

Innovation Platform: A Tool for Sustainable Rice Production in Ghana

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Abstract

Agriculture plays a key role in Ghana's economy and that of sub Saharan Africa. Transforming agriculture in Ghana is key to increasing farm output, reducing poverty, ensuring environmental sustainability and reducing food insecurity. Linear transfer of technology addressing productivity, marketing and policy underlies the poor performance of the rice sector hence the need for the Innovation Systems Approach using the Innovation Platform which is a coalition of actors along the value chain as a key tool. Rice is the second most important cereal after maize in Ghana and is fast becoming a cash crop. Rice production and the area cropped are increasing but national annual average yield has remained low, at 2.5 tons/hectare. Despite the enabling prevailing policy environment, local rice production still falls short of local demand hence rice importation is very high, valued at US\$500 million annually. To reduce the rice demand deficit in Ghana, four Innovation platforms were established in Atebubu, Amantin (Feed the future), Jasikan and Weta (Systems of Rice intensification). A total of 265 actors were involved in the study. Farmer constraints identified included high cost of agro chemicals and fertilizer, unreliable rainfall patterns/lack of irrigational facilities, low farm gate prices, high incidence of weeds on rice farm and low yielding rice varieties. Key roles of innovation platforms in increasing rice productivity in Ghana are identifying the main bottlenecks in the rice value chain, creating room for some of the challenges to be addressed upfront, creating a united front for advancing and affecting policy, quality rice for the domestic and international markets and linking actors to financial institutions. The requirements to ensure that the full potential of rice resource in Ghana are achieved lie in pulling all efforts at the various stages of the rice value chain together to serve as an attraction pool for strong policies and national aid.

Keywords: Rice, Value chain, Innovation system, Innovation platform

La Plate-forme d'innovation: un outil pour une production durable du riz au Ghana

Résumé

L'agriculture joue un rôle clé dans l'économie du Ghana et celle de l'Afrique subsaharienne. La transformation de l'agriculture au Ghana est essentielle pour accroître la production agricole, réduire la pauvreté, assurer la durabilité environnementale et réduire l'insécurité

alimentaire. Le transfert linéaire de technologie traitant de la productivité, du marketing et de la politique sous-tend la mauvaise performance du secteur du riz, d'où la nécessité de l'approche des systèmes d'innovation en utilisant la plate-forme d'innovation qui est une coalition d'acteurs de la chaîne de valeur en tant qu'outil clé. Le riz est la deuxième céréale la plus importante après le maïs au Ghana et devient rapidement une culture de rapport. La production de riz et la superficie cultivée augmentent, mais le rendement moyen annuel national est resté faible, à 2,5 tonnes/hectare. En dépit de l'environnement politique favorable, la production locale de riz est toujours inférieure à la demande locale, de sorte que l'importation du riz est très élevée à 500 millions de dollars par an. Pour réduire le déficit de demande du riz au Ghana, quatre plates-formes d'innovation ont été créées à Atebubu, Amantin (Nourrir les futur 'Feed the future' en anglais), Jasikan et Weta (Systèmes d'intensification du riz). Un total de 265 acteurs ont été impliqués dans l'étude. Les contraintes des agriculteurs identifiés comprenaient un coût élevé des agro-produits agro-chimiques et des engrais, des précipitations peu fiables/un manque d'installations d'irrigation, des prix bas de la ferme, une forte incidence de mauvaises herbes sur les fermes de riz et le rendement faible des variétés du riz. Les rôles clés des plates-formes d'innovation dans l'augmentation de la productivité du riz au Ghana ont permis d'identifier les principaux goulets d'étranglement de la chaîne de valeur du riz, créant ainsi certains défis à relever; créant un front uni pour faire avancer et affecter les politiques, le riz de qualité pour le marché domestique et international et reliant les acteurs aux institutions financières. Les exigences visant à garantir que le plein potentiel de la ressource du riz au Ghana réside dans l'effort consistant à attirer tous les efforts aux différentes étapes de la chaîne de valeur du riz pour servir comme un pool d'attraction pour des politiques solides et des aides nationales.

Mots-clés: *le Riz, chaîne de valeur, système d'innovation, la plate-forme d'innovation*

Introduction

Agriculture plays a key role in the sub Saharan African economies. It is in most cases the major income earner for most of the economies (Osei-Asare, 2010). The sector is however saddled with a number of challenges that are fragmented, hence the need for a system of intervention that encompasses various stakeholders. The challenges span from production, through post-harvest, marketing, policy interventions and the information flow among stakeholders. Transforming agriculture in sub Saharan Africa is key to increasing farm productivity, reducing poverty, ensuring environmental sustainability and reducing food insecurity. The Linear transfer of technology is one of the transformational models introduced to

address problems in agriculture. This evolved into the farming systems perspective (farmer participatory approach), where the importance of farmer engagement in the knowledge development process was considered. There was less consideration for implementation and administrative constraints, and the usefulness of multiple actors besides the necessity to engage all key stakeholders. This led to the emergence of the Innovation Systems Approach using the Innovation Platform as a key tool (Hounkonnou *et al.*, 2012). Innovation platform is a coalition of actors along the value chain formed to address particular constraints to upgrade the value chain through the use of knowledge and mutual learning which could be applied in all aspects of agriculture and for technologies

that are either simple, complex, integrated or composite.

Rice is the second most important cereal after maize in Ghana and is fast becoming a cash crop for many farmers (MiDA, 2010; Osei-Asare, 2010). National and agricultural development plans and strategies, such as the Ghana Poverty Reduction Strategy (GPRS I), Growth and Poverty Reduction Strategy (GPRS II), Food and Agricultural Sector Development Policy (FASDEP) I and II, Medium Term Agriculture Sector Investment Plan (METASIP), and Accelerated Agricultural Growth and Development Strategy (AAGDS), have featured rice as one of the targeted food security crops. Annual per capita consumption of rice is growing rapidly, from 17.5 kilogram (1999 - 2001) to 22.4 kilogram (2002 - 2004) and 24 kilogram (2010-2011) (MOFA, 2011a), and rice demand is projected to grow at a compound annual growth rate of 11.8 percent with maize at 2.6 percent in the medium term (MiDA, 2010).

The majority of local rice production comes from the Northern (37%), Upper East (27%), and Volta regions (15%) (SRID-MOFA, 2012). Production in the Northern and Upper East regions decreased in 2011 due to poor weather condition, but production in Volta Region continued to increase and did not seem to be affected by less rain in 2011. In general, rice production and the area cropped with rice are increasing but national average yield has remained low, at 2.5 tons/hectare/year (MOFA, 2011), or 2.2 tons/hectare/season according to the recent survey by the CSIR - Crops Research Institute (CRI), Savannah Agricultural Research Institute (SARI), and International Food Policy Research Institute (IFPRI), indicating a significant opportunity to reach potential achievable yields of 68 tons/hectare. Although rice can be grown mostly in the wet

season, it is also viable in the dry season under irrigation using upland varieties. Rice demand is projected to grow (MiDA, 2010), and prices have been trending upward over time. The average wholesale price of local milled rice (100 kilogram bag) more than doubled, from 55 Cedis in 2006 to about 120 Cedis in 2011, while that of imported milled rice nearly tripled, from about 63 Cedis to nearly 169 Cedis (Amanor-Boadu, 2012). Imported rice is priced higher than local rice, by about 1540 percent on average and is mainly associated with better-quality long-grain perfumed rice of good taste and good appearance (translucent and with whole grains, although broken grains have their place in specific local dishes). Vast potential irrigable lands, valley bottoms with water supply, and water bodies throughout the regions are available for rice cultivation coupled with indigenous knowledge gathered from rice farming experience over the years (Osei-Asare, 2010). The policy environment is also advantageous for rice production, evidenced by numerous projects and programs supporting the sector. In 2004, the Ghana Rice Inter-professional Body (GRIB) was established as a platform for negotiation, policy dialogue, and resource mobilization to revamp the local rice industry.

In spite of these interventions, local rice production is still not able to meet local demand resulting in high rice importation. Several estimates show very high levels of imports valued at US\$500 million annually (Osei-Asare, 2010), putting much pressure on foreign reserves and food security in Ghana. Estimates show that imported rice comprises about 70 percent of the quantity consumed in Ghana (Amanor-Boadu, 2012). One key mechanism for boosting local rice production in Ghana is through the innovation platforms approach. This paper seeks to examine the need for the rice sector to adopt the Innovation

Platform (IP) approach in reducing the bottlenecks in rice production and increasing output in order to ensure food security and reduce the high foreign exchange spent on the importation of rice in Ghana. The paper therefore attempts to identify the constraint in the rice industry using Innovation Platforms and to evaluate the role of the Innovation Platforms in addressing issues.

Material and Methods

Innovation platform formation was an integral part of the Feed the Future Rice (FtF) and the System of Rice Intensification Project (SRI). Two Innovation platforms were established under each of the projects in Atebubu, Amantin (Feed the future) and Jasikan, Weta (Systems of Rice intensification). These platforms are still in the formative stages hence were composed mainly of primary actors (producers, traders, processors, consumers, input dealers) and 2 service providers (agricultural extension agents and researchers). Across the IPs, the total participants were 265 (120 farmers, 40 traders, 20 processors, 20 food vendors, 20 consumers, 20 input dealers, 20 agricultural extension agents and 5 researchers). In each location, 30 farmers, 5 traders, 5 food vendors, 5 consumers, 5 input dealers and 5 agricultural extension officers were purposively chosen for their involvement in rice related activities in the communities. Five (5) researchers working on rice related activities were also selected from CSIR - Crops Research Institute. The researchers facilitated the platform activities.

Structure checklists drawn from reconnaissance visits undertaken in the research areas were used in soliciting for information in the various actor groups. In aid of a holistic understanding of the operations of the rice sector, the results presented is based on issues that cut across the four study areas.

Information presented are qualitative outputs of the various interactions that were undertaken at the breakout sessions.

Results and Discussions

Constraints in the rice value chain

The following constraints were identified by various actor groups across the four location (Atebubu, Amantin, Jasikan and Weta).

A. Farmers

- (i) High cost of agro chemicals and fertilizer: Most of the farmers are peasant farmers or small holder farmers hence find it difficult to purchase agro chemical and fertilizer mainly due to the high cost. They are therefore not able to apply recommended rates to ensure optimum yield.
- (ii) Unreliable rainfall patterns/Lack of irrigation facilities: Farm lands are mainly rain-fed lowlands with no irrigation facilities. Farmers therefore are exposed to the erratic rainfall pattern which determines their output.
- (iii) Low farm gate price of produce/Exploitation by traders: Rice farmers are often cheated by traders and middlemen who purchased the paddy mostly with oversized bags at relatively low prices. This leads to low profit which in turn discouraged subsequent production. Farmers were de-moralized because of the low income barely broke even.
- (iv) High incidence of weeds on rice farm/Ineffective herbicide: Rice farmers complained about the high incidence of weed which reduced total yield and also affected the quality of the grain. This was attributed to low quality and in some cases ineffective herbicides obtained from agro chemical dealers.

(V) Low yielding varieties: Most rice farmers are growing local varieties that are low yielding, resulting in low total output and low profits. To obtain increased incomes from rice, long grain aromatic rice are essential quality attributes that needs to be considered.

B. Traders: Constraints identified were high cost of paddy rice at farm gate, poor quality paddy rice at farm gate resulting in poor grain quality with reduced weight, high cost of milling, Poor milling quality and low volumes of paddy rice available for purchase.

C. Millers: Key challenges found among millers were Less efficient millers/ local millers available, Low service charges, Stones in paddy rice destroying the mills leading to frequent repair works at high cost and no alternative source of power aside that of the national electricity grid among others were identified constraints in milling activities.

D. Food vendors: The challenges identified among food vendors were high moisture content of purchased milled rice, high cost of local rice, stones in rice and low quality of milled rice (Non-aromatic, unpolished and ungraded as their constraints)

E. Consumers: High cost of rice (both processed and unprocessed), stones in rice, poor cooking quality (either becomes soggy or hardens a few minutes after boiling) and non-aromatic tasteless rice were some consumer constraints.

F. Input dealers: Input dealers are faced with high cost of chemicals at wholesale points and noncompliance of farmers to required rates of chemical application.

Discussions revealed input dealing and

production (farming) as the entry points. Dealing with challenges at that level of the value chain would have a ripple effect on all other actors within the rice value chain.

Role of the Innovation Platform in mitigating the constraints

Identifying the main bottlenecks in the rice value chain: The IP gives a common grounds for all actors to identify gaps that exist in the operations of enterprises and challenges from other actors as well. For example farmers in Amantin alluded to the fact that, they do not winnow the rice before selling because the traders use oversized bags to buy the paddy. Similarly, the traders also emphasized that, they used the oversized bags because after winnowing the quantity purchased usually reduces. Farmers again indicated that chemicals purchased from input dealers are sometimes not effective. Input dealers responded that this is due to the fact that some farmers do not heed to the instructions they give to them, but rather listened to what other farmers. This clearly shows how effective the IPs are in identifying constraint both within and outside an actor group. Bernet *et al.* (2011) re-emphasized the need for a collective approach to a diagnosis of the problems that are enshrined in a commodity value chain and concluded that it was necessary for finding an effective and all-encompassing approach to deal with the challenges.

Create the room for some of the challenges to be addressed upfront: In the situation where farmers and traders gave reasons for not winnowing and used oversized bags irrespectively, actors agreed that, farmers should winnow the paddy rice well before selling to traders whereas traders are expected to desist from using oversized bags in purchasing rice. There was therefore a consensus that these negative practices should be stopped. Input dealers also advised farmers to consult them for approved agro inputs so that they could take the

right instructions from them to achieve the best for increased productivity. Addison *et al.* (2015) emphasized the need to form cooperatives among actors to help in dealing with immediate challenges that affect the operations of the value chain.

Creates a united front for advancing and affecting policy: The decision of farmers to sell clean paddy rice and traders to use of the appropriate measuring units became a by-law on the IP where culprits were to pay a fine. This was to be documented and sent to the district assembly for deliberation and approval as an accepted rule in the district. A similar by-law has been enacted in Ejura-Sekyedumasi District where the use of the No. 5 bag for purchasing maize is prohibited. The No. 4 bag is instead the accepted measure for purchasing maize as a result of the activities of the Maize Innovation Platform under Support to Agricultural Research for Development of Strategic Crops in Africa (SARD SC) project (Adu Appiah *et al.*, 2014). In addition, collectively they could influence the flow of rice trade in and out of the district, thereby controlling the price and quantity released at any point in time to ensure enhanced production, total output and maximum profit.

Result in quality rice for the domestic and international market: Acheampong *et al.* (2012) stated that consumers of rice focus on the cleanliness and nature of grain size to determine their choice of a rice brand. By implication, local rice must be of international standards to make it the first choice of consumers. The decision on the IP to sell clean paddy would enhance availability of quality rice grains to the millers. This will also ensure the availability of high quality milled rice for consumers. Through the platform, all actors of the rice value chain were to be well informed about the quality of rice consumers

prefer. In Ghana, consumers prefer long grain aromatic rice. By implication researchers are guided to breed aromatic rice varieties for producers. This would enhance consumer demand for long grain aromatic rice on the Ghanaian market thereby increasing incomes among actors. Once production increase to feed the domestic market, the excess could be exported to neighbouring nations for foreign exchange. CSIR - Crops Research Institute has bred aromatic rice that is adapted to the growing ecologies in Ghana. They are namely Amankwatia, AGRA Rice and Jasmine 85. These varieties are known to the farmers. It was outlined that the difference between local rice and imported rice in most cases was the grading and polishing in favour of the latter. The IP could champion a course where rice meant for domestic market is graded and polished before sales. This could be achieved by making the IP the single sale outlet for members. In so doing, the quality issues are checked and ensured. In as much as they lead to high prices, production would be encouraged.

Link to financial institutions for assistance: A major constraint identified almost at every level of the value chain was lack of adequate capital/finance to undertake large/intensive activities. Financial institutions in Africa prefer to deal with organized groups than individuals. Addison *et al.* (2015) outlined that though financing schemes existed for cooperatives, the lack of cooperation among actors in the rice value chain had made it impossible for actors to access financial aid from such opportunities. An IP consisting of all the actors and backed by the district authorities and research institutions creates an acceptable credit worthiness for the IP. Access to financial assistance therefore would be less stressful and prompt at a lower interest rate as compared to an individual accessing the same facility. The quantum of funds that could be

dispensed would also be bigger than if they had accessed it individually. This creates room for the expansion of operations at the critical levels of the value chain especially production and processing. The processor could get access to modern milling machine that provides international standard of milled, polished and graded grains. This would increase the quantity and quality of rice produced thereby promoting local production and a decrease in rice importation "holding all other things constant".

Conclusion

The requirements for achieving the full potential of the rice industry in Ghana lies in pulling together all efforts at the various stages of the rice value chain together to serve as an attraction pool for strong policies and national aid. As much as we address collectively the challenges at the various stages in the rice value chain, we reduce the inefficiencies that limit production. A unified force therefore comes into existence to influence policy leading to enactment of productive, practical laws devoid of partisan politics but efficient economic and scientific rice operations. The creativity, determination and curiosity of the facilitated farmer groups, other value chain actors (traders, processors, consumers, input dealers) supported by research, extension and policy provides effective innovation base for optimum utilization of resources available for rice production and creates a pull-environment to acquire other needed logistics. For these platforms to continue to achieve the desired results financial support for such operations is a requirement. Bottlenecks reduced means, output increases hence more rice to feed the local market and excess for export. Import bill for rice reduces hence saved funds could be channelled into improving other sectors of the economy.

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