POLICY BRIEF

Opportunity to Influence and Impact Policy on Mechanisation and Infrastructure Delivery for Rice Production - Ghana

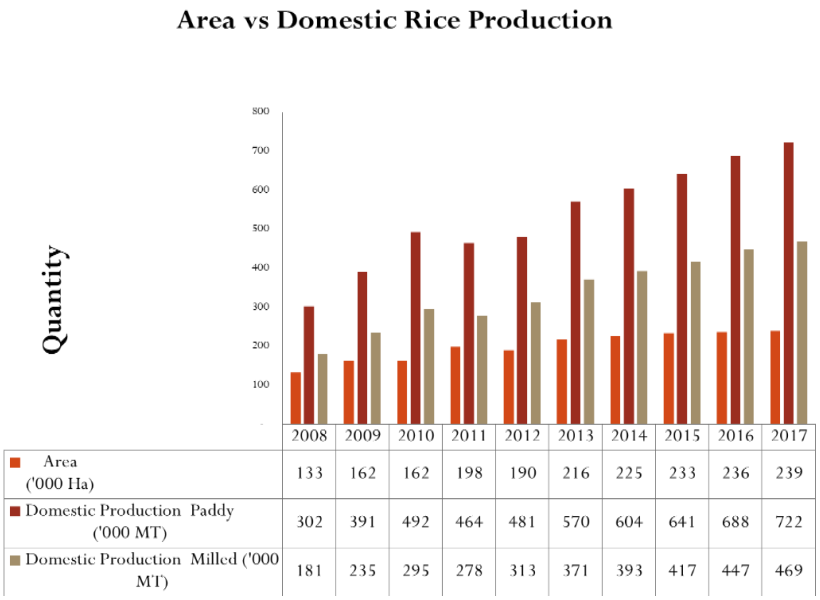
Date: October 2020

Set Targets and Report Return on Investments (ROI) in Infrastructure, and Machinery in Rice Value Chains Disaggregated District

Context

Rice is one of the most important food staples in Ghana and its consumption keeps increasing as a result of population growth, urbanization and change in consumer habits. It is a labour intensive crop and it is cultivated both as a food and a cash crop.

Between 2008 and 2017, paddy production was in the range of 302,000 and 722,000 MT (181,000 to 469,000 MT of milled rice) with large annual fluctuations. The annual production fluctuations are largely due to the area (ha) put under rice cultivation, with marginal yield variations (t/ha) as indicated in Fig. 1. : Production Area against Paddy Production



The total rice consumption in 2008 amounted to about 500,000 MT (JICA, 2008), which is equivalent to per capita consumption of 26kg per annum. Ghana depends largely on imported rice to make up for the deficit in domestic rice supply. On the average, annual rice import is about 500,000 MT as shown in figure 2. The self-sufficiency ratio of rice in Ghana declined from 38% in 1999 to 24% in 2006 (CIRAD, 2007) and increase to around 42% in 2017.

The Problem or Issue

Government policy strategies and campaigns over the years, as captured in MOFA's policy documents, have sought to promote rice production to address food security, poverty reduction and import substitution.

However, the rice sector in Ghana is seriously encumbered by agricultural infrastructure deficit and poor access to appropriate agricultural machinery that continuously diminishes efficiency and productivity. Key infrastructure deficit of the sector includes the dearth of efficient irrigation schemes, motorable roads, modern markets, developed agricultural lands, efficient storage and warehouse facilities.

The sector is also largely characterized by traditional farming practices such as dependency on rain and the use of basic farming tools such as cutlass, hoe and sickle. The dependence on erratic rainfall for agricultural activities serves to make the bad situation worse, if timely land preparation activities are not realized. The overall outcomes of these constraints have resulted in drudgery associated with rice farming coupled with low productivity and low competitiveness with imported rice.

Generally, infrastructure has the tendency to phenomenally accelerate the transformation of existing traditional and subsistence agriculture systems into modern and commercial agriculture systems.

Agricultural mechanization reduces the drudgery associated with traditional farming, enhances the timeliness for production, improves yields and quality of paddy rice through precision planting, crop maintenance and paddy harvesting thus increasing productivity.

Both infrastructure and mechanization however involve huge initial capital investments, long gestation periods and low rate of returns on investments.

However, it is necessary to prioritize which infrastructure and machinery in a multiplicity of locations require immediate attention to sustainably grow the rice sector value chain.

It is against this background that The John A. Kufuor Foundation (JAKF), acting as a consortium partner to Alliance for Green Revolution Africa (AGRA) and Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung (BMZ) in implementing the ***Public-Private Partnership for Competitive & Inclusive Rice Value Chain Development: Planting for Food and Jobs (PFJ) – The Rice Chapter*****,** seeks to influence and impact policy on Mechanization and Infrastructure delivery for rice production.

The Evidence

There are mainly three (3) ecosystems for rice production in Ghana. These are (i) irrigated rice areas; (ii) lowland/hydromorphic rice areas and (iii) upland rice areas. Out of the ecosystems, the most productive in terms of yield per hectare is the **irrigated rice production**.

Some constraints of production under rainfed lowland include; vulnerability to climatic variability (drought and submergence) causing yield fluctuations, inherent low soil fertility and poor infrastructure and poor access to farm equipment at farm level. Under irrigated ecology the constraints are biotic factors, that is, diseases, insects and pests among others rather than climatic factors.

The various rice producing ecosystems within the various districts coupled with other geographical factors such as soils, climate, rainfall regime, vegetation as well as economic factors such as employment, agricultural practices, level of access to technologies and infrastructure, all contribute to the current rice production volumes in the country.

National Rice Production by Regions 2018, report that Northern region represents the region with the largest area under rice cultivation with an area of 81,165 hectares followed by Volta region with 58,662 hectares respectively. However, in terms of average yields, Volta region ranks the highest with 5.11 metric tonnes per hectare followed by Greater Accra with 4.82 MT/ha respectively. Northern and Upper East region rather records one of the lowest average yields (2.00MT/ha and 2.78MT/ha respectively) in the country even though larger areas are cultivated in these regions.

Several factors account for these differences in average yields and the area of land cultivated. For example, smallholder farmers in Volta region cultivates on average 0.8 hectare whiles smallholder farmers in Northern region cultivates about 2 hectares. Due to the small farm sizes in Volta region farmers are able to fully manage their farms, with all the good agronomic practices (GAP) whiles due to the rather large farm sizes in the Northern regions farmers after initial land preparation and seeding are unable to invest time and resources to fully manage and apply all the GAP to their farms leading to low yields

On the other hand, factors that contribute to farmers in Northern region ability to cultivate larger areas include good access to vast abundance of arable flat lands which are more conducive to apply any form of farm equipment and machinery with little obstacles to impede tillage operations as compared to Volta region, which has a blend of undulating highland and lowlands, and mix of guinea savannah woodland and semi-deciduous forest.

This is the reason why over 70% of tractor population in Ghana are concentrated in the Northern Ghana and comparatively, smallholder rice farmers as compared to Volta region cultivate larger areas. Other factors that support the high yields of rice in the Volta region include the soil classifications, soil fertility, climate and access to perennial water resources as these factors differ on regional locations.

The Parameters and Level of Effort to Close the Gap

District level endowment of agricultural infrastructure and mechanization application by rice farmers in the 143 districts are characterized and colour coded as **blue**, **brown** or **green** depending upon if the resource level is Low, Medium or Advanced.

The ***low-level*** entails rice farmers' use of basic farm tools (hoe, cutlass, sickle and animal traction) for production under rainfed and on undeveloped farmlands.

The ***medium level*** is described as use of mechanical powered engines like power tillers, tractor with primary tillage implement only (ploughing), reapers and threshers for production under rainfed on fair developed farmlands.

The ***advanced level*** is defined as the use of effective and modern farm equipment & machinery including power tillers, tractors with both primary and secondary tillage implements (tractor/plough/harrow/rotovators/levelers). Adequate access to seed drill equipment, transplanters, boom sprayers, combine harvesters, reapers and threshers. It further include producing under rain-fed conditions on properly developed lowlands or valleys or irrigation fields with adequate access to effective infrastructure and water regulatory structures (dams, pump or gravity, concreate canal, pipes) for supplementary irrigation, good transportation network and condition, adequate access to storage facility with modern rice milling equipment made up pre-cleaners, destoners, graders, colour sorters & dryers.

From the analysis it is observed that out of 143 sampled districts, about **67%** are classified as low-level, about **25%** are classified as medium level and finally about **6%** are classified as advanced level.

Table 1 below shows that the region with the most advanced level of mechanized assets and infrastructure deployment (Volta region with 44%) reported the highest rice productivity yields

of 5.1Mt/ha, and the highest level of rice production (39%), although area under production in the Volta region of 23% is less than the 31% reported by the Northern region.

The Northern region although has second highest level of production (21%) reported the lowest yield productivity of 2.01 mt/ha, lower than the weighted average of 2.96 mt/ha for all the regions. The Northern region ranked highest with (24%) in the Medium level of mechanisation and infrastructure deployment. It also came in second in the Advanced Level range with 33% .

Table 1 Regional Endowment of Mechanisation and Infrastructure

LEVELS OF MECHANISATION AND INFRASTRUCTURE OF DISTRICTS						
REGION	**LOW**	**%**	**MEDIUM**	**%**	**ADVANCED**	**%**
WESTERN	14	14%	2	5%	0	0%
CENTRAL	4	4%	3	8%	0	0%
GREATER ACCRA	0	0%	1	3%	1	11%
VOLTA	18	19%	3	8%	4	44%
EASTERN	5	5%	3	8%	0	0%
ASHANTI	16	16%	6	16%	0	0%
BRONG AHAFO	10	10%	3	8%	0	0%
NORTHERN	14	14%	9	24%	3	33%
UPPER EAST	9	9%	3	8%	1	11%
UPPER WEST	7	7%	4	11%	0	0%
TOTAL	**97**	**100%**	**37**	**100%**	**9**	**100%**
PERCENTAGE %	**68%**		**26%**		**6%**	
Tota # of Districts	143					

	National Rice Production Data - 2018				
REGION	**AREA (HA)**	**% ofArea**	**YIELD (MT/HA)**	**PROD'TN (MT)**	**% of Prod**
WESTERN	34,797	13%	1.37	47,554.34	6%
CENTRAL	2,341	1%	2.12	4,967.86	1%
GREATER ACCRA	4,687	2%	4.82	22,576.52	3%
VOLTA	58,662	23%	5.11	299,893.71	39%
EASTERN	9,737	4%	4.02	39,114.13	5%
ASHANTI	14,167	5%	3.89	55,056.22	7%
BRONG AHAFO	10,077	4%	1.75	17,628.45	2%
NORTHERN	81,165	31%	2.01	163,544.61	21%
UPPER EAST	37,530	14%	2.78	104,255.20	14%
UPPER WEST	6,545	3%	2.26	14,809.82	2%
TOTAL	**259,708**	**100%**	**2.96**	**769,400.86**	**100%**

Source: Statistics, Research and Info. Directorate (SRID), Min. of Food & Agric.- March, 2019.

Table 2 Development Issues and Policy Dialogue to Address Gaps

Developmental Issues	Policy Dialogue to address gaps
1.1 Poor land development of rice fields as result of tree stumps, roots, debris, etc creating barrier for the effective use of farm equipment. 1.2 Weak skill capacities in developing lowlands with requisite water regulatory structures for rice cultivation	1.1.1 Promote use of equipment such as skid shredders, mulchers and laser levellers for land development. 1.1.2 Collaborate with developing partners to invest in proper land development of lowlands and valley bottoms for rice production 1.2.1 Build skill capacities of bulldozer operators and contractors in proper land development for rice production
2.1 High cost of appropriate farm machinery equipment (power tillers, tractors with requisite implements, mini/conventional combine harvesters, reapers, threshers, etc) 2.2 Inadequate supply of appropriate (power tillers, reapers, threshers) and affordable machinery and equipment 2.3 Inadequate mechanization service providers and leasing companies 2.4 Poor after sales service providers including poor spare parts access	2.1.1 Provide credit/subsidy schemes for farmers to acquire appropriate farm equipment (power tillers, reapers, threshers, mini combine harvesters, moisture meters) 2.2.1 Provide credit/import duty waivers/tax relief to suppliers and dealers of farm equipment to import equipment such as power tillers, tractor + rotovators, reapers, threshers, mini combine harvesters 2.3.1 Provide tax relief to service providers who service smallholder farmers 2.4.1 Provide import duty waivers/tax relief to local agents and dealers of spare parts to set up satellite spare parts depot in farming communities
3.1 Most rice growing districts lack drying and modern milling facilities which contributes to the high postharvest losses & poor grain quality especially among smallholder farmers	3.1.1 Promote the establishment of modern appropriate rice mills (pre- cleaners, destoners, graders, colour sorters where applicable) with high standards for high grade quality to attract good market prices 3.1.2 Introduce appropriate modern and efficient parboiling, cleaning and drying equipment (including drying patios) that will enhance the

Developmental Issues	Policy Dialogue to address gaps
	quality of the paddy rice to meet the requirements of the mills
4.1 Most agricultural machinery/equipment operators do not have the requisite skills and knowledge to effectively and efficiently set the implement properly or even operate the machinery/equipment to enhance productivity of the farmers.	4.1.1 Regulate and provide continuous modular comprehensive training for both operators and service mechanics. Provide certification to trained operators and mechanics.
6.1 Weak local fabrication capacities to manufacture simple farm equipment and replacement parts	6.1.1 Build capacities of local artisans and fabricators to standardise the manufacture of simple farm equipment and replacement parts. 6.1.2 Provide tax relief for the importation of high quality steel materials for agricultural machinery production; 6.1.3 Adherence to standards and specifications in the manufacture and supply of steel products;
7.1 High cost of irrigation infrastructure and components (dams, dugouts, canals, pipes and pumps) 7.2 Low efficiency in existing irrigation schemes & lack of maintenance 7.3 Limited skill in design, construction and management of irrigation structures 7.4 Land degradation including illegal mining (galamsey) on water bodies	7.1.1 Provide funding to construct modern and effective irrigation infrastructure such as dams, dugouts, canals, pipes and pumps 7.2.1 Rehabilitate existing irrigation schemes under GIDA to improve efficiency 7.3.1 Build skill capacities of contractors and design engineers in the design and construction of modern and efficient irrigation structures; Build capacities of farmers/users on management of irrigation structures 7.4 1 Create awareness on environmental degradation and enforce bylaws
8.1 Poor rural road network and condition leading to limited access to markets	8.1.1 Provide funding support to improve existing rural road networks and other modes of transport
9.1 Inadequate and poorly situated warehouse facilities leading to high postharvest losses	9.1.1 Collaborate with stakeholders to establish well-equipped and properly situated warehouse infrastructure

Conclusions and Recommendations

The Policy implications are that increased ***appropriate*** support at all levels of Mechanisation and Infrastructure deployment to address the current gaps will yield a positive return in terms of productivity and production.

Therefore, setting and reporting on yearly yield and production targets as well as post-harvest losses by district enables the policy makers to isolate and estimate a Return on Investment disaggregated by district, Region and ecosystem. Investments by the private sector needs to be recognized in the reporting for picture completeness.

The inadequacy of capital, particularly, through the provision of infrastructure and services, which could be delivered using government resources, has the potential to crowd out funds for alternative spending – farm expansion and input procurement.

Promote Policy to provide targeted incentives to private sector agribusinesses that will assist in reducing working capital requirements, and thereby free up additional capital for reinvestment in agribusiness.