

Weather Index Insurance for Agriculture in Bangladesh: Significance of Implementation and Some Challenges

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Abstract:

Farmers are very poor and vulnerable especially in the developing countries. Farmers face several natural disasters and challenges during the agricultural production. The unavoidable and negative impact of weather could reduce the capacity of production, make farmers unproductive and put farmers into poverty. To face these challenges, weather index insurance could play a significant role but implementing index-based insurance is also challenging. Different stakeholders from insurance companies to government to donor agencies should come forward to protect the agricultural production because agriculture is the main source of food. These stakeholders also need to protect the lives of farmers, and enhance economic growth by implementing weather index insurance. This paper will focus on the present literatures of weather index insurance mainly some basic issues of weather index insurance and the relevance to use this in the context of Bangladesh, the advantages of weather index insurance and the challenges of implementation.

Keywords: Weather Index Insurance, Bangladesh, Agriculture, Insurance

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1. Introduction:

Bangladesh is mainly an agricultural country where agriculture is the greatest contributor in the economy. Most of the Bangladeshis are living on agriculture. About 85% of the total population is living in the rural areas. They are directly or indirectly related with agricultural production (Rabbani et al., 2007). A significant component of the national GDP is the rural economy. Agriculture (including crops, livestock, fisheries and forestry) has a contribution of 21 percent to national GDP. In Bangladesh, poverty prevails mostly in the rural and remote areas. Almost 53 percent of its rural population is identified as poor, totaling 85 percent of the country's poor. However, due to the unstable economic growth, insufficient institutional support, demographic and geographic characteristics as well as vulnerability to natural disaster creates a challenging environment in Bangladesh. One of the challenges is to maintain pressure on the land. Population is increasing at a rate of 1.6 percent per year. Demographic pressures and rapid urbanization have reduced the cultivated area every year (The World Bank, 2012).

Bangladesh is a country of rivers. This country is a terminal flood plain delta of three large rivers such as Brahmaputra, Ganges and Meghna. This country is suffering from flood frequently and flood is affecting 20 to 30 percent of the country in every year, even every few years the percentage jump into about 40 percent. This is one of the main causes of damages to infrastructure, crops and the entire economy (The World Bank, 2012). Climate change drastically affect agricultural sector in Bangladesh. Over the years, farmers are losing their expected production and becoming reluctant to cultivate their land. Thus, production is becoming less, which is an alarming sign for survival of the economy and people. The deficit of the production could create severe problems in the normal lives of the mass people. Agriculture is the only sector to provide basic food to Bangladeshi people. Due to high damage of the production, farmer faces extreme poverty. To protect this sector from the climate change and to save substantial agricultural production, weather index insurance could play a significant role, but it is also challenging to implement this index insurance.

Despite of some challenges to implement weather index insurance, this could be an amazing tool to address the issue of vulnerability in the agricultural sector. Different financial institutions, insurance companies or other stakeholders could come out with innovative strategies to implement this index insurance. Bangladesh government has a major role to provide all sorts of assistance to multiple stakeholders to implement this. Providing support might not be enough but government could actively work to bring positive changes and make win-win situation for both insurance companies and policyholders.

2. The brief profile of Bangladesh with agriculture and insurance perspectives

Agricultural sector has a great contribution in the entire economic sector of Bangladesh. For the enormous contribution, this sector is known as the heart of the economy of Bangladesh. The contribution of this sector cannot be overlooked due to some basic reasons, for instance, agriculture is the basic source of food and nutrition, employment opportunities, and poverty reduction of the county (Bangladesh Economic Review, 2011). According to The World Bank (2012), Bangladesh has arable

land approximately 7.5 million hectares (18.5 million acres) where every year Bangladesh is losing almost 1 percent because of the river erosion, urbanization or increasing population.

In most of the low layer areas, farmers usually harvest once in a year which is not sufficient to meet the demand of the food for the whole population of Bangladesh. Total food crop demand in every year is 23.029 million metric ton (BBS, 2006). Due to the less production, it becomes also challenging to meet the demand of the food crops. The basic crops of this country are rice and jute. Besides that, wheat, maize, sugarcane, vegetables, potatoes, different fruits such as bananas, jackfruit, mangoes and pineapples are becoming important along with tea. Fishing and forestry have also a great contributor in the agriculture economy in Bangladesh. The land of Bangladesh is fertile, and rice could be produced three times in a year. But due to the natural disaster, this country has less rice production.

Agricultural production has a direct impact on the lives of farmers and their families. The country's agricultural production is mostly affected by natural disaster and extreme weather such as flood, drought, cyclone, and salinity intrusion, which are directly related to the climate change. When the production is affected, farmers and their families face extreme vulnerability as well as poverty. Especially in the coastal areas of Bangladesh, farmers face some common challenges regularly such as drought, flood and salt intrusion. The effect of climate change is an ongoing threat as it occurs frequently (Asian Development Bank, 2013). The experience of crop insurance has both positive and negative discussions in different countries but in many countries crop insurance has experienced a bitter result in terms of viability. However, despite of these criticisms, crop insurance has benefits for the agriculture and farmers.

Agricultural production is always risky as it is highly dependent on the climate. Most of the rural population are involved in agriculture who are facing many challenges to cover the risk of production such as market risks and production risks that leads to unstable and unpredictable income years after years. Though some risks could be managed by farmers, but other risks cannot be managed by them. For coping up with these kinds of catastrophic risks, all stakeholders such as farmers, formal or informal financial service providers, raw material suppliers, insurance companies, government might have their own innovative mechanisms. But it becomes challenging to cope up with covariate risks that could mainly affect large number of people at a time. Rural people or farmers face difficulties to address such kind of risks. For managing these risks, farmers need to get outside help. The traditional crop insurance products are not enough to meet the demand of the farmers or even more costly for verifying crop losses and thus sometimes need to depend on the clients' honesty. However, the possibility is that riskier farmers might be more interested to buy insurance (Mehta, 2011).

The role of the government is very crucial for the success of the insurance. Insurance could be effective by the support of the government in a form of subsidy. In Bangladesh, the only state-owned insurance company named Shadharan Bima Corporation, initiated a crop insurance product as a pilot in 1977. After the failures in several times, the project has been withdrawn in 1995 (Islam, 2012). The cause of that failure could be different but it's obvious that weather risk management is one of the innovative and newest mechanisms which would be able to transfer financial risks (Varangis et al., 2002). Government has already taken an initiative to introduce an 'agricultural insurance' scheme to provide crop price support to the farmers who are involved with small and medium size farming in the event of crop failure due to natural disaster (Bangladesh Economic Review, 2011). However, questions always exit of their effectiveness and sustainability.

3. Weather index insurance and weather risks: An overview

3.1 Basic concept of Weather Index Insurance:

Though the idea of index insurance is not new but weather index insurance is very new and innovative concept in Bangladesh. Recently, weather index insurance (WII) became an interesting tool to insure rural farmers from weather related risk especially in the developing countries. The main idea of weather index insurance is simple. When a certain determined weather index is high (flood) or below (drought) with specific predetermined threshold then insurance give indemnity payment to the policyholder (Fuchs & Wolff, 2011). Weather index insurance is such a tool that helps to reduce risk of the production for the farmers from the climate shocks and climate change. One study (Hazel et al., 2010) states "Index insurance is a financial product linked to an index highly correlated to local yields. Contracts are written against specific perils or events (example-area yield loss, drought, hurricane, and flood) that are defined and recorded at regional levels (example-at a local weather station)". In these days, development agencies and researchers have been experimenting and exploring the opportunities of using weather index insurance to reduce the risk of poor people in the rural areas. By using this product, farmers may get indemnities on the realization of a weather index measures, a specific variable of weather, for example, rainfall or temperature, measured at a specific weather station over a specified time. Despite of all these benefits, criticism also exists. It is evident that weather index insurance does not cover the actual losses experienced by the policy holder (Barnett & Mahul, 2007). However, The World Bank has successfully piloted some of the projects of weather index insurance in some developing countries such as Malawi, Mongolia and India. In India, weather-based insurance products are implemented by one of the MFIs and state-owned bank (IFC, 2012).

3.2 Weather risk in Agriculture and different types

Weather risk in agriculture mostly depends on the diverse issues and the impact of climate change. Thus, it becomes difficult to make a common statement to understand this. It depends on the agricultural orientation to the fertility quality of soil and crop, variability of water to irrigation process to poor drainage system to lack of managerial competency. Weather risks mainly occur due to the uncertain events such as heavy rain or windstorm or could be for events occurring for a long time such as drought. However, all these depends on the timing and crops strengths of the agricultural production system. In the following table, weather related risks have been identified and impact on agriculture have been shown.

Table 1: Major weather-related risks affect agriculture:

Risks	Impact on Agriculture
Drought	Crop varieties face difficulties to adapt with mean rainfall and weather balance, it is naturally happened annually or more times in a year, very risky for livestock.
Excess rainfall and flood	This directly or indirectly affect agricultural production, it is in nature of riverine, flash and coastal flood, destroy the irrigation system, drainage.
High temperature	This create drought, affect the product life cycle.
Low temperature	This also affect production by freezing, it may create less warm at season.
Wind	It could create cyclone and frontal windstorm or even tornado that directly hampers production.
Hail	This is mostly localized.

Source: The World Bank (2011)

4. Significance of weather index insurance in agricultural development

4.1 Relationship between weather and production:

Weather and production have a direct correlation with each other because agricultural production is highly dependent on the weather. In the extreme cases when flood, windstorm or drought happens, those might cause serious damage of the agricultural production. From the early stage to final stage of production means during products life cycle, different natural supports are needed for smooth production. Extreme weather could damage any part of the production phase that would ultimately destroy the production of the final product. Sometimes damages could be measured by personal judgment but in most of the cases, it is difficult to make sure about the weather incidents and damage together. Sometimes relationship between two variables could be found easily when there is regular weather event. However, some other important factors also influence the production of agriculture such as pest and disease that causes crop losses. In some places where rainfall is more and seasonally less traced, in that case relationship might be less easy to establish. So, considering all these issues, it is evident that there is a strong correlation between weather and production (The World Bank, 2011).

4.2 Advantages of Weather Index Insurance to Agriculture

Understating the advantages of weather index insurances is equally important to understand the disadvantages that farmers face due to the climate change. Poor rural farmers in developing countries, for instance, Bangladesh, are vulnerable to manage risks associated with their production. They are also incapable to address the obstacles that hamper their socio-economic development. Based on the damage assessment, traditional insurance could not protect farmers effectively because of the asymmetric information as well as moral hazard between two parties such as farmers and insurance companies (Leblois et al., 2012). Weather risk is very dangerous to an agricultural production. This risk could destroy the future of production as well as put farmers into poverty. Weather risks give many shocks to farmers that make farmers not to invest in the field (Dick et al., 2011). However, to address these risks and challenges, insurance could help poor people to overcome several risks in their production period. Compared to other traditional insurance products, weather index insurance has many benefits. Here are some of these: the contract of this type of insurance is simple and straightforward which eventually helps the entire sales mechanisms; it pays based on the realized value of the related index; calculation of actual loss can be avoided; no need to determine policy holders considering risks; insurer has a high knowledge on the best information which reduces the problem of adverse selection. Moreover, it also reduces moral hazard, cost of operation is relatively low to avoid asymmetric information. Due to the nature of the index-based insurance, no one needs to be an expert to run this insurance in the agricultural field (Barnett & Mahul, 2007).

4.3 Role of institutions to agricultural development through weather index insurance

The role of stakeholders is very crucial for the agricultural development. Weather index insurance could play an important role for protecting the rural poor farmers in Bangladesh. When the strategy of implementing this insurance is integrated and market driven, then it could easily support agricultural development. Many farmers do not want to take risk for the production due to several bad weather experiences. If farmers have less knowledge on how to cope up with the extreme environment, they usually

escape from the risk of investment. This is how they are out of possible several productions in a year. So, for creating more values in terms of helping these poor farmers out of the risk, weather index insurance could work as a bridge among competitive market, infrastructure, information, technological opportunities as well as financial inclusion in an effective manner. These value additions will also help insurer to increase the uses of insurance in a sustainable manner. The main feature of this index insurance is its simplification and understandable to different stakeholders specially customers to rely on the information. Thus, this insurance mechanism could be useful to reach many poor families in the rural areas. However, the most likely target group will be both emergent and well-off farmers. It can be expected that many poor smallholders would directly purchase insurance on a sustainable basis since weather risk is very dangerous to agricultural production. This risk directly affects the production, put farmers into poverty and hamper the improvement of socio-economic condition of the poor farmers (Dick et al., 2011).

Institutional support especially multiple stakeholders' involvement is needed to run this insurance successfully. Depending on the insurance companies or donors could not be the only solution of implementing this index insurance to protect farmers in Bangladesh. Institutional support from local insurance companies to donors' organizations, international organizations to local government support that all are needed to see this insurance effective in the real field. Creating awareness among the staff of the organization who will deal with this product as well as the customers is an important task. International network organizations or world development and finance bodies such as The World Bank, International Finance Corporations, Asian Development Bank, European Investment Bank all could play an important role as promoters of weather index insurance in developing countries especially in Bangladesh.

5. Challenges of implementing weather index insurance

In Bangladesh, many challenges would arise to implement weather index-based insurance because literacy of this product is very limited, and people are reluctant to purchase insurance product due to the fraudulence activities in the insurance market. One of the challenges would be to properly initiate the index-based insurance as it is new and special expertise is needed for conducting research and effective product development, orient the internal organizational staff, insurance agents. At the same time building awareness and capacity of farmers or customers would be difficult one. Reaching to the rural areas would be another challenge because of the shortage of the infrastructure or local institutions or lack of necessary partnership. Collecting premium on timely basis as well as using technology to reduce cost would be other challenges. Due to address these challenges, operational cost could be higher than expectation that might lead to limit the scale of the implementation of the weather index insurance products.

Insurance companies also need to get reinsurance support from other institutions and managing this could be challenging. Setting the technology near to cultivate areas and protect themselves from the theft, developing automated weather stations, satellite data for rainfall insurance, ensuring quality data and make farmers understand the real data are some of other challenges that insurer might face. However, government support is crucial for the success of an initiative and without that the implementation of weather index insurance is impossible. For educating the government officials and stimulating their mindset to implement this insurance is important. In the implementation phase, primarily government may come out with the help of subsidy to make it possible and assist the vulnerable farmers from all the possible risks of weather changes. However, the strategic steps of starting weather index insurance in a country could be : finding stakeholders and sponsors for piloting, giving importance on insuring crops and regions, gathering recent data on weather, emphasizing to include expert in the process of judging weather behavior, practices of farmers and crop modeling, focusing on structuring pilot projects with stakeholders, taking initiatives to launch products as well as reinsure the risk (Mapfumo, 2007).

6. Conclusion:

In most of the rural areas of Bangladesh, natural disaster affects poor farmers in a substantial manner. This often forces farmers and their family members into poverty. To face this challenge, poor farmers lose their valuable assets to purchase food. Not only this, it could also affect child education. Parents prefer to save fees rather than sending their children to the school. To address all these direct and indirect challenges of climate change, weather insurance can make farmers more confident to purchase raw materials such as fertilizers, seeds and to protect their crops as investment (Rockefeller Foundation, 2012). To protect clients from risks of climate change, improve the quality of life and more agricultural production, weather index insurance could play a significant role. The proper management of risk could help farmers to access to credit which will help to enhance the operation of farming (ILO, 2011). With all above-mentioned challenges of implementing weather index insurance for rural farmers in Bangladesh, every stakeholder should work together for the well-being of the farmers. When farmers would be secured in terms of cultivating their land effectively, they could be more capable of contributing in the economic growth of the country. The contribution of agricultural sector to GDP would be increased. Besides that, many poor people could be relieved from the curse of poverty. People would be able to enjoy their lives without the tension of food security. Government should establish institutions that would provide opportunities to policy makers to develop strategic guidelines and clear vision on policies (GlobalAgRisk, 2009). Moreover, government should come out with innovative strategies to implement this index insurance with building strategic partnership with diverse non-government organizations.

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Dedication: This article is dedicated to all the farmers of Bangladesh who always work hard to keep us happy with quality food.