



Production Risks and Coping Mechanisms: The Case of Rice farmers in the Upper East Region of Ghana

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Introduction

Rice is a strategic food crop in Ghana. The strategic nature of rice has long drawn the attention of policy makers who view promoting domestic rice production as a means of reducing dependency on imports, lowering the pressure on foreign currency reserves, ensuring stable and low-priced sources of food for people, and generating employment and income for rice growers (Randolph, 1995). Despite the role of rice as a major food crop in the Ghanaian economy, its production is beset with several bottlenecks including poor rainfall patterns, high input costs and lack of incentives. Aside, the rice sub-sector is plagued with

risks[1] and uncertainties[2]. In the midst of these bottlenecks, risks and uncertainties in rice production, economic efficiency (technical and allocative) of rice farmers, employment and productivity levels are threatened because rice farmers are compelled to make production decisions under turbulent socio-economic conditions. Employing the participatory method of research this paper discusses the types, nature and effects of production risks on rice production in the Upper East Region of Ghana using 440 smallholder paddy farmers. The paper also examines rice farmers' coping strategies against rice production risks. The emphasis here is on production risk because it directly affects the technical and allocative efficiencies of farms and is more pronounced in the Upper East Region than marketing risk.

The Upper East Region

The Upper East Region is one of the ten regions of Ghana. It lies between latitudes 10° 15' and 11° 10' North and longitudes 0° and 1° 4' West. The region is bounded to the north by Burkina Faso, to the east by Togo and to the south and west by the Northern and Upper West Regions, respectively. The region covers an area of 8,842 sq. km. Its climate is characterised by two distinct seasons: the wet season from May to October and the dry season from November to April. Mean annual rainfall ranges from 950 to 1100 mm. The region is a key rice-producing region in Ghana, and is ranked second among five major rice producing regions in the country (Aggrey-Fynn, 2000). Between 1992 and 2002 the Upper East Region accounted for about 27% of rice output in Ghana. The region possesses great potential in rice production because of its rich soils (Fumbisi, Basyonde and Binaba valleys) and abundant labour. Rice production accounts for over 30% of food output in the Upper East Region. Rice is grown during the rainy season in the valleys or in swampy or irrigated areas. Non-irrigated rice farming is practiced across all nine districts in the region, while irrigated rice farming is done mainly at Tono and Veve dams in the Kassena-Nankana, Bolgatanga and Bongo districts. Rice is planted in April/May each year for rain-fed and November/December each year for dry season farming. Average farm size is estimated at 1.3 hectares with an average yield of 1.8 t/ha (compared with the national average of 2 t/ha). The major rice inputs include seed, land, labour, fertilizer, bullock and pesticide. Hoe, cutlass and sickle are also used as simple farm implements. Use of agro-chemicals is widespread among irrigated rice farmers. Harvesting of rice (which occurs in October/November for rain season farming and April/May for dry season farming) is manual with limited use of combine harvesters.

Rice Production Risks and Coping Strategies

Usually, sources of risk in agriculture are categorized into production and marketing. Producers' ability to cope with any particular type of risk is very important in input allocation decisions, which in turn affect output supply. Even though the right combination of inputs may necessitate optimum rice production, the impact of natural and environmental factors such as the intensity and duration of rainfall, humidity and temperature cannot be underestimated (Edeh et al., 2011). Uncertainties pertaining to weather and climatic variations, insufficient water management control measures as well as destruction caused by pests, weeds, diseases, mammals and birds pose serious risks to rice cultivation in Ghana (Kranjac-Berisavljevic et al., 2003).

Results of focus group discussions revealed erratic rainfall (ER), crop disease (CD), worms (W), bushfires (BF), birds (B) and grasshoppers (GS) as the six major kinds of production risks affecting rice farming in the region. The rice farmers explained that they encounter more than one type of production risk in a particular cropping season. In terms of intensity,

52% of the total number of 440 rice farmers said they encounter birds problem followed by 13% who indicated that they face crop disease annually. Seven percent indicated that they face the risk of poor rainfall and grasshoppers whereas 5% said they encounter worms annually. Only 2% of the responses reported that bushfires occur yearly. Farmers are capable of explaining the nature and magnitude of rice production risks (Fig 1).

Figure 1: A Rice farmer using graphics to explain rice production risks at Naabogu Community



The results indicate many effects of rice production risks on farmers. In the short run, rice production risks cause low output, poor rice quality, and reduced chances of farmers to borrow from financial institutions. For example, on the impact of erratic rainfall on rice cultivation, a farmer from Chaania remarked as follows: *“We do not receive adequate loans because those who are supposed to give us the loans say the rains are not reliable making rice farming risky”*. Thus, production risks make rice output unpredictable, hence the volatility in farmers’ incomes. In the long run, production risks discourage increased investment in rice farming.

Farmers’ ability to cope with any particular type of risk depends on the nature and intensity, as well as the frequency of occurrence of the risk. In many developing countries, product or enterprise diversification has been widely used as a coping strategy against production risks even though crop insurance is being encouraged in recent times. Ahmed and Garnett (2011) argued that integrating rice farming with fish farming could be an efficient diversification strategy for increased income and food security. Traditionally, it is claimed that people have often harvested wild fish from wet rice fields because it is believed that many fish species reproduce in rice farms (Little et al., 1996, Ahmed and Garnett, 2011). This may have encouraged initiatives that sought to combine fish and rice farming in order to increase productivity and reduce production risks (Gurung and Wagle, 2005).

Table 1: Effects of production risks and farmers’ coping strategies

Production Risk	Nature	Effect	Coping strategies
	Poor rainfall pattern. The rains	- Soil erosion	- Bunding

Erratic rainfall	either set in too late or stop very early. This type of risk is characterized by flood or drought.	<ul style="list-style-type: none"> - Low output - Low yield - Poor rice quality - Reduces farmers' chances of borrowing from banks - Disincentive to production 	<ul style="list-style-type: none"> - Formation of farmers' groups - Borrow food or money from relatives - Sale of livestock and small ruminants
Crop disease	Crop disease retards rice growth and maturity rates and is caused mostly by insects and other living organisms	<ul style="list-style-type: none"> - Low rice output - Low quality of rice - Retards rice growth and maturity - Disincentive to production 	<ul style="list-style-type: none"> - Use of agro-chemicals - Report to MOFA
Worms, grasshoppers	Living organisms that attack rice on the ground	<ul style="list-style-type: none"> - Destroy rice seeds/seedlings - Poor yield 	<ul style="list-style-type: none"> - Use of agro-chemicals - Use of ash to spray farms - Report to MOFA
Bushfires	Wild or uncontrolled fires that destroy rice farms	<ul style="list-style-type: none"> - Low output - Reduces soil fertility - Confusion and mistrust among community members 	<ul style="list-style-type: none"> - Monitoring farms constantly - Creation of fire belts - Early harvest - Report to community opinion leaders^[3]
Birds	Flying creatures that destroy rice plants or grains	<ul style="list-style-type: none"> - Destroy seeds after planting - Suck rice fluid during maturation 	<ul style="list-style-type: none"> - Early planting - Early harvest - Employ children to drive away

		- Low output	birds
		- Time consuming	- Use of scare crows

The results show that farmers adopted some coping strategies with the aim minimizing the negative impact of rice production risks. Details of the type, nature, effects of rice production risks as well as coping strategies are contained in Table 1. Formation of farmer groups or associations, borrowing from relatives, sale of livestock, especially small ruminants, use of agro-chemicals, use of scarecrows and constant monitoring of farms among others, are the coping strategies for production risks. Rice production risks such as crop diseases and problems of worms and insects that require special skills are usually reported to MOFA for assistance or advice, but in situations where farmers feel helpless, they throw up their hands in despair and allow those risks to take their fair share of the crop. Figures 2 and 3 show a sample of scare-crow and a rice farmer removing grass from his farm, respectively.

Figure 2: Scare-crow on a rice farm in Foo Community for driving away birds



Figure 3: A rice farmer manually removing grass from his farm at Foo Community. At his back is his scare-crow.



Conclusion

Rice production in the Upper East Region is threatened by various kinds of production risks. About 25% of the variation in rice output is due to factors beyond the control of the farmers. Launching an assault on declining levels of production would not only be timely, but would also be highly desirable particularly when risks and uncertainties continue to drag producers towards failure (Balasubramanian et al., 2007). There is the need to introduce and promote measures aimed at improving risk management. There is the need to institute regulatory frameworks to support market based initiatives such as insurance schemes or non- market based initiatives such as free extension services and information to farmers for which they may avoid, minimize, transfer or cope with production risks. The need to promote medium-sized irrigation schemes cannot be underscored.

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[1] Risk is the situation whereby the probability of an outcome is known. Risk has often been measured by input-output variances (Sasmal, 1993; Kumbhakar, 2002). Sources of risk in agriculture are frequently categorised into production, marketing and financial elements, and farmers may have varying degrees of tolerance towards risk in each of these categories (Bard and Barry, 2000).

[2] Uncertainty is a state of mind in which the individual perceives alternative outcomes to a particular action (Roumasset, 1977). The three types of uncertainties are natural uncertainty (technical), parameter uncertainty and model uncertainty (Abbaspour, 1994).

[3] This may include the Chief, the Assemblyperson, Youth leader, Farmers' group executives and religious leaders (Imams and pastors).