2010 Liberia Agriculture Statistics indicates, 91% of rice producing households planted "traditional" varieties, only 5% planted LAC 23 and 1% planted Nerica varieties. Standard practice however is that farmers will sow several varieties at the same time as a risk mitigating strategy to ensure that they will obtain some production. Commingled seed varieties present significant problems for application of best management practices such as optimal timing of fertilizer application, pest control, timing of harvest, and milling quality.	Support research varietal trial screening and development for selections that are adapted to Liberian rice production environments. Ensure that currently adapted germplasm for lowland rice (Suakoko 8, WITA, Nerica, etc) and for upland (LAC 23 and Nericas) are being used aggressively in rice breeding efforts at Africa Rice, IRRI, and other national experiment stations. Support more open and integrated discussions with the China project at CARI to develop and produce hybrid varieties. Develop a network of "leading" farmers in as many rural communities as possible to enroll in producing and testing improved varieties within the context of the national rice campaign demonstration plots. All participants would be recognized at the national rice conference and a set of annual awards will be developed to be given to Top Farmers (highest yield, most innovative technology award, etc.). Support rice seed producers in training to understand new Liberian seed policy and regulatory framework to supply certified seed. On-farm demonstration sites should be followed up with a development of a

Liberia Rice Sector Gap Analysis - FED Project		
Future State	**Current Situation**	**Actions/Proposals**
		national directory of rice seed suppliers by locality in the project target counties. Seed producers should be given technical and business management training regarding appropriate seed handling, labeling, packaging (size and type), accessing and pricing to wholesale and retail (local farm) markets. Finally, rice varieties before release should be evaluated for nutrient, processing (milling rates) cooking-characteristics, and other characteristics of concern to consumers. Support for a grains quality (food science) scientist should become a priority for CARI as it seeks to introduce improved varieties.

Liberia Rice Sector Gap Analysis - FED Project		
Future State	**Current Situation**	**Actions/Proposals**
Production using best management practices of fertilizer and cultural techniques	Current fertilizer use is limited. No soils test laboratory in the country. No experimental fertilizer response studies for soils and improved varieties.	Support research at CARI on nutrient and fertilizer application experimental trials. Engage support of private fertilizer supply companies to sponsor research and farm level demonstration trials. Only with experimental trials on locally adapted varieties and soils can the development of fertilizer supply firms and merchandizers be justified. Develop support of a soils testing laboratory and support training of extension workers to assist farmers in collecting and evaluating fertilizer requirements. Current fertilizer pricing for producers needs to be evaluated such that pricing reflects nutrient value added based on research trials.

Liberia Rice Sector Gap Analysis - FED Project		
Future State	**Current Situation**	**Actions/Proposals**
Production using best management practices of integrated pest control	2010 Liberia Agriculture Statistics reports that by percent of households reporting the most prevalent pest (in order of importance) are: ground hogs, birds, termites, weeds, and insects.	Support research on best management practices to control pests. Trials of frightening and scaring devices and techniques, physical barriers, and chemical repellents should be supported. Develop businesses that produce pest control technologies, such as live traps, bird disturbance devices, herbicide treatments, and integrated insect management. A report of rice pest management in neighboring West African nations should be developed so that lessons learned can be extended in Liberia. Collaboration with wildlife and birding NGOs should be pursued to identify pest species and understand appropriate control methods. Similarly, weed scientists and entomologists should be consulted to assess the plant and insect species that are most damaging pests for rice and obtain advice on best management control for small farm plots.

Liberia Rice Sector Gap Analysis - FED Project		
Future State	**Current Situation**	**Actions/Proposals**
Production using best management mechanization with respect to labor supply/demand	Current uptake of rice farm labor into mining and perennial crops production is posing a significant labor supply constraint on rice production. As a subsistence crop women and children are often left to manage the production of rice in Liberia. There has been significant rural population migration to Monrovia and major cities in counties creating labor scarcity in rice production areas.	Mechanization policy should be carefully developed for the rice sector. Farmers indicated that a major production constraint was lack of tools, for both production and harvest. Since this project will focus on lowland rice production and rehabilitation, there is an important need to assess the appropriate types, sizes, ownership, supply and financing of machinery to expand and reclaim lowland areas. Given the important role of women in rice production, addressing obstacles such as access to finance and training for mechanization must be paramount. Production and merchandising of farm tools and machinery provides an important area for developing a significant number SMEs to participate in this critical component of the rice value chain.

Liberia Rice Sector Gap Analysis - FED Project		
Future State	**Current Situation**	**Actions/Proposals**
Production using best management practices for irrigation and water control for lowland varieties	Less than 10% of Liberia rice production is swamp/lowland (irrigated). Irrigation infrastructure is in poor condition. Costs of reclaiming lowland rice production areas is expensive ($300-$500 per acre)	Land and water development for lowland rice is central to improving productivity of Liberia's rice sector. Most land under lowland rice went out of production during the civil strife. Program 4 of LASIP intends to invest in expansion of irrigable land. It has been estimated that nearly 10,000 ha need to be rehabilitated per year over the next five years to be able to begin to meet self-sufficiency rice production goals of the National Rice Strategy. Policy constraints that the project must address and monitor include improvement in land tenure and titles for producers who are expected to move onto rehabilitated lowland rice production areas, investment and financing constraints that must be removed to achieve expansion of irrigable areas. Coordination with companies who have been allocated rice production concessions on lowland rice in order to develop adequate input and product market infrastructure, including machinery and equipment suppliers, seeds, fertilizers, and other purchased input enterprises as well as post-harvest rice drying, storage and milling. To the extent that the GOL

Liberia Rice Sector Gap Analysis - FED Project		
Future State	**Current Situation**	**Actions/Proposals**
		has committed to reducing slash and burn upland rice production to meet environmental objectives (reduced carbon emissions) by promoting lowland double crop rice production, a monitoring policy to ensure no loss in total national output.

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Future State	**Current Situation**	**Actions/Proposals**
Production using best management practices of post-harvest drying and storage of paddy	The dominant method of drying rice is ground or tarpaulin spreading using sunlight. Paddy is currently stored in 50kg bags in farm households.	Support research activities on post-harvest management of paddy rice. Identify improved methods of rice drying and storage to minimize post-harvest losses and maintain quality of paddy prior to milling. Enable SME to assess feasibility of producing and merchandising improved rice drying and storage equipment. Promote development of techniques and equipment to manage post-harvest losses from pests (rodents, etc.) which should also be pursued by assisting SMEs to produce and market storage and drying infrastructure to minimize damage from pests.
Transportation of paddy to mill sites/markets based on best logistical and integrated markets	Paddy is either home milled using mortar or taken to local market where it is tow milled by a single pass huller (Engelberg-type). With only limited commercial rice milling, currently the miller drives to known farms or farm groups where paddy is purchased directly from the farmer.	Investment in roads and monitoring policies which are constraints to transportation infrastructure must be addressed for surplus household production to reach local and urban markets. Expansion in the number of grain merchants will encourage a competitive procurement system for paddy rice and minimize opportunistic and predatory pricing of farm to wholesale marketing margins.

Liberia Rice Sector Gap Analysis - FED Project		
Future State	**Current Situation**	**Actions/Proposals**
Processing of rice from paddy to milled using best management practices with respect to milling quality (out-turn), nutrition, storage, and access to markets.	Milling quality of Liberian rice is poor as a result of primitive milling methods. Even best mills produce high percentages of brokens. Many causes include commingling of different varieties, different maturation and drying of batches being milled, lack of investment in milling equipment, grading, sorting, hulling and polishing machines. The upside is that most domestic rice is only lightly milled with a high percent of bran (brown rice), which is considerably more nutritious compared to white rice.	The project should encourage an expansion in the number of rice millers and work to remove financial and investment barriers that these rice processors encounter, including business registration, excessive food safety regulations and limitations on access to wholesale and retail markets. Nutrition policy analysis should consider how quickly improving the rice milling sector should proceed as poorly milled rice in general is more nutritious that well-milled white rice. Until the Liberian diet becomes less dependent on rice as a staple food, the development of a high quality milling sector producing well-milled rice should be approached with caution.
Production and distribution to local rural markets of domestic rice	The linkage from farm to local rural market is weak. Surplus rice is marketed but current production levels require imported rice at remote local rural markets.	The project should identify bottlenecks including transportation, storage, regulatory food policies that constrain the movement of domestic rice into competition with imported rice.

Liberia Rice Sector Gap Analysis - FED Project		
Future State	**Current Situation**	**Actions/Proposals**
Production of domestic branded rice products for distribution to urban areas	Currently there is one Liberian-branded rice product found in retail stores--Fabrar. Production is very limited.	Branding and packaging of domestic rice can help to promote markets and improve visibility of Liberian rice production. Barriers to advertising, promotion and brand development should be addressed by the project to enhance the profitability and competitiveness of wholesale and retail suppliers of domestically supplied rice.

Liberia Rice Sector Gap Analysis - FED Project		
Future State	**Current Situation**	**Actions/Proposals**
Increase profitability of the rice sector	Baseline cost estimates of rice production are lacking. While LIPSIS has developed a regional rice price reporting system, without estimates of costs, measuring current profitability of domestic rice production is difficult. Even with little use of purchased inputs other than seed, the major cost component must be labor which for yield levels only slightly above 1 MT per ha returns to rice production are low. Cost of imports as they flow up country to local and regional markets provide a useful shadow price for local production. What is most clear is that current production is primarily for household self-sufficiency in the face of undeveloped market channels. Systematic development of research based technology innovations, significant investment in rehabilitation of lowland rice production areas, commitment to test alternative farm-level innovations through demonstration plots	The project must develop credible baseline production cost estimates for upland and lowland rice production systems. This will allow the development of domestic resource cost (DRC) estimates to assess improvement in the competitiveness of the rice sector over the life of the project. Profitability of the rice sector can be attained through the development of a commercial business infrastructure for delivery of new technologies, improved seeds, improved quality of rice products, and expanded access to rural and urban markets. However, if the research and extension components are not developed simultaneously, enabling the business environment will be futile. Therefore, consistent support and interaction with agricultural research and extension will be critical to the success of this project.

Liberia Rice Sector Gap Analysis - FED Project		
Future State	**Current Situation**	**Actions/Proposals**
Stimulate private enterprise growth and investment	While a clear MOA policy exists against the distribution of free inputs, the current situation is that many NGOs are providing free seeds, hand tools, and other inputs. Private enterprise growth and investment cannot develop under these circumstances.	The project must coordinate with MOA and donor agencies/NGOs to transition immediately from free distribution to market based supply of inputs. Further, unscrupulous marketing of farm inputs without adequate research recommendations and regulatory oversight must also be addressed including, enforcement of seed policies for seed purity, guaranteed germination, and research-based applications of fertilizers, pest management and other output enhancing inputs. The project should identify and work with input supply companies and identify local businesses that need training to supply and provide advice on input purchases. In addition to establishing appropriate input recommendations through research trials and extension efforts, the project must address financial constraints and business training for local input suppliers.

Liberia Rice Sector Gap Analysis - FED Project		
Future State	**Current Situation**	**Actions/Proposals**
Enabling the policy environment for private sector growth in the rice value chain	The National Rice Development Strategy is designed to work within the context of the Poverty Reduction Strategy and the Liberia Agricultural Sector Investment Program (LASIP). The primary policy goal is to reduce dependency on imports of rice (currently over 60% of supply) and to increase incomes of small farmers.	The project must address the lack of basic economic and technical information needed to evaluate the ability of domestic rice varieties to replace imported rice. Imports have traditionally been sourced from China, the so-called "butter rice". However over the past several years, the import market has become much more of a parboil rice market. This change suggests that world market prices, which differ significantly by type and degree of processing, largely determine the type and source of rice being imported into Liberia. Rice consumption by Liberians is very price sensitive and it is unclear what type and method of processing is truly preferred by Liberian consumers. The project should conduct a study of rice preferences using experimental auctions to determine willingness to pay for rice type, degree of processing, etc. so as to provide guidance to the varietal selection and investment strategies for processing and marketing. Other activities that the project must pursue to ensure a policy environment favorable to private sector growth include: 1) Assess impact of constraints to land

Liberia Rice Sector Gap Analysis - FED Project		
Future State	**Current Situation**	**Actions/Proposals**
		tenure on lowland rice production areas, 2) Evaluate progress on the implementation of the national seed policy and regulatory framework such that barriers to SME participation in certified rice seed production and marketing are identified and addressed, 3) Evaluate the ability of Liberia to compete with rice imports based on a domestic resource cost study of Liberia rice production under current and an improved (attainable) production environment. This study should also identify the investment activity priorities which will have the highest return to achieve competitiveness relative to prices of rice imports, 4) Assess the organizational requirements for farmer-based organizations, such as local, country level and national level rice producer organizations. This study should identify a program to develop young rice farmer leaders by developing a curriculum and sets of activities that enable an understanding of the issues that affect the performance of Liberia's rice sector, 5) Rice sector price policy study to evaluate the cumulative/comprehensive effect of

Liberia Rice Sector Gap Analysis - FED Project		
Future State	**Current Situation**	**Actions/Proposals**
		taxation and subsidies on the domestic market relative to imports, 6) While not specific to rice, cross-cutting policy studies that affect all four value chains of the project should include policy studies on plant protection and pesticide regulations, food safety regulations, policy to promote women's participation in private sector development, access to credit, barriers to resolution of legal conflicts.

Policy Milestone Matrix for Liberia Rice Sector					
Policy	**2012**	**2013**	**2014**	**2015**	**2016**
Seed Multiplication Policy: identify constraints to implementation of national seed policy and regulatory framework for certified rice seed production and seed enterprises	X	X			
Rice Price and Trade Policy: identify effects of taxes and subsidies on current and potential competitiveness of Liberian rice production relative to rice imports. This study will examine both product and input price policies as well as trade policies such as tariff and non-tariff barriers, and market structural effects.		X			X
Lowland Rice and Water Policy: identify constraints to the investment and rehabilitation of swamp rice production areas, including implementation by concessions, land tenure and access to water rights, investment facilitation and coordination under Program 4 of LASIP.		X	X		
Road and Transportation Infrastructure Policy: identify barriers to achieving goals of LASIP Program 2, rehabilitation and expansion of rural roads to rice production areas that are expected to produce surpluses			X	X	

Policy Milestone Matrix for Liberia Rice Sector					
Policy	**2012**	**2013**	**2014**	**2015**	**2016**
Agricultural Research for Rice Policy: Evaluate human resource and physical infrastructure needs to achieve basic levels of experimental rice research. This policy study should be coordinated with the MOA/CARI, Africa Rice Center, and International Rice Research Institute.	X	X			
Agricultural Extension and Training Policy for Rice Production: Evaluate the capability and needs for training and logistical support to develop and sustain a high level of extension activities for the rice value chain. This policy study should be coordinated with MOA/Extension and NGOs active in providing direct farmer technical services.	X	X			
Agricultural Input Enterprise Development Policy: identify barriers for input supplier enterprises including cross-cutting issues such as credit, women participation, and input (pest control) regulations		X	X		
Community Development and Farmer Organization Policy: identify constraints in rural communities to promote civic organizations that support businesses such as Chambers of Commerce and Farmer Producer Organizations, Farm Women Organizations, etc.			X	X	