Improving and Scaling up the System of Rice Intensification in West Africa

SRI-Rice Trip Report
February 22nd - March 2nd, 2014
Republic of Liberia

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1. Introduction

Liberia is part of the regional, commissioned WAAPP project “Improving and scaling up SRI in West Africa”, steered by CORAF/WECARD, and coordinated and implemented by the *Institut d’Économie Rurale*’s National Center of Specialization on Rice (CNS-RIZ), based in Mali. The SRI International Network and Resources Center (SRI-Rice), based at Cornell University (NY, USA), is the principal technical partner at the regional level. This regional project was developed over a two-year period in a participatory process with stakeholders from all 13 participating countries, including members of the farming, extension and research communities. Two workshops were held in July 2012 (Ouagadougou, Burkina Faso) and in August 2013 (Saly, Senegal) to developing the project framework, and the project was officially accepted at the end of 2013.

Representing Liberia’s Farmer Union Network (FUN), Robert Bimba participated in the Ouagadougou workshop in 2012. Inspired by what he learned at the workshop, upon his return to Liberia Robert voluntarily put in place Liberia’s first SRI plot through the Community of Hope Agriculture Project (CHAP) in December 2012. Results evaluated by CHAP and surrounding farmers were promising, and generated interest in further pursuing SRI.

Following the workshop in Saly in August 2013, WAAPP Liberia and CHAP collaborated closely to get SRI WAAPP Liberia activities started:

- WAAPP Liberia designated CHAP as the national SRI Focal Institution, and Robert Bimba as the national SRI Focal Point
- A work plan for SRI activities for 2014 was established and approved
- A first training of trainers was held in December 2013 with 84 participants coming from every county in Liberia
- Since the training in December, participants had already set up 5 SRI sites by January and February, despite this being the dry season, a time when farmers don’t typically plant rice
- The focal point and a champion farmer participated in the launching workshop of the regional project from Feb 17-19, 2014 in Porto Novo, Benin
- Robert Bimba has been active in discussing the SRI WAAPP project with many stakeholders in Liberia

As SRI activities in Liberia are starting-up, given the interest for SRI in Liberia, the considerable number of people trained in December 2013, and given the plans for quick expansion of SRI plots in all 15 counties, Robert Bimba, WAAPP Liberia and the regional coordination of the SRI project felt that it was appropriate to organize a first support mission from the regional coordination.

2. Objectives

The **main objective** of this mission was to provide technical support to the start-up activities of the SRI Liberia project under the WAAPP.

The **specific objectives** were to:

i) Meet with the stakeholders involved in the SRI WAAPP project and discuss mechanisms for introducing SRI throughout the country

ii) Visit SRI fields, including the CARI research station, and obtain a better understanding of local rice systems; discuss with farmers and researchers the performance of the SRI plots, provide
technical advice for SRI implementation and identify agro-ecological opportunities for the Liberian environment

iii) Meet with organizations active in the rice sector and evaluate collaboration opportunities with the SRI WAAPP project

iv) Present the SRI WAAPP project to the Agriculture Coordination Committee (ACC), at the Ministry of Agriculture, Monrovia

v) Provide a day-long training for farmers and technicians as a follow-up of the TOT in December

3. Agenda

The trip was organized by WAAPP Liberia and the SRI Focal Point Robert Bimba. Bimba came along to all of the meetings and field visits. WAAPP National Project Coordinator J. Cyrus Saygbe, Sr. was out of country during the visit. I met with Edwin Tucker and M&E specialist Edward Borloh from WAAPP. Debriefing was done over the phone at the end of the mission with the WAAPP coordinator.

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<tr>
<th>Date</th>
<th>Activity</th>
<th>Comments</th>
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<tr>
<td>Sat., Feb 22</td>
<td>Flight from Cotonou to Monrovia, via Lomé and Accra</td>
<td>Arrival in the evening</td>
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<td>Sun., Feb 23</td>
<td>Meet with CHAP project staff and champion families, church service, visit historic sites of Monrovia</td>
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<td>Mon., Feb 24</td>
<td>Meetings:</td>
<td>People met in Annex 1</td>
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<td>Oxfam Liberia</td>
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<td>FED/USAID project</td>
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<td>Visit of CHAP farm and SRI plots</td>
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<td>Tue., Feb 25</td>
<td>Meeting with Farmer Union Network (Robert Bimba)</td>
<td>Drive to Suakoko District,</td>
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<td>Field trip to CARI research station, Meeting with M&amp;E WAAPP officer</td>
<td>Bong County, to visit CARI</td>
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<td>Visit to BRAC field station</td>
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<td>Wed., Feb 26</td>
<td>Car problems – field visit cancelled</td>
<td>Time used to prepare</td>
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<td>Meeting with Robert Bimba about program</td>
<td>presentation for next day</td>
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<td>Thu., Feb 27</td>
<td>Presentation to Agriculture Coordination Committee; meeting</td>
<td>48 participants</td>
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<td>with staff of the Ministry of Agriculture</td>
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<td>Fri., Feb 28</td>
<td>Training day and field day with technicians and farmers at CHAP meeting</td>
<td>About 25 participants</td>
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<td>room and SRI fields</td>
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<td>Sat., Mar  1</td>
<td>SRI field visit with FED/USAID project</td>
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<td>Meeting with CHAP staff regarding the design of their SRI pilot project</td>
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<td>Sun., Mar 2</td>
<td>Debrief with WAAPP coordinator Cyrus (phone)</td>
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<td>Debrief with Focal Point Robert Bimba</td>
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<td>Flight from Monrovia to Brussels, NY</td>
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4. Meetings with actors in the rice sectors

4.1 Oxfam Liberia: Met with Sampson V.K. Dolo (Economic Development Coordinator) and Samuel H.B. Quermorlue (Program Quality and Learning Coordinator). Under their livelihoods program, Oxfam Liberia is working on rice by developing virgin swampland in the districts of River Gee and Grand Dedeh into lowland areas where complete water control year round becomes possible. Started in 2009, the 5-year project developed 722 acres and works with 1240 farmers in 23 communities. The goal is to develop 1500 acres. A dam as well as other water control infrastructure was put in place, followed by demonstration plots for various crops and agricultural techniques. Community based organizations were established and members received training in marketing and business management. Six processing centers were set up to process locally produced products for the benefit of women’s groups. Rice is also milled there and is supplied to the weekly local markets. Oxfam staff participated in the SRI TOT in December and are ready to integrate SRI into their rice value chain program. Traditionally, farmers in the area concentrated on upland slash-and-burn agriculture. They are now able to use the improved lowlands year round, a real improvement for their agricultural production. Oxfam Liberia is interested in and committed to integrating SRI into their project.

It will be important to provide further training to Oxfam staff and key farmers to assure that activities are technically well implemented. The staff was not aware of Oxfam’s role in promoting SRI elsewhere (such as Vietnam, Cambodia and Haiti), and it would be good for them to connect to Oxfam colleagues in other countries working with SRI.

4.2 USAID’s Food and Enterprise Development (FED) Program for Liberia: Met with Agnes Luz (Chief of Party), Robert Nyambaka (Agri-Business Specialist), Eric Yeasu, Sr (Enterprise Development Officer), Doe Adovor (Extension Specialist), and Gonyeyee Bartuah (Rice Officer) at their offices in Monrovia and during field visit at the CHAP farm.
The USAID funded Food and Enterprise Development Program (FED), implemented by Development Alternatives, Inc. (DAI), has set out to help Liberia achieve food security—in terms of food availability, utilization, and affordability—by building incentive structures that assist local stakeholders in adopting a commercial approach. New market linkages are catalyzing income and job growth and increases in the production, processing, marketing, and nutritional utilization of rice, cassava, and vegetables in Bong, Lofa, Nimba, Grand Bassa, Montserrado, and Margibi counties. A five-year project (2012-2016) with 75 million $US, FED is one of the largest agriculture projects in Africa.

The FED project has three priorities: i) value chain development, ii) policy dialogue, and iii) capacity strengthening.

Rice sector development: Currently 70% of rice is imported. With a 0% tariff on imported rice, rice is relatively cheap, and is also transported to Guinea and Sierra Leone, where rice is more expensive. Much of the rural rice produced is subsistence rice and is not marketed, due to a lack of infrastructure, good milling opportunities and a lack of markets.

FED is giving focus to develop lowland rice areas, and on improving rice productivity there. Urea deep placement has been tested in 4 sites of the three counties in collaboration with IFDC (International Fertilizer Development Center), with average rice yields in 2012 of 2.5 t/ha, and in 2013 of 4.5-5 t/ha. FED is focusing on seed certification for rice, with foundation seed received from AfricaRice. A concern for developing lowland rice is the potential threat of Schistosomiasis, but no currently available studies provide a good indication how to deal with it. SRI could definitively play an important role in increasing productivity, and FED is interested in discussing SRI’s role further.

On Saturday, February 26 a field visit was also organized at the CHAP farm for the FED project. Erika made a presentation to the Chief of party of FED and her staff, as given to the Agriculture Coordination Committee. The CHAP and FED teams appear together in the photo above, taken after the field visit.
4.3 WAAPP, SAPEC, IFAD, AIDP project representatives: This was mostly a briefing about the WAAPP SRI project to a group of program representatives (see list of names in the Annex). Time availability was unfortunately too short to enter into more details with each of the programs. Of the participants in the briefing, SAPEC’s William Kawalawu expressed the most interest in SRI, therefore a follow up with him is recommended.

4.4 Farmers Union Network (FUN): Liberia has 35,000 registered members. Membership fees are 500 Liberian Dollars/year (6.25 USD/year) for farmers, and 2,500 LD/year (31.25 USD/year) for organizations (1 USD = 80 LD). Funding for FUN comes from the members, the government and an IFAD grant. FUN is a member of Network of Farmers’ and Producers’ Organizations of West Africa (ROPPA), and a member of the Rice Council under ROPPA. FUN is undertaking advocacy work, and focuses on family farms, employment of people, improved inputs (seeds), and entrepreneurship. Improving food security of farm families and developing local markets are their objectives, with the goal to improve the livelihood situation for farming communities. Little formal and in-depth information exists today on Liberia’s farming sector, which is why FUN is currently undertaking a survey with farmers about their farm activities so that they can target their advocacy and activities better. A validation workshop of the study is planned for June. Robert Bimba, SRI focal point for the WAAPP SRI project, is also the national coordinator for FUN.

4.5 BRAC – Program in Liberia: BRAC, an NGO from Bangladesh, established operations in Liberia in 2008, today reaching more than 500,000 Liberians with programs in microfinance, small enterprise development, agriculture, livestock and poultry, and health, and BRAC is working extensively on rice. They have a seed testing and seed multiplication farm in Kingsville, where they test, multiply and then distribute seeds of Nerica L19, L14, and some iron-toxicity resistant varieties provided by AfricaRice. In 2012, BRAC trained over 440 farmers and 193 model farmers on improved agricultural practices. SRI is a methodology that can fit well into their extension package, and BRAC staff participated in CHAP’s December SRI TOT. Sajoy Nandi, Program Manager for Agriculture, also participated in the farmer and technician training day we held during this trip. BRAC is a NGO with a wide reach across Liberia, playing an important role in the rice sectors, thus an ideal partner to associate with for the SRI project. Follow up with Sajoy Nandi is recommended. (http://www.brac.net/content/brac-liberia).
4.6 CARI field research station: Met with Dr Aaron Marshall, Interim Team Leader of the Central Agricultural Research Institute (CARI), Suakoko District, Bong County. CARI is the only Liberian Government owned and operated research entity on agricultural matters. It is located in central Liberia some 120 miles northeast of Monrovia, the national capital. After the civil war, one of the main tasks for CARI was to rebuild the seed sector and identify high-yielding varieties. Liberia received 200 varieties from AfricaRice, which were screened over several years, resulting in a selection of about 10 varieties that fit the environment well, including: Nerica L14, Nerica L19 (100-120 days), LAC 22, and Suakoko 8. The latter can be used to open up new swamps as it is iron-toxicity tolerant.

Marshall participated in the SRI workshop held in Saly in 2013 and thus contributed to setting up the regional SRI WAAPP project. He sent two of this staff to the TOT training in December, Amis Cecilia Merchant and Rennie B. Kolliyou, who installed two SRI test plots of 400m² each on the research station in January 2014 (see the entry on CARI in the field visits section, below).

5. Field Visits

Two sites were visited with SRI plots: the CHAP site, and the CARI Research Station.

5.1 CHAP site

There are 17 SRI plots of 20m x 20m in size, which amounts to 0.68 hectare, with plots in various stages of plant development. The oldest plot was at 39-43 days after transplanting, thus planted in mid-January. Technical parameters of SRI plots were as follows:

- Variety: Nerica L19
- 1 seedling/hill, planted at 2 leaf stage
- 25cm x 25cm spacing
- No fertilization (rich soil)
- Hand weeding and use of rotary weeder and the Garden Weasel, a commercially produced garden weeder from the USA
- Alternate wetting and drying irrigation

Plant development was very vigorous, and no pest or diseases had been identified so far. Farmers and CHAP staff were very pleased with the plots. Starting rice production at the end of the dry season has the advantage of allowing them to harvest before the heavy rains occur later in the rainy season, which can cause a lot of damage.

5.2 CARI research station: Suakoko District, Bong County

Aaron Marshall, Interim Team Leader of CARI, sent two CARI research assistants, Amis Cecilia Merchant and Rennie B. Kollieyoun, to the SRI TOT in December. Upon their return they set up a SRI trial on the research station, with two plots, each measuring 20m x 20m.

The technical parameters for the test were:

- Variety: Nerica L19.
- Transplanting at the age of 10 days at 1 seedling/hill,
- Spacing: 30cm x 40 cm spacing between plants and rows
- Fertilization: 1.25t/ha manure, 12 kg/ha urea
- Water management: Alternate wetting & drying (AWD) irrigation management; kept soils slightly flooded for 1 week after transplanting, after that added water in the evening 3-5cm and drained it in the morning on a daily rhythm
- Weed management: with AWD more weeding was necessary; weeders were not available, thus they did hand weeding

Observations by technicians

- Pest and diseases: no problem
- Number of tillers/hill doubled compared to the conventional transplanting
- (in the SRI plot: tillers per plants: after 1 week: 3-4 tillers, after 3 weeks: 10 tillers, currently at 20-22 tillers – compared to traditional plots with 10-12 tillers/hill.
- Panicles longer (just emerged)
- Plants more vigorous
- Used 7kg seed/ha
Observations and recommendations by Erika:

• Plots were well-established, SRI practices well respected, and crop is growing very well.
• Soils are depleted, thus organic matter addition and fertilizers applied was not sufficient to provide balanced nutrition; plants were yellowish, indicating N-deficiency. Technicians agreed with this observation.
• Spacing might have been a bit too large, especially on a depleted soil
• Recommendation for next test plot: Consider a spacing of 25cm x 25cm, improved fertilization. On a plot of 20m x 20m, it would be interesting to plant for instance 3 bands of 6.6m x 20m with different spacing: 25cm x 25cm, 25cm x 30cm, 30cm x30cm. Additional varieties can be included in next testing.
• Nursery: the technicians had an innovative idea to do line sowing in nursery (see photo), which allows for easy uprooting. The downside is the close spacing of seedlings, which will make it more difficult to separate the roots from each other during transplanting. Technicians will create a less densely sown seed bed for the next trial and compare the techniques.

6. Presentation to the Agriculture Coordination Committee at the Ministry of Agriculture headquarters, Monrovia (February 27)

The technical and donor community on agriculture in Liberia meets once a month for the Agriculture Coordination Committee (ACC) to update each other on progress of their programs, to discuss new initiatives and ideas, and to coordinate amongst themselves for implementing agricultural activities in
an integrated way in Liberia. I was invited to give a presentation to introduce the ACC to SRI and the WAAPP SRI project, to give an update on SRI activities in Liberia, and to outline opportunities for improving rice in association with SRI. The presentation is available at www.slideshare.net/SRI.CORNELL/sri-opportunities-for-liberia. About 50 people from the Ministry, multi-lateral and bi-lateral donors and programs, NGOs and farmer organizations were present. Interest was high and many questions were raised during and after the presentation.

7. SRI Training Day at CHAP Farm

Twenty two farmers, technicians, the CHAP team and two journalists who participated in the TOT training in December 2013 came to the CHAP farm in Zubah Town, Paynesville, Monrovia for a 1 day training that included a field visit. This was a refresher training, and was led by Erika Styger. Covered topics included: i) how to set up a side-by-side comparison trial with SRI and traditional methods; ii) in-depth technical discussion on implementing the SRI methodology; and iii) a session on data collection. For most participants, it was their first time visiting an SRI plot. CHAP’s farm has 17 SRI plots, each measuring 20m x 20m, totaling 2/3 hectare, with plants in various stages of development (the oldest plot was at 43 days after transplanting). Participants were very encouraged to see the vigorous development of the field, and were enthusiastic to set up their own plots when returning home.


I also had a longer technical discussion with the CHAP team about their upcoming pilot in the counties of River Gee and Grand Gedeh, and we discussed different aspects of implementation arrangements.

8. Recommendations and Opportunities with SRI

Rice productivity in Liberia is very low, with yields around 1t/ha. The need and demand to increase productivity is greatly expressed across Liberia, though there are extensive difficulties in regards to
infrastructure, input markets and seed availability, which are all prerequisites for input-based agriculture intensification. The possibility to increase productivity, on the other hand, with the locally available resources is possible by applying and adapting the SRI methodology.

SRI was introduced to Liberia by farmers, and thus – similarly to other countries in Asia and Africa – SRI in Liberia is mostly farmer-driven. With knowledge spreading through farmers’ networks, through self-selected ‘champions’, and with programs that focus on rice production such as the WAAPP that support the farmer-driven innovation process, there is great potential for spreading the knowledge about the SRI methodology quickly throughout the country. SRI can be directly applied by farmers in Liberia with their current means and current local conditions! Projects like OXFAM Liberia’s swamp reclamation activities can compliment this by providing more ideal conditions for SRI with better water control and utilization of soil with naturally replenishing organic matter supplies.

Creating new cropping approaches through direct farmer involvement allows for immediate identification of practices that work well for farmers, and facilitates easy and informal passing on of the lessons learned. Needless to say, good technical backstopping and follow up is needed to best support this local innovation process by validating and confirming the agronomic practices that work well for farmers in different agro-ecological conditions.

Seed availability and seed production is a big bottleneck in Liberia. SRI provides a number of advantages in regards to seed production. By planting only 1 plant/hill – and not several plants together – and respecting wide spacing between the plants, it is easy to identify visually if varieties are mixed. Individuals foreign to the variety planted can easily be eliminated from the field throughout the cropping season. This allows farmers to purify their varieties, and if needed reconstruct their varieties. Another important advantage is that a SRI crop needs only a 6-8kg of seeds/ha, instead of 40-60kg/ha for conventional rice production – a much more efficient multiplication ration. Furthermore, reducing the amount of seed required for multiplication purposes allows farmers to carefully select from only the most robust plants; during the harvest farmers can simply step into their fields and hand select panicles from the best plants, thus creating good seed quality for next year’s crop. Therefore, it is possible for any farmer to produce healthy and pure seed, thus become seed producers themselves.

The insight that rice grows better under non-flooded, aerobic soil conditions creates important opportunities. Roots can breathe and develop, which supports plant growth and grain filling, and results in higher yields. Creating aerobic soil management for rice can also reduce the prevalent iron-toxicity problem. It can be hypothesized as well that it might be possible to reduce vector breeding for Schistosomiasis through periodic drying of fields and canals.

Irrigation infrastructure construction and design will change as the focus is not anymore directed towards creating flooded rice fields, but towards being able to add water to plots or drain water as needed. As high rainfall and natural flooding of rice areas is common in Liberia, attention should be paid wherever possible to enhancing drainage, and to crop production on raised beds.

A very important innovation spearheaded by CHAP is the planting of rice in the dry season and at the end of the dry season. This is possible as water demand for SRI is not as high as it is under flooded rice production. Planting 1-4 months before the rainy season starts has the advantage of limiting exposure to the heavy rains in that are characteristic of the second half of the rainy season, which can damage crops considerably. It also allows for harvesting rice during the hunger season and for
marketing rice over a longer period of time, thus avoiding large volumes coming to the markets at once – important economic and food security considerations.

In areas where water can be controlled year-round, as achieved in the Oxfam project, it will be possible to grow rice as well in the dry season, and new techniques such as lock-lodge ratooning can be applied, increasing the number of crops per year and allowing farmers to increase productivity immediately and substantially.

Mechanization is a big bottleneck, especially in regards to soil preparation. It might be worthwhile to develop minimal soil preparation practices following a conservation agriculture approach. This would help in saving on expensive mechanization costs, but soils would need to be improved through soil organic matter additions, soil protection and crop rotation.

In conclusion, agro-ecological and knowledge-based approaches have high potential in a country like Liberia, where infrastructure and organization of the entire sector is under reconstruction. If knowledge can be passed on to farmers, and farmers are stimulated and respected in contributing to develop farmer-based innovations, immediate and substantial improvement to the agriculture sector can be made. SRI can be a good and effective entry point for innovation development to go beyond SRI, and beyond rice.

Erika Styger (second from right) and the CHAP team, ready to start an SRI pilot under the WAAPP project in River Gee and Grand Gedeh Counties.