Production Risk Management in the Rice Sector

This FARMD Featured Topic provides a brief introduction to some of the key production risks faced by rice producers globally. This Topic shares the experience, insight, and research of practitioners and academics working, and researching, in this space. Authors include representatives from the International Rice Research Institute (IRRI), Utah State University, the Center for Continuing Education and Interdisciplinary Research at the University of Development Studies in Ghana, and the Indonesia Center for Agricultural Socio-Economic and Policy Studies (ICASEPS).

ABOUT FEATURED TOPICS

FARMD Featured Topics are a series of original articles from members and experts focused on selected topic areas related to agricultural risk management.

Authors contribute articles, photos, recent publications, biographies, opinions and video from around the world and from a variety of viewpoints to FARMD Featured Topics. Topics are also frequently update online and new content added by authors and from around the web. This section of FARMD is ever evolving and quickly becoming a valuable resource for agricultural risk management practitioners.

WHAT ARE MAJOR RICE PRODUCTION RISKS?

The major production risks affecting the rice sector include weather events such as drought and flood as well as the occurrence of rice pests and diseases.

WEATHER RISK IN RICE

Man-Keun Kim, Utah State University

Rice yield and rice production depend on many factors, such as technology, soil quality, planting practices, and weather variables. Year to year rice yield variability due to weather variables is an important production risk, especially in Southeast Asian countries including Indonesia, Bangladesh, Thailand, Vietnam, Myanmar, and the Philippines. One of the biggest risks is that rice yield variability from weather hazards can also lead to market risk to producers, consumers, and trading partners.

Volatility of yields due to weather conditions is predicted to become increasingly uncertain as climate is changing in such a way that weather conditions are predicted to become unfavorable for rice production. Rice production risk from weather variables may be quantified using the probabilities of the rice yield and its coefficient of variation (which measures randomness relative to the average yield).

Historical observations for rice production between 1962 and 2010 from FAO STAT show that the 2010 rice yield ranges from 3 tons/ha to 5 tons/ha across the six Southeast Asian countries mentioned and the yield variability ranges from 2% to 4% after controlling for technological progress and other factors. It is important to note that the rice yield variability can be measured using farm, regional, or national level data. However, estimates tend to be lower when the variability is measured at the higher levels of aggregation than at the farm level. This is because random deviation tends to be offset when averages are taken across farms. Meanwhile, farmers' risk can be seriously underestimated by using yield variability measured at the county level.

The relationship between the rice yield and weather variables can be investigated using a statistical method with historical rice production and weather data. It is noteworthy that temperature increases the rice yield variability, i.e., the temperature is a risk-increasing factor. Statistical analysis shows that a 1°C rise in the temperature induces rice yield variability to increase by 3.3%. The precipitation, however, does not have a statistically significant relationship with yield variability. At the farm level, improving farming technology, new heat-resilient rice variety, and input substitution are expected to be important elements for strategies aiming at reducing yield variability due to weather. For the long run, collaboration between international organizations in agricultural investment focused on developing countries in Asia should facilitate climate-related production risks.

COUNTRY FOCUS: INDONESIA

Bambang Sayaka and Sahat Pasaribu, Indonesia Center for Agricultural Socio-Economic and Policy Studies

The rice farm business in Indonesia is risky due to natural calamities, such as drought in the dry season and flood in the wet season. Pests and diseases are also major threats to rice farming. These risks can reduce rice yields and, in extreme cases, result in total crop failure.

Beginning in 2011, the government of Indonesia enacted a policy to cover rice farmers' losses. Total funding is around US$27 million and covers 68,448.22 hectares of rice planted in 100 regencies of 20 provinces in the country, encompassing 5,825 rice farmers' groups. The overall aim of the policy is to convert this aid into a long-term agricultural insurance product.

A pilot project, due to start in October 2012, will offer farmers coverage for a premium of US$20 (Rp 180,000) per hectare of planted paddy field, the farmers will pay 20% of premium (around US$ 4 or Rp 36,000) per hectare per planting season, with the rest paid by fertilizer companies. If successful, this pilot project will represent a first step towards an insurance product that transfers production risk away from rice producers. Over the longer term the pilot will be expanded to larger areas and to cover more farming households.

RODENT RISK

Grant Singleton, International Rice Research Institute (IRRI)

Across Asia, pre- and post-harvest losses from rats in rice are approximately 10-15%. Considering that a loss of 7% is enough rice to feed 245 million people for a year, it is evident that rats pose a major production risk to the rice sector.

The development of resistance and increased tolerance of rodents to chemical rodenticides, and an increased awareness of ecological and human health issues associated with these methods of control, has led to a search for more environmentally friendly methods of rodent control.

Ecologically Based Rodent Management (EBRM) provides a new approach to rodent management. EBRM has provided a better understanding of breeding ecology, habitat use, and changes in population density during the cropping season. EBRM allows ecologists to work closely with farmers and combine their knowledge of rodents to develop improved strategies for rodent control. The key in the process is identifying when and where to control rats. Farmers already have many traditional methods to control rats, but these are usually applied too late, rendering them ineffective.

EBRM has been highly successful in Indonesia and Vietnam for the rice field rat, Rattus argentiventer. In Indonesia, a 3-year village level study over five cropping seasons resulted in a 6% increase in rice yield, a 50% reduction in use of rodenticides, no further use of "engine oil chemical cocktails", and reduced costs of control. In Vietnam, a similar study led to a 10-14% increase in rice yields, 50% reduction in rodenticide use, and 20% higher economic returns to smallholder farmers.

Rodents are a major risk in Asia's rice sector and continuing to improve risk management methods such as EBRM is an important step in reducing production losses to rice farmers.

COUNTRY FOCUS: GHANA

Seidu Al-hassan, Centre for Continuing Education and Interdisciplinary Research, University of Development Studies, Ghana

Rice is an important strategic food crop in Ghana. While the right combination of inputs can maximize rice production, natural and environmental factors such as rainfall, humidity, and temperature cannot be underestimated. In work carried out in the Upper East Region of Ghana, 52% of rice farmers identified birds as their biggest problem in rice production. Other major risks selected include crop disease at 13%, poor rainfall and grasshoppers at 7%, worms at 5% and bushfires at 2% of farmers identifying this as their major risk.

Farmers' ability to cope with a particular type of risk depends on the nature and intensity, as well as the frequency of the occurrence of the risk. In many developing countries, product or enterprise diversification has been widely used as a coping strategy to deal with production risks. The results of a study of 440 farmer households in the Upper East Region of Ghana show that farmers adopted some coping strategies with the aim of minimizing the harm caused by rice production risks.

ABOUT FARMD

The Forum for Agricultural Risk Management in Development (FARMD) is a network of practitioners seeking to enhance the sharing of experience and knowledge in agricultural risk management. In time, the network will evolve from being a platform for sharing experiences and information to become a forum for learning, capacity building, and advancing knowledge in agricultural risk management. By improving the practice of agricultural risk management, the network seeks to optimize investments in the agricultural sector and reduce vulnerabilities of stakeholders. As a moving and constantly evolving forum, FARMD aims to provide an ever-changing platform for the exchange and promotion of knowledge on various subjects linked to agricultural risk management.