

# POLICY SUPPORT FOR CLIMATE RISK ADAPTATION: THE ROLE OF MICROFINANCE

## *Dukungan Kebijakan untuk Adaptasi Risiko Perubahan Iklim: Peran Keuangan Mikro*

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### ABSTRAK

Kegiatan pembangunan pertanian di Indonesia kini dihadapkan pada situasi perubahan iklim yang sulit diprediksi. Dengan risiko yang tinggi, Indonesia dituntut untuk tetap mampu menyediakan pangan yang dapat diakses seluruh masyarakat dan dengan harga yang terjangkau. Dalam kaitan ini, sekolah lapangan iklim diharapkan dapat meningkatkan pengetahuan petani untuk beradaptasi terhadap perubahan iklim. Sambil berupaya beradaptasi terhadap perubahan iklim, perlindungan pertanian diajukan untuk mengurangi risiko yang ditimbulkannya pada tingkat yang paling rendah. Asuransi pertanian ditawarkan sebagai salah satu bentuk perlindungan usahatani, berbagi risiko dan sekaligus menunjukkan adanya keberpihakan pada kepentingan petani. Asuransi usahatani padi akan melindungi petani dari kegagalan panen karena banjir, kekeringan dan serangan hama dan penyakit. Dukungan pemerintah dalam penyediaan dana membantu petani untuk membayar premi dalam bentuk subsidi perlu dilakukan pada awal pengenalan skim asuransi pertanian. Dukungan subsidi ini akan dikurangi secara berangsur-angsur dan dimasukkan sebagai bagian dari ongkos produksi usahatani. Lembaga keuangan mikro dibutuhkan untuk mendukung ketersediaan biaya usahatani pada saat bank pertanian masih belum tersedia di Indonesia. Sebagai tindak lanjut jangka pendek, Program Pengembangan Usaha Agribisnis Perdesaan (PUAP) yang saat ini berlangsung diharapkan dapat membantu petani menyediakan ongkos produksi pada masa mendatang melalui kelembagaan keuangan mikro. Peran lembaga keuangan mikro ini merupakan bagian dari antisipasi terhadap perubahan iklim dan sangat signifikan untuk menyediakan dana menunjang kegiatan usahatani dan membantu petani menghadapi risiko kegagalan panen.

**Kata kunci** : *asuransi pertanian, perlindungan usahatani, risiko gagal panen, sekolah lapang iklim*

### ABSTRACT

Agricultural development in Indonesia is being faced by the unpredictable climate situation. With such a high risk, however, Indonesia should be able to provide sufficient food for all of the people and access to food at affordable prices. In this regard, the climate field school is important to improve farmer's knowledge to anticipate such climate change. While adapting to the climate change, agricultural activities should be protected and reduced the risk to the lowest possible level. Agricultural insurance is introduced to

protect the farms, share the risk, and favor the farmers. Rice farm insurance, in particular, is applicable to share the risk of harvest failure caused by flood, drought and pest and disease infestations. Government support to provide subsidy for premium payment is encouraged. Such subsidy would be reduced gradually and integrated in the farm cost of production. In the absence of agricultural bank in Indonesia, microfinance institution is required to provide sufficient fund to cover cost of production. For a short-term follow up action, the current Rural Agribusiness Development Program (PUAP) is expected to help farmers through its microfinance institution in funding the farm activities. The role of microfinance is part of the climate change anticipation strategy and is very significant to help farmers to envisage the effect of harvest failure risk.

**Key words** : *agricultural insurance, farm protection, harvest failure risk, climate field school*

## INTRODUCTION

Climate change is currently a global issue. It is one of the external factors that difficult to predict and cause a serious impact on human livelihood. An increase in CO<sub>2</sub> concentration has generated green house gases creating the global warming that lead to great damage on agricultural production. The negative impacts will severely occur in the developing countries because of vulnerability in many aspects.

Agriculture is the economic sector that heavily affected by climate change. The unpredicted flood and drought condition are the major factors that cause failures in crop harvests. The damage of infrastructures, such as irrigation facilities and farm roads, are the examples of direct effect of such natural threats. The identified negative impacts of climate change are: (a) changes in cropping calendar, (b) occurrence of pests and diseases, (c) problems in post-harvest handling, due to high rainfall intensity, and (d) harvest failures.

Similarly, food supply remains depend upon conventional agriculture which is highly determined by climate. Climate is beyond the human control and, therefore farmers have to adapt themselves to the climate behavior. This is the only way, so far, to reduce the negative impact of uncertainty caused by climate changes. Farmers' own mechanisms for risk diffusion or loss management are particularly very expensive in high risk areas like arid, semi-arid and tropical regions (Binswanger, 1980). Farmers in these areas have resorted to disinvestment (selling of livestock or other assets) to cover their cost of production, repay debts and protect ownership of land (Walker and Jodha, 1986).

Rice is an important crop occupying around 60 percent of the total arable land (20.5 million hectare) in Indonesia. Since rice is a staple food for Indonesians, its production growth is very important to reduce dependence on imports. This means that sufficient domestic production will save foreign exchange and improve access of people to rice markets. Availability of rice at

reasonable prices also helps reduce domestic political and economic stability. Rice is so critical that its shortage will affect household food security, and therefore, the government should continue to promote the achievement of self-sufficiency in rice. Despite being the third largest rice producing country in the world, Indonesia has continued to remain a net importer of rice. This was last up until 2004 with irregular decisions to allow some imports of rice to maintain national stocks at safe levels. Following a significant increase in domestic rice production, the imports of rice is negligible since 2008.

Farmers, government officials, and other stakeholders are the key elements to bring new perspective on how to respond the current global climate change. With the above mentioned description, this paper is an attempt to discuss farmer's adaptation on climate change in connection with the role of microfinance institutions to support rice production in Indonesia.

## **THE PRODUCTION ACHIEVEMENT AND RISK OF RICE FARMING**

The productivity (yield per hectare) of rice (in terms of paddy) in Indonesia has been steadily increasing during the last four decades. It increased from an average of 2.65 tons per hectare in 1970s to 3.86 tons in 1980s, 4.34 tons in 1990s and further to 4.61 tons during 2000 to 2008. In 2008, the average national yield was estimated at 4.89 tons per hectare.

Risk denotes probability of occurrence of an event or condition, which may have adverse consequences at any stage in the pathway of production chain. The risk adversely affects the current as well as future farmers' decisions and severely impairs production and farm income, when it crosses absorptive limits of self adjustment coping mechanisms. The production and price risks are the major risks in agriculture, including rice farming. Major sources of price risks are imbalance in demand and supply, market imperfections, post-harvest losses, and lack of production or farm-income stabilization support systems.

Risks are associated with processes of rice production as well as handling of rice till it reaches the ultimate consumers. Obviously, risks are faced by rice producers/farmers as well as by other stakeholders who perform the functions of input production and supply, credit delivery, processing and marketing of rice. However, the most vulnerable groups to these risks are rice farmers, especially those who engaged in small scale farming systems. Risk management strategies for small scale rice farmers ought to be distinctly different from that for other farmers. Over the generations, people have concerned and have evolved ways and strategies to reduce risks and mitigate uncertainties. These include diversification, mixed farming, mixed cropping, intercropping, and crop rotations. Farmers in Indonesia have also adopted diversification to prevent harvest failures arising from mono-cropping (Hadi *et al.*, 2000); Susilowati *et al.*, 2002; Sumaryanto, 2006;

Saliem and Supriyati, 2006). Although the virtues of these traditional risk management mechanisms are widely recognized, they have limitations.

Harvest failure due to flood, drought, and attack of pests and diseases are common in Indonesia. The frequency and intensity of such risks are not the same in different places but the effect accumulates to a large amount when the whole country is considered. Hadi *et al.* (2000) estimated that during 1989-1998, the size of paddy harvest failure due to the three types of risk mentioned above was, respectively, 0.21 percent, 0.50 percent, and 0.06 percent of the planted area. Recent data indicate that the actual rice area affected by flood, drought, and pest and disease was, respectively, 333 thousand, 319 thousand, and 428 thousand hectares with respective production loss amounting to 997 thousand, 984 thousand, and 352 thousand tons (2008). The total production loss due to flood, drought, and pests and diseases was 2.33 million tons, which is 4.31 percent of the total production in 2008. For majority of the rice farmers who employ small size of landholdings (less than 0.3 ha in Java/Bali), such losses are very significant. These unexpected losses become a problem for the survival of members of farmers' households. Stem borer and rats are the main pest and disease commonly faced by the farmers in all rice producing centers in the country.

Food security has long been the priority of national development plans of Indonesia. Efforts were directed at increasing food production through technology innovations as well as through the implementation of programs for improving farm management. However, lately, the government of Indonesia is facing unexpected challenges on domestic food crops sector due to supply shortages leading to high prices of several basic foodstuffs. The supply shortages arise due to fluctuations in the production of main food crops (rice, corn and soybean). High dependency on imports causes economic instability throughout the country. Meanwhile, the demand for such crops is steadily increasing in the country due to increase in population. Therefore, the increasing frequency of harvest failures and yield losses need urgent policy response as a part of agricultural development and food security program. In this context, crop insurance can be a strategic policy response to the current food production scenario. This is one of the financial instruments to transfer farmers' production risks, associated with farming, to a third party (private company or government institution) through certain amount of premium payment. Agricultural insurance is very important to help prevent small farmers from crop loss and to ensure that they have minimum working capital for the next planting season.

Considering the current food security concerns of Indonesia, the role of microfinance institutions to support rice farm insurance is vital. The adapting climate risk could be shared with the third party (insurance company) to protect the farmer's interest in line with the objective of national agricultural development.

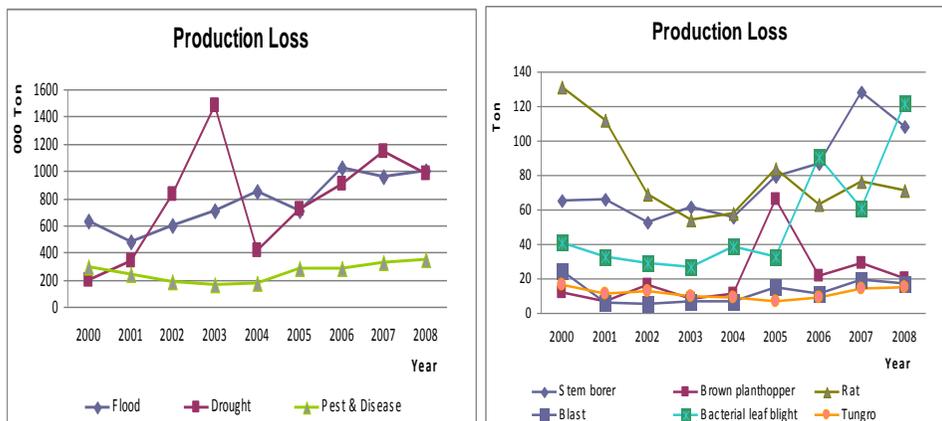


Figure 1. Production Loss Caused by Flood, Drought and Pest and Disease, 2000-2008 (Source: Pasaribu *et al.*, 2009)

## ADAPTATION AND ANTICIPATION PATTERNS

The direct or indirect negative impact of climate change should be wisely responded. The direct impact was dealing with cropping pattern, crop management, productivity reduction, and failure in harvesting and the indirect impact was the decline in food availability and purchasing power of the farmers. Farmers, in this case, should be well prepared with sufficient knowledge for the success of their farms.

Based on a study conducted in 2007, the strategies of farmers to anticipate the climate change consisted of defensive, aggressive, and anticipative. The defensive strategy is dealing with adaptation to the environmental circumstances. The aggressive strategy tends to modify crops or adopting new technologies, while the anticipative strategy deals with the action planning to reduce the negative impact of climate changes (Pasaribu *et al.*, 2008).

When flood occurs, farmers' group did *gotong-royong*<sup>1</sup> to repair dikes and drainage canals. The warning signal (*Siaga-1*) is given if the water discharge of the river reaches the level of at least 700 m<sup>3</sup> per second. For progressive farmers, water reservoir and deep/shallow well were constructed during the rainy season and make use it to grow maize during the dry season. On the other hand, other farmers only adjust their planting time after sufficient rainfall is coming. Another strategy is to delay selling crops in both villages. None of the farmers did crop insurance to protect their interest.

<sup>1</sup> *Gotong-royong* is a tradition of the farmers to work together without payout.

In the past, there was local wisdom locally developed in rural areas. Parents were able to indicate the regular and repeatedly natural events. In Java, for instance, one of such knowledge called *Pranoto Mongso*, the famous local wisdom of Javanese regarding the schedule or the good time to do a work. The stable climate in the past enables farmers to use this knowledge to plan cropping schedules. Presently, farmers can not use this knowledge anymore, because the climate has totally changed. Note that this knowledge was also used for doing any activities, such as, planting, fishing, traveling, marriage, and other works.

Further folklore about local wisdom is the fact that a lot of farmers use such knowledge to predict not only weather condition or climate prediction, but also the time and intensity of rainfall. In Nusa Tenggara Timur Province, for example, farmers believe that some natural events would indicate something. For example: (i) the yellowish cloud occurs in the west in the afternoon, it indicates less rainfall will come; (ii) if the big birds (*makleat*) make a noise around the village in November, especially throughout the night, it indicates the normal rainfall will come some days after; (iii) if the tamarind flowers are falling, means that rainy season will come soon.

There are many farmers' responses to the change in climate condition for which most of them pointed out the forest damage as the main reason. Farmer's groups play significant role to keep their working area free from such invisible hands. But the real damage is not in their working area; rather, it is in the upstream region along the way of their irrigation systems.

To anticipate the abnormal weather, farmers construct water reservoirs to anticipate dry season where they expect they can grow maize. Another way is to change the variety of crops to use that of recommended drought tolerance. The farmers also did crops diversification to reduce the harvest failure risk due to climate change.

Farmer's response to global climate change could also be anticipated through climate field school. This model of climate risk adaptation has been conducted in several locations in Indonesia. The objectives of climate field school are (a) to improve farmer's knowledge about climate and their ability to anticipate extreme climate incidence, (b) to help farmers to observe climate elements and use such information to support their farm activities, and (c) to help farmers to translate information about climate prediction to formulate appropriate farm activity strategy (Boer, 2009).

Introduced in 2002, the farmers in a rice production center of Indramayu Regency, West Java Province have enjoyed this field school model. Their knowledge about climate information have been fulfilled by climate module of this non-formal education using official climate data and information produced by the National Meteorology, Climate, and Geophysics Agency (BMKG). With the helpful of extension workers at the local level, a number of farmers' groups have been experienced the advantage of this field school model. Now, the farmers are

able to read the 10-days climate data and to plan more precisely the time/date of paddy cultivation. Following the success achievement in Indramayu, similar field school model have been introduced and developed in 19 provinces with 234 units in total (2007).

## **THE ROLE OF MICROFINANCE INSTITUTION**

Supporting institutions are very important to lead the success of farmers in doing adaptation and anticipation with respect to climate risk. Farmers institution, like farmer's group, has enable farmers to work more efficiently in purchasing inputs, doing pest control, post-harvest handling, and selling their product together. Non farmer's institutions, like micro finance, inputs and output markets, extension, and so on, play an important role to the success of farmers in farming. So do the government institutions which are dealing with supporting policies (Pasaribu *et al.*, 2009).

### **Agricultural Insurance for Risk Share**

Nearly 38 percent of rural households derive their livelihood from rice farming. Rice is also an important component of Indonesian daily food. It supplies 50 percent of the energy needs of an average Indonesian. Recognizing the importance of rice in macro and household food security by meeting energy needs of the people and as a major source of livelihood of small scale subsistence farmers, the domestic policies of Indonesian governments have aimed at achieving self-sufficiency in rice. However, despite being the third largest rice producing country in the world, Indonesia has continued to remain a net importer of rice.

There is a considerable scope to increase the rice yields further, as around 80 percent of rice is grown under irrigated conditions. Improvement in yield of rice is important both for improving national and household food security and increasing the incomes of small-scale subsistence rice growers. The experience in Indonesia and similar other countries shows that the necessary enabling environment for farmers to increase rice productivity consists of evolution and improvement of appropriate site specific yield-enhancing technologies and transferring these to rice farmers; creating an efficient system for making available modern inputs (improved seeds, fertilizers, agronomic practices, plant protection chemicals, etc.) to farmers at right time and place and at reasonable prices; and assurance of an assured market for the surplus rice that emerges with the farmers after the adoption of new technology. This package requires investment by both the government as well as the farmers. The farmer's enthusiasm to invest in new technology depends on the risk perceived by them in making such investments. Risks faced by rice farmers in Indonesia are both natural and man-made. Harvest failures and production loss due to droughts, floods and pests and diseases are

common in several parts of Indonesia. According to Nurmanaf *et al.* (2007), rice farming is feasible to be covered by agricultural insurance.

The objectives of rice crop insurance policy in Indonesia should be envisaged as follows: (a) To encourage farmers to increase production by reducing the risks involved in higher costs associated with the use of new improved modern technology; (b) To provide cover to the rice farmers against crop losses due to natural causes, so that they are able to fulfill essential needs, including food for the family; (c) To provide financial stability and confidence in the farm sector, and thereby reduce the migration of farmers or workers to urban centers; (d) To ensure the recovery of loans of government or other lending agencies in the times of crop failure; and (e) To facilitate the government to budget the assistance to farmers as a part of continuing annual program rather than being faced with *ad hoc* emergency programs, often hurriedly planned and financed, which are difficult to administer and are prone to inequities and local pressures.

### **Application Strategy**

In the initial stage, the government will intensively introduce agricultural insurance, the envisaged benefits through the protection of farm crops from harvest failure. The adaptation of farmers to climate risk will be supported by agricultural insurance. Micro scale insurance scheme in the form of pilot projects will be fully prepared to ensure the continuation of the scheme in a larger area. In this context, a more recent step taken by the government is the introduction of a pilot project by the Ministry of Agriculture. According to Pusat Pembiayaan Pertanian (2009), the project is intended to cover all risks (loss due to illness/poor health, lost, or stolen) for 45 cattle with 45 participants/ beneficiaries in Cirebon Regency of West Java Province and another 97 cattle and 97 participants/beneficiaries in Boyolali Regency of Central Java Province. Another similar project is called an all-risk program (harvest failure due to pests and diseases explosion) for farm input in Semarang Regency of Central Java Province covers 100 ha of rice field with 600 participants/beneficiaries. The budget for this program is provided by the Ministry of Agriculture. As this is the most recent agricultural insurance project in the country, the lesson learned from this project would be helpful in a larger insurance scheme for rice crop.

In the absence of agricultural insurance, the role of microfinance institutions is very significant. It is well understood that small-scale farmers unable to cover cost of insurance and, therefore, the government should provide certain amount to pay the premium rate. In a pilot project stage, the continuation of the program in terms of financial support should be well managed. Payment of insurance premium by the government through subsidy would not be an appropriate decision. Therefore, budget allocation through the existing program could be considered. This would also cover premium cost for farmers who are not bankable. From the development point of view, the current Ministry of

Agriculture's Rural Agribusiness Development Program (PUAP) could be taken into account to empower agribusiness microfinance institution. PUAP has been in operation in many regency levels throughout Indonesia. The success of PUAP is also depending on the performance of microfinance institution. Therefore, the role of such institution is very clear and its success would primarily depend upon the capability of personnel involved in management and operations.

In the future, the government is expected to actively promote agricultural insurance and could thoroughly consider budget allocation within the annual agricultural development. If subsidy could be provided for agricultural inputs, farm insurance scheme would not be less important than those. Principally the more farmers listed in the scheme, the lower the premium rate to be paid and the larger the area to be covered by the scheme. When harvest fails due to climate change or other reasons, the government burden would be partly lifted by the insurance claim. To this point, theoretically, the regional economy development could also be expected through a bright prospect of business arm of general insurance companies.

## CONCLUDING REMARKS

Policy alternatives to improve farmers capacity to adapt and anticipate the climate change should consider: (a) development of food crops practices and field school of climate, (b) improvement of extension services as well as construction and renovation of rural infrastructure, (c) development of varieties tolerant to biotic stresses, and (d) improvement of farmers' access to climate and market information, and government intervention on marketing of agricultural products.

Climate field school is very important and useful for extension workers and farmers' group. Improvement of flow of information on climate condition from the office of meteorology, climate and geophysics (BMKG) to the provincial and district agricultural offices and down to the farmers is very critical. Scientific knowledge along with local wisdom developed in certain areas should significantly enrich farmer's experience to adapt with climate change.

Farm risk share is very significant to protect farmer's interest and, for a wider objective, to maintain rice production and productivity. For this reason, insurance scheme is important and the role of microfinance institution is very strategic to support the scheme. Considering the low financial ability of small-scale landholding farmers, in the early stage of farm insurance scheme, the government intervention would be vital. The government will take initiative to introduce, advocate and socialize the scheme up until the application and implementation phases. In this initial stage, particularly in carrying out pilot projects in several locations, the government should provide financial support to pay premium rate and field operational cost.

At the implementation stage, the cost of insurance would be gradually paid by the farmers and could be included into cost of production. The microfinance institution under the current Rural Agribusiness Development Program (PUAP) spread throughout the country would be eligible to finance the insurance scheme along with the other cost of production, especially for farmers who are not bankable. A consistent commitment in adaptation of stakeholders to climate risk through agricultural insurance would enhance farm crops production and improve farmer's income.

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