REPORT ON

INTERNATIONAL TRAINING FOR AGRICULTURAL STAFF FROM TOGO AND BENIN

ON

"SAWAH" ECO-TECHNOLOGY

IN GHANA

(November 23 – December 1, 2011)

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December 2011

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1. Introduction:

Rural poverty and food insecurity can be attributed to degradation of land resources and lack of improved technologies. Throughout the West African sub-region, it is the small-scale farmer that produces the bulk of the food requirements of the people. The over reliance on the small scale farmer to produce the bulk of food required for an ever increasing population is a key factor for food insecurity in most countries. Major constraints to food production include declining soil fertility levels, poor support to resource poor farmers and luck of clear-cut land use policies. To reverse rural poverty the enabling environment needs to be created to encourage income generation in the rural areas, increase food production and security and protect the environment from degradation (Sanchez et al, 1997). Among the recommendations for achieving increased rice production in West Africa (AICAF, 1995) are improving rice growing technology (optimum fertilizer usage, effective nutrient and water management options, use of high yielding varieties).

Over the years, although considerable progress has been made in addressing some of the problems confronting the rice growing industry within the sub-region, there is still the need to devise simple, low cost and environmentally friendly systems for managing the inland valleys that can be adapted by resource poor farmers. This led to the development of the "Sawah" eco-technology.

2. What is "Sawah" Eco-technology

The term "sawah" refers to a leveled, bunded and puddled rice field with inlets and outlets for water management. In order to apply these scientific technologies, farmers' have to develop typically refined rice growing environments referred to as "Sawah" or develop similar alternatives which can conserve soil and control water. Essential components of such land development are: (i) demarcation by bunding based on topography, hydrology and soils, (ii) levelling and puddling to control and conserve soil and water, and (iii) water inlets and outlets. The above parameters are typical characteristics of "Sawah" fields. The essence for this is to avoid too much water collected at one side of the field to the disadvantage of other parts of the field. "Sawah" can broadly be classified into 5 types; (i) spring type, (ii) dyke/weir – canal type, (iii) rain fed type, (iv) pump type (v) integrated type when two or more of the above types are used in combination. Local materials such as sand bags, bamboo sticks, wood etc are used to construct weirs/dykes or harvest water.

3. Why "sawah" eco-technology

In Sub-Saharan Africa (SSA), even though there have been research concepts to improve Natural Resource Management (NRM), no clear research concept has been developed on how to improve natural resources such as soil and water conditions at the farmers' field level. The "Sawah" eco-technology is one of such missing concepts to improve natural resources management in majority of African rice farms. It can accelerate improvements in effective natural resources management, minimize environmental degradation and increase soil productivity in majority of African conditions. Of all lowland types available in the sub-region, inland valleys and to some extent flood plains have a comparative advantage because of relatively easy water control. However, African lowlands are quite diverse. Therefore careful site-specific development and management technologies are needed for their effective and sustainable utilization. The development of such technologies and their management by local farmers through self propelled efforts and the use of small-scale equipment such as power tillers are very prudent under African conditions.

4. Advantages of "Sawah" eco-technology

The "Sawah" eco-technology can improve fertilizer and irrigation efficiency. Thus it can minimize the effect of water shortage, poor nutrition especially for nitrogen and phosphorous supply, neutralize acidity as well as alkalinity, and improve micronutrient supply. With this, improved varieties can perform well to realize green revolution in Africa. Thus the "sawah" eco-technology is the prerequisite condition for the three green revolution technologies to be successful. The "Sawah" system of rice production therefore seeks to improve on lowland rice production by helping to effectively manage land, control water and nutrients to boost local rice production. The lowland "sawah" can also sustain rice yields (> 6t/ha) through macro scale natural geological fertilization from upland and micro-scale mechanisms to enhance supply of various nutrients. If appropriate lowlands are selected, developed and soil and water managed properly, then the application of improved agronomic practices such as System Rice Intensification (SRI) under the "Sawah" systems, can result in paddy grain yields exceeding 10 t/ha. Use of the technology can increase rice production from about one ton per hectare under the current traditional system to over four tons per hectare. It is also environmentally friendly and it minimizes erosion, reduces land degradation and increases nutrient-use-efficiency.

5. Training Objectives;

The general goal of the training was to maximize resource conservation for sustainable food production. The specific objectives of the training were to

- (i) Make the "sawah" technology more assessable and available to a wider rice farming communities (Togo and Benin)
- (ii) Increase the availability of technologies for improved water management and utilization
- (iii) Increase the availability of technologies for improving and maintaining soil fertility

6. Training Methodology and Activities Covered.

"Sawah" practice is based on the principle of active participation. In other words, "Sawah" is practically learned on the fields through on-the-job training. Based on this principle, most of the training activities were organized on the field. Trainees were therefore taken through the following activities

6.1 Concept of "Sawah" Development

Trainees were introduced to the concept of "Sawah" by a short but detailed lecture (power point presentation) in one of the conference halls of the CSIR-Soil Research Institute. Trainees were introduced to most if not all, the major processes that have to be carried out in the proper adoption of the "Sawah" technology. During this period, trainees were given the opportunity to interact with trainers and seek clarification on issues of interest which were not clear/understood by them. Prior to this time, trainees were made to join the field trip, organized for participants to the International "Sawah" eco-technology workshop. During this visit, trainees had the opportunity to visit several sites and fields where they observed different "Sawah" types and processes.

6.2 Water Harvesting Methods;

Valleys are variable and divergent. Hence, water harvesting for any site is greatly determined by the type and nature of the valley. Trainees were specifically sent to different valley types to see and observe the different water harvesting methods based on the type and nature of the valley. These included ware harvesting through weirs, springs and canals.

6.3 Site Selection

Agro-ecological location, population density and intensity of valley use play key roles in site selection and development. Trainees were trained on the need to select sites based to a greater extent on water availability, topography, soils, accessibility, etc for effective and efficient "Sawah" development, maintenance and sustainability

6.4 Land Development

Land development covered a greater part of the training period. Trainees were taken though land brushing, clearing, field lay out, bund construction, ploughing, puddling and leveling using the power tiller and simple tools like the hoe and spade. Trainees had the opportunity to try using the power tiller under each of these operations. Trainees learned how to use the wooden plank as a simple tool, attached to the power tiller, for field leveling.

6.5 Water Management

Water management is critical for efficient and effective input use. Trainees were therefore taught how to manage water at each of the major stages of land development, particularly before and during transplanting, during fertilizer application and at harvest.

6.6 Nursery Establishment and Transplanting:

Due to the short duration of the training, a nursery was established before the arrival of the trainees. Trainees were, however, taken through the processes of establishing a nursery. Trainees were given the chance to fully transplant one of the fields they had developed during the period. They therefore had the feel of how to handle seedlings, when to transplant and how to transplant.

6.7 Machinery Handling and Maintenance

Apart from handling the power tiller during land preparations, trainees were also taken through simple processes of handling the power tiller. Some of these include servicing of the machine like changing oil and filters, replacement of simple parts that are easily worn out, daily routine checks on the machine etc.

6.8 Farmer Organization and Land Tenure

Farmers are the end users of the "Sawah" technology and therefore their initial understanding of keys issues are very critical. Trainees were taken through the processes of organizing farmers into groups or units. Farmers will be sharing common resources like water, machinery, tools and some inputs. The need to let farmers accept and work together is very important. They may be no fixed rules or processes of organizing farmers as this will vary based on farmers background in addition to social and economic factors. Trainees were made to understand and appreciate such variations and to consider existing conditions and circumstances when organizing farmers. This will allow them to operate freely and effectively. Communities within selected sites should be organized into several farmer-groups for easy management and allocation of resources. Initial "Sawah" development is quite expensive and therefore guarantee over land for a longer period is very necessary. Trainees were made to appreciate this fact and based on the variable land tenure systems that exist in their countries, farmers should be educated to negotiate for longer periods under land tenancy agreements.

7. General Comments.

During the period, all trainees show much interest and enthusiasm during field operations in particular. "Sawah" eco-technology is best learnt when one is actively involved in "Sawah" development on the field and it takes quite some time for one to master the basic skills required. The training period was quite short and therefore could not allow for effective transfer of skills on the major operations. It is, however, hoped that, trainees have learnt the basic skills to allow them commence field activities. It is also important to note that, there will be the need for the monitoring of trainees on the field, to guide them on certain operations that they may not have gathered enough skills.

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