Policy Options for Rice and Corn Farmers in the Face of Seasonal Climate Variability

CELIA M. REYES, SONNY N. DOMINGO, CHRISTIAN D. MINA, AND KATHRINA G. GONZALES

ABSTRACT
In the face of seasonal climate variability, the smallholder farmers, particularly those in rural communities, are among the most adversely affected. As a way to address this, together with concern on low productivity, the Philippine government has been implementing a range of risk management programs for farmers and other agricultural stakeholders. Based on key informant surveys and focus group discussions conducted in key producing areas in the country, rice and corn farmers reported that they still have limited options in terms of changing their production decisions in response to seasonal climate forecasts. Among the risk mitigation tools available, the following emerged as most preferred by farmers: localized climate information; accessible credit; crop insurance; and special assistance programs such as irrigation and seeds provision. This paper tackles these programs in detail and discusses the challenges besetting these programs. The paper also presents some policy options which could enhance the delivery of these agricultural services in pursuit of improved productivity and welfare in target farming communities in the country.

1 Celia M. Reyes is Senior Research Fellow, Philippine Institute for Development Studies and Team Leader, PIDS-ACIAR Project. Email creyes@mail.pids.gov.ph for correspondence. Sonny N. Domingo and Christian D. Mina are Supervising Research Specialists, Philippine Institute for Development Studies. Kathrina G. Gonzales is Senior Research Specialist, Philippine Institute for Development Studies.
INTRODUCTION
The vulnerability of agriculture to the unpredictability of nature is an age-old riddle, which had left even the wisest of men without answers. In most cases, people are left with no other recourse but to adapt to environmental phenomena and make do with what they have. In the Philippines, where agricultural production represents a major source of livelihood for many rural people, the pressure to do better amidst seasonal climatic variability is immense.

Safeguarding the livelihood and interests of local farmers entails concrete action in social, economic, and political fronts. National and local governments, nongovernment organizations (NGOs), and other stakeholders are doing their part but further consolidation of efforts is needed. Among those that the Philippine government has come up with to assist farmers in the face of seasonal climate variability are price stabilization measures, typhoon and drought relief efforts, livestock and feed subsidies, farm input subsidies, agricultural credit, and subsidized crop insurance schemes.

Decades of agricultural support, risk mitigation, and relief efforts have been relatively successful, but a more lasting and sustainable solution is yet to come. Farm- and household-level surveys and focus group discussions (FGDs) conducted among rice and corn farmers in key producing areas in the country, under the ACIAR-funded project titled “Bridging the Gap between Seasonal Climate Forecasts and Decisionmakers in Agriculture,” made it apparent that the agriculture sector still needs much assistance. Some of the key findings from these surveys and FGDs include the following: general farm productivity still needs to be improved; farms are highly vulnerable to extreme climate events such as drought, floods, and typhoons; and given a number of government interventions, many farmers still have limited options in crafting their decisions in response to climate variability.

Impact of seasonal climate variability on rice and corn production
Much had happened in the country’s agricultural sector over the past decade. Great technological milestones have been achieved but setbacks were also ever present. Productivity in the crop subsector has been generally increasing over the last 10 years but production losses, especially due to seasonal climatic aberrations, have been huge.

Data from the Department of Agriculture (DA) confirm the vulnerability of the farming sector to the unpredictability of nature (Table 1). Droughts, floods, and typhoons have been wreaking havoc on crops and causing untold miseries among farmers. From 1995 to 2004 alone, climatic aberrations had resulted in total damages amounting to 4.9 million hectares of prime rice and corn farmlands.
Cumulative losses incurred amounted to PhP16 billion for rice farmers and PhP7.2 billion for corn growers.

A major cause of the climatic catastrophes experienced in the country, and in other parts of the world, is the El Niño Southern Oscillation (ENSO) phenomenon. ENSO shows its destructive face through two major phases: the El Niño or warm event and the La Niña or cold event. El Niño conditions lead to drier seasons due to suppressed tropical cyclone activity and weak monsoon characterized by delayed onset and early termination of rainy season. La Niña, on the other hand, is characterized by above normal rainfall, prolonged, and early onset of rainy season (SCF Project Team 2005). The destructive power of ENSO was clearly documented during the 1997–1998 El Niño/La Niña episodes when the total rice and corn production losses incurred amounted to PhP7.04 billion. This is equivalent to around 30 percent of the total rice and corn production losses during the ten-year period.

More alarming is the seemingly frequent occurrence of the ENSO phenomenon in recent years. There had not been a single year from 1994 up to 2005 when either the cold or warm phase of ENSO, regardless of intensity, was not present (Table 2). This fact is distressing given the trend that the event only occurred every 2 to 7 years during the last 300 years. According to Jabines and Inventor (2007), the more frequent occurrence of El Niño and La Niña events...
are likely local manifestations of global climate trends. This apparent increase in climatic variability equates to elevated risks in agricultural production and postproduction operations.

**Problems compounding rice and corn farming**

Risks are easily converted to losses when not properly addressed. Seasonal climate variability has impact on all segments of society, but among the most affected are the resource-constrained farmers whose livelihoods are greatly dependent on natural resources. This is most evident among farmers who rely exclusively on rainfall to irrigate their crops. However, other agricultural businesses that operate with better resources and more modern technology on better farmlands are also not spared from the same risks.

Prolonged dryspells, excessive rains, and floods are among those critical events that could easily destroy a season’s crop. The coming of rains signals the start of a new planting season, but the same gift from nature could easily wipe out a standing crop. Similarly, lack of water supply during critical growth stage of crops due to El Niño-induced drought could adversely affect crop yields.

The problems of smallholder farmers are further aggravated by a number of complicating elements in the rural countryside. Getting enough capital to buy inputs and start the cropping season is a big challenge in itself for most rural producers. Replenishing finances after an environmental catastrophe, especially if crop production is not insured, is a much greater hurdle. On top of these, excessively high-interest loans from informal lenders bring unusual burden to local farmers.

The need to help smallholder rice and corn farmers to overcome environmental and socioeconomic challenges is a given. A more critical concern is how to proceed in giving such help. Over the years, both the government and

---

**Table 2. El Niño and La Niña episodes, 1994–2005**

<table>
<thead>
<tr>
<th>Period</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>May 1994–April 1995</td>
<td>El Niño</td>
</tr>
<tr>
<td>October 1995–April 1996</td>
<td>La Niña</td>
</tr>
<tr>
<td>June 1997–May 1998</td>
<td>El Niño</td>
</tr>
<tr>
<td>August 1998–July 2000</td>
<td>La Niña</td>
</tr>
<tr>
<td>November 2000–March 2001</td>
<td>La Niña</td>
</tr>
<tr>
<td>June 2002–April 2003</td>
<td>El Niño</td>
</tr>
<tr>
<td>August 2004–March 2005</td>
<td>El Niño</td>
</tr>
</tbody>
</table>

NGOs have been trying to come up with the best means to solve the perennial socioeconomic problems in rural farming communities. Some efforts produced commendable results but many failed and were just written to the annals of unsuccessful development initiatives.

This paper expounds on some preferred mitigating tools, which have been explicitly aired by rice and corn farmers through farm- and household-level surveys and FGDs conducted by the project team in selected case study sites. In particular, this paper presents some background information on the abovementioned tools as well as some challenges besetting them. Based on these, the paper provides some policy options and recommendations which could enhance the delivery of agricultural services and help improve productivity and welfare in target farming communities.

**CONCEPTUAL FRAMEWORK**

In the midst of climate uncertainties, individual farmers are more likely to “self-insure” in order to mitigate the adverse effects of extreme climate events on their production. Among the most common adaptation strategies that farmers do are the following: diversifying their crops; changing cropping intensity; changing crop mix; changing crop type/variety; adjusting planting or harvesting dates; modifying the amount of other farm inputs such as irrigation water, fertilizer, pesticides, among others; changing farm locations; and adopting integrated pest management programs (Mwinjaka et al. 2008; Fraisse et al. 2008; Pandey and Bhandari 2009).

The responses to climate variability may either be ex post or ex ante. Ex post measures are taken only after crops are damaged due to climatic aberrations while ex ante measures are carried out in anticipation of a possible climate-related catastrophe (Mwinjaka et al. 2008). Apparently, most of the adaptation strategies followed by farmers are ex post. Burton (1996) and Smit and Pilifosova (2001) argued that ex ante or planned strategies are both more efficient and effective than ex post measures. Nevertheless, these measures, to become more effective, entail some economic costs and require sufficient resources, knowledge, and skills from farmers (Pandey and Bhandari 2009). As noted in a number of related studies, the capacity of farmers to autonomously adapt to climate variability depends on institutional support, manpower, financial, and technological resources (Yohe et al. 1996; Mendelsohn 1999; Mendelsohn and Neumann 1999; as cited in Mwinjaka et al. 2008).

Majority of those considered highly vulnerable to climate variability are the smallholder farmers, who usually do not have enough means to mitigate the climatic effects all by themselves. Because of this, government intervention is considered necessary. In general, governments, especially those in developing
countries, respond only to climate aberrations after experiencing the impact primarily due to financial constraints (Meijer et al. 2009; Hoff et al. 2003). However, studies have pointed out that in government intervention (to successfully assist the vulnerable farmers cope with climate variability), structural, long-term, proactive, and ex ante strategies are more important than ad hoc, short-term relief measures (Pandey and Bhandari 2009; Mwinjaka et al. 2008).

Based on a survey of literature, some of the policy interventions that can help improve farmers’ capacity to adapt to the effects of climatic aberrations include the following: (1) provision of relief, which include food, agricultural inputs, credit, among others; (2) water resource development such as small- and large-scale irrigation schemes, farm ponds, and watershed development; (3) improvements in rural infrastructure, marketing, and extension resulting in farmers’ income diversification; (4) investment in rural education, which facilitates income diversification and helps increase labor returns; (5) widening and deepening of rural financial markets; (6) provision of accurate and timely seasonal climate information to farmers through improved forecasting and early warning systems as well as continuous awareness raising; (7) rainfall-based crop insurance; and (8) research on and dissemination of calamity-resistant crops (Pandey and Bhandari 2009; Meijer et al. 2009; Hoff et al. 2003).

PREFERRED DEVELOPMENT INTERVENTIONS

The Philippine government has been implementing a range of risk management programs as a way of helping farmers, especially the smallholder ones in rural areas, cope with the adverse effects of seasonal climate variability. Based on the results of the farm- and household-level surveys and FGDs conducted by the project team in the selected study sites, the following emerged as the most preferred mitigation tools by farmers: better climate information; accessible credit; crop insurance; and special assistance programs such as irrigation development and seed subsidy.

Seasonal climate forecast and information

The Philippine Atmospheric, Geophysical, and Astronomical Services Administration (PAGASA), the country’s premiere meteorological agency, has a wide range of climate information products and services being offered on a regular basis. It issues around 10 advisories designed to inform and warn the populace on upcoming climatic/weather conditions. Table 3 enumerates the different climate information packages produced by PAGASA for various stakeholders in agriculture.

One of the most significant PAGASA products and services is the seasonal climate forecast (SCF), which could serve as a tool in helping farmers and
decisionmakers mitigate the adverse effects of seasonal climate variability. SCF applies probabilistic principles in projecting climatic deviations. PAGASA uses seasonal predictions from both national and international climate centers in coming up with its own forecasts for a certain period. International agencies tapped for this purpose include the National Center for Environmental Prediction/Climate Prediction Center, International Research Institute for Climate and Society, and the Australian Bureau of Meteorology (WMO 2006).

Climate information are disseminated in a number of ways. PAGASA holds quarterly forums with institutional partners and key stakeholders, which are scheduled more frequently during times of calamities. Among those who regularly attend the forums are media people, information end-users, and representatives of interagency committees dealing with water resource management, agricultural development, and disaster mitigation and relief. Regular press releases are also issued by the agency, especially during extreme weather events. Television and radio programs are also tapped in disseminating climate-related information, especially among farmers. Meanwhile, local agricultural technicians also help disseminate appropriate advisories for the benefit of farmers and other stakeholders within the locality.

Agricultural credit

Formal and informal lenders make up the rural financial scene. Formal lenders include commercial banks, thrift and development banks, rural banks, and credit-guarantee institutions. Informal lenders, on the other hand, include traditional moneylenders (i.e., traders, millers, large-scale farmers, friends, relatives, landowners, and overseas contract workers, among others) and organizations (i.e., credit unions, credit cooperatives, rotating savings and loan associations, among others).

Table 3. PAGASA’s climate information products and services

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Monthly Weather Situation and Outlook</td>
</tr>
<tr>
<td>2</td>
<td>Annual Seasonal Climate Forecast</td>
</tr>
<tr>
<td>3</td>
<td>El Niño/La Niña Advisory</td>
</tr>
<tr>
<td>4</td>
<td>Tropical Cyclone Warning</td>
</tr>
<tr>
<td>5</td>
<td>10-Day Advisory</td>
</tr>
<tr>
<td>6</td>
<td>Farm Weather Forecast</td>
</tr>
<tr>
<td>7</td>
<td>Philippine Agroclimatic Review and Outlook</td>
</tr>
<tr>
<td>8</td>
<td>Press Release on Significant Events</td>
</tr>
<tr>
<td>9</td>
<td>Philippine Agri-Weather Forecast</td>
</tr>
<tr>
<td>10</td>
<td>Climate Impact Assessment Bulletin for Agriculture</td>
</tr>
</tbody>
</table>

Although formal institutions such as Land Bank of the Philippines (LBP), Development Bank of the Philippines (DBP), and Quedan and Rural Credit Guarantee Corporation (QUEDANCOR) have been contributing significantly to agricultural lending, informal lenders still make up the majority of creditors servicing the rural countryside. Data from Bangko Sentral ng Pilipinas (BSP) show that majority of farmers go to informal lenders for their credit needs (Table 4). Although informal lending decreased by 16 percent from 1996 to 2002, its hold on the credit market had still been formidable at 60 percent.

At the top of government efforts to oversee agricultural credit is the Agricultural Credit Policy Center (ACPC). ACPC is mandated to help the government develop and implement strategies and policies that could increase and sustain the flow of credit to agriculture and fisheries, improve the viability of farmers and fisherfolks, and support agriculture modernization, food security, and poverty alleviation.

**Crop insurance**
Crop insurance is designed to protect farmers against loss of crops on account of natural calamities, plant pests and diseases, and other perils. This agricultural service is claimed to have great socioeconomic relevance because it does not only address the welfare aspect of the after-loss event, but it also helps stabilize farm incomes more equitably. It also aims to reverse the risk-averse nature of farmers and motivate them to invest more on new technologies to help increase productivity (PCIC 2006). In the Philippines, the Philippine Crop Insurance Corporation (PCIC) implements and manages the government program on agricultural insurance.

Seasonal climate variability proved to be the top source of uncertainty for rice and corn farmers (Figures 1 and 2). Based on PCIC data, the two top causes of loss claims for rice and corn crops until 2000 have been typhoons/floods and droughts. Losses from pests and diseases only gained momentum at the start of the new millennium. In general, typhoons and floods have been the major causes of production damage for rice, while drought has been the number one cause of loss.

Table 4. **Percentage shares of formal and informal lenders in total farmers' borrowing (%), 1996–2002**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Formal institutions</td>
<td>24.0</td>
<td>28.6</td>
<td>34.4</td>
</tr>
<tr>
<td>Informal lenders</td>
<td>76.0</td>
<td>61.3</td>
<td>60.3</td>
</tr>
<tr>
<td>Formal and informal lenders</td>
<td></td>
<td></td>
<td>5.3</td>
</tr>
</tbody>
</table>

Claims on rice insurance from typhoons/floods totaled to around PhP1.05 billion from 1981 to 2007. Claims on corn insurance caused by drought amounted to PhP258 million for the period 1982–2007. An aggregate amount of PhP1.7 billion in rice and corn insurance claims is attributed to damages from typhoons,
floods, and droughts. The figure represents 66 percent of the total indemnities paid by PCIC for all insured commodities covering all causes since the start of its operation. This figure alone effectively describes the impact of seasonal climate variability on crop insurance operations and agricultural productivity in general.

Irrigation
Irrigation facilities available for rice and corn production are the national irrigation systems (NISs), communal irrigation systems (CISs), small water impounding projects (SWIPs), small farm reservoirs (SFRs), diversion dams (DDs), and shallow tube wells (STWs). NISs are administered by the National Irrigation Administration (NIA), CISs are under the Irrigators Associations, while SWIPs, SFRs, DDs, and STWs fall under the wings of the Bureau of Soils and Water Management (BSWM). Rice farms mostly benefit from large-scale irrigation infrastructure while corn areas are generally rainfed.

The NIA operated and maintained an aggregate irrigated area of 972,692 hectares in 2005. The area consists of 496,242 hectares for wet crops while 476,450 hectares for dry crops. The total area of 558,598 hectares irrigated by CISs comprised 291,891 hectares during wet season and 266,707 hectares during dry season. All in all, the total irrigated area during wet and dry seasons for NISs and CISs is 1,531,290 hectares (NIA 2006).

As of 2007, BSWM has reported the construction of a total of 1,399 SWIPs, 22,282 SFRs, and 30,728 STWs. These types of infrastructure are classified as small-scale irrigation systems with each structure servicing only limited farm areas. Average service areas for the systems are 55 hectares for SWIPs, 1–2 hectares for SFRs, 20–60 hectares for DDs, and 3–5 hectares for STWs. Although relatively limited in coverage, small-scale irrigation systems have lower investment cost per hectare and could be developed by private individuals or entities.

During the 1997–1998 El Niño episode, the use of small-scale irrigation facilities figured prominently in government efforts to mitigate the adverse impact of drought. Units like SWIPs and SFRs were able to harvest rainfall and runoff from catchment areas for use during water-lean months. On the other hand, NIA-supported irrigation systems mostly benefited rice production as they were designed to meet the water requirements of large tracts of land.

Seed subsidy
To help small farmers meet the high cost of inputs, the government (through the DA) implements programs that subsidize the price of hybrid and inbred rice seeds as well as hybrid and open-pollinated varieties (OPV) corn seeds. The seeds are provided during regular season to increase farm productivity and, at times, during post-calamity relief to aid in the rehabilitation and replanting of damaged farms.
Two umbrella programs under the DA—the Ginintuang Masaganang Ani (GMA) Rice Program and the GMA Corn Program—cover the implementation of the seed subsidy programs.

The GMA Rice Program includes component programs on inbred and hybrid rice. Inbred rice seeds are freely distributed to masterlisted farmers in target irrigated and rainfed lowland areas. The hybrid component, through the Hybrid Rice Commercialization Program (HRCP), on the other hand, provides price subsidy to farmers to encourage them to plant hybrid seeds and, consequently, enhance their productivity and income.

The GMA Corn Program includes hybrid seed subsidy and the OPV seed exchange programs. The former distributes quality hybrid corn seeds under counterpart agreements while the latter distributes and produces OPV corn seeds for counterpart agreements with local government units (LGUs) and for intercrop with coconut. Both hybrid and OPV subsidized seeds are also extended as rehabilitation support to farmers in calamity-stricken areas.

CHALLENGES BESETTING RISK MANAGEMENT PROGRAMS

Seasonal climate forecast and information
Among PAGASA climate information products, only El Niño/La Niña Advisory and Tropical Cyclone Warning effectively reach majority of the farming populace in selected sites in Isabela. As reported in Reyes et al. (2009), 94 percent of farmers in selected sites were aware of ENSO forecasts while 85 percent received tropical cyclone warnings. The rest of the information products got low awareness ratings, ranging from 2 to 19 percent. Usefulness and reliability ratings were acceptable, with only a few expressing extreme discontent on the products (Table 5). However, the figures still indicate that much has to be done to properly disseminate climate information, improve its accuracy, and package the products in more useful ways.

Among the most pressing concerns aired by farmers is the absence of localized climate/weather forecasts. PAGASA comes up with only national and regional advisories. The clamor for more relevant and specific information is justified given the archipelagic nature of the country and the diversity of local climate/weather conditions. Farmers really need to be provided with localized forecast to be able to craft better coping strategies against climate variability.

Another challenge is the lack of time-series data that can be used for developing forecasting models, which could be used as input in designing relevant programs and policies. Not all LGUs have meteorological stations. Among those with stations, many are relatively new (less than 50 years) and do not have data that are long enough to establish significant patterns. As a consequence, assessment
of the impact of climatic variability using simulation modeling and other modern methodologies cannot always be carried out.

**Agricultural credit**

The risk aversion of formal banks makes it hard for them to fully venture into the rural financial market. Aside from the inherent lack of assets and financial resources common to many countryside residents, income from smallholder agriculture is quite variable and uncertain. This reality impacts on the capacity of farmers and other agricultural workers to meet their loan obligations. The uncertainties unintentionally brought by the Comprehensive Agrarian Reform Law (CARL) further decreased the willingness of banks to provide financial services to rural areas (Llanto 2004). Llanto and Estanislao (1995) and David et al. (2003, cited in Llanto 2004) explained that the restrictive provisions of agrarian reform eroded the collateral value of land, hampering farmer’s access to credit, particularly in the formal financial markets.

Directed credit programs (DCPs), although seemingly the easiest recourse to address an unyielding formal credit sector, still failed to reach majority of the borrowing farmers. Farmers are still left with limited options and inadequate credit services. In addition, the sustainability of donor-
supported credit programs has also been questionable. Funds easily get depleted and once donor support is withdrawn, operations get impaired and programs are put to a halt.

Moreover, the market-oriented approach to agricultural credit also failed to meet expectations. Hyped as the best recourse during the peak of DCP implementation in the early 1980s, market-oriented credit and financial policy barely succeeded in convincing formal banks to venture more on agricultural lending.

The foregoing observations boil down to informal credit being the most feasible option among farmers, especially when they are adversely affected by extreme climate events. The project team found that smallholder farmers in key corn producing areas in Isabela continued to patronize informal lenders albeit high interest rates (offered at a minimum of 30%). Informal credit, however, has a number of drawbacks. Llanto (2004) mentioned that a problem with informal finance is its inability to sustain the credit needs of a growing rural economy and to intermediate the rural surplus. Also, given a relatively inelastic demand for rural credit, informal lenders tend to manipulate interest rates to their advantage but at the expense of smallholder farmers.

**Crop insurance**

Experts agree that traditional crop insurance schemes are plagued with inherent problems (Roberts 2005; Skees 2001). Common to all classic insurance programs are problems on information asymmetry, adverse selection, moral hazard, and high administrative and transaction costs. The same difficulties are being experienced by the crop insurance program in the Philippines. Estacio and Mordeno (2001) claimed that the major problems besetting the crop insurance program in the country are high overhead costs and insufficient investment funds. The program’s survival depends greatly on subsidies and organizational cost trimming as the government does not allow PCIC to load operational overhead, cost of money recovery, and profit markup on insurance premium.

Traditional crop insurance is expensive to implement, but more so given the setup of PCIC. The program incurs very high transaction cost in bringing service to the countryside. This is aggravated by the fact that PCIC adopts an individual underwriting and claims approach, wherein dealings are on a farmer-to-farmer basis and claims assessment requires field inspection. The high operational cost of PCIC is not being met by yields from its investment funds. This, coupled with late and/or nonremittance of government share in premium, makes the case of PCIC doubly difficult.

When the crop insurance program started in 1981, the government made it a compulsory requirement for borrowing farmers to avail of crop insurance. Through the years, the proportion of borrowing to self-financed farmers
continued to widen. Since 1991, almost all clients of PCIC were borrowing farmers. Estacio and Mordeno (2001) claimed that antiselection of the self-financed market was evident and that the compulsory “borrowing farmers” market lulled PCIC to complacency. The problem of adverse selection showed its head with the antiselection of the self-financed market. Only farmers in disaster-prone areas came to patronize the insurance program, making it difficult for PCIC to balance its risk portfolio.

Another problem with PCIC is its lack of market orientation. Efforts to market PCIC’s insurance products to target clientele seemed inadequate. The total number of insured farmers has never reached the 50,000 mark for rice and 10,000 mark for corn since 2001. These figures represent only less than one percent of the estimated 5.2 million smallholder farmers in the country. The number of borrowing farmers alone plays at around 3.4 million a year, of which 1.3 million are formal borrowers (ACPC 2003a). This is quite a substantial part of the crop insurance market if tapped accordingly.

Meanwhile, adoption of new crop insurance schemes in an attempt to address the perennial problems associated with traditional crop insurance is becoming a challenge for PCIC. Among these new product lines are index- and market-based insurance. Under the index-based insurance scheme, indemnities are paid based on the value of an index or trigger rather than actual farm losses. Instead of the usual insurance policy, a simple coupon that gives a monetary sum is used. The coupon becomes payable upon certification by authorities that the trigger event has occurred. Triggers or indices could be meteorological measurements (i.e., rainfall, windspeed, and temperature), area yield, price, or livestock mortality rate, depending on applicability and correlation with crop damages. In the case of weather-based index insurance, a sufficient network of tamper-proof meteorological devices would be required to serve as reliable monitors. Key decisions would also have to be made on the nature and specifics of trigger mechanisms such as size of typhoon, wind strength, rainfall level as well as the proximity of these occurrences to insured areas.

**Irrigation**

Out of more than 4 million hectares of farm lands devoted to rice and 2.5 million hectares devoted to corn, only around 1.43 million hectares are serviced by NIA-administered and private irrigation systems. Considering that not all lands are irrigable, NIA estimated that about 1.7 million hectares still need to be irrigated.

However, irrigation development entails high economic costs. The estimated cost of just rehabilitating existing irrigation facilities ranges from about PhP100,000 to PhP150,000 per hectare (PCARRD 2005). On the other hand, the cost of establishing new national and communal irrigation systems could be much
high. On top of these, operation and maintenance of the systems cost around PhP2,000 to PhP3,000 per hectare per year.

Another issue with irrigation is the level of benefits derived from it. PCARRD (2005) questioned the rationale behind spending most of the irrigation budget on rice. Despite being prioritized in irrigation development, rice productivity has remained low over the last three decades. There also seems to be no coordinated and sincere effort to irrigate other crops such as corn, vegetables, among others. Moreover, irrigation facilities serve both as water reservoir and drainage in attempt to mitigate the adverse effects of climatic aberration like droughts and floods. There are limitations, however. During times of drought, service areas of NIA-administered systems are drastically cut. The tail-end portion of serviced farms often experience water shortages during prolonged dryspells or sometimes even during regular dry season. These situations entail the use of supplementary water sources such as onfarm reservoirs or other small-scale irrigation systems.

**Seed subsidy**

Dialogues with farmers in Isabela revealed a problem with the corn seed subsidy scheme. Corn farmers who received free seeds as part of postcalamity relief efforts were not happy about the program. Among their most frequent complaints were low quality seeds with low germination rate and low volume of seeds (at around 3–5 kg. per farmer), which would not even be enough for replanting operations for a quarter of a hectare.

In terms of rice, Rice Watch and Action Network (R1) noted that farmers’ adoption of hybrid seeds was low and only reached a peak coverage of 11 percent of the total rice farm area in 2005. A World Bank (2007) report also cited that the sizeable amount of money and public human resources allocated to HRCP were not able to produce much net social benefit. Moreover, David (2006) noted that even with massive subsidies, the program still failed to deliver strong evidence that currently available varieties are commercially viable. There were also documented problems on unsuitability of varieties and poor quality of seeds that were not addressed.

**POLICY OPTIONS AND RECOMMENDATIONS**

The productivity of smallholder rice and corn farmers evidently needs to be improved. Average yields for both crops, even in areas with input support and irrigation systems, are still quite low. This fact, coupled with shocks from extreme climate events such as droughts, floods, and typhoons, makes the smallholder farmers extremely vulnerable. Government interventions in this case are considered essential. The government intervenes in a number of ways, but the most preferred by farmers (as gathered from surveys and focus group discussions) are
as follows: better SCF and information; credit support; crop insurance; irrigation services; and farm input subsidy, e.g., seeds. These development tools proved to have legitimate claims to economic and social benefits. However, challenges besetting these tools are apparent, which need to be addressed properly by the government.

**Seasonal climate forecast and information**

PAGASA has a wide range of meteorological products, which could address a variety of climate-related queries. The usefulness of these materials would be in question if access to them by target clientele is impaired. An advocacy to use wider communication channels would address this concern. Television and radio programs have been proven to be effective means of bringing information to farmers in the countryside. Print materials in layman form, preferably written in local dialect, would also help a lot in informing farmers and other agricultural stakeholders.

A main hindrance in developing better climate models, which could be used as input in designing relevant programs and policies, are missing information and lack of longer time-series data on weather parameters such as rainfall, temperature, solar radiation, among others. Efforts should be made to fill up missing figures as well as extend the available time-series data and make them available for various studies.

One of the most important policy options for the government to be able to provide better SCF and information is the upgrading of PAGASA’s capacity to come up with localized SCF. This is a more long-term goal, which could be addressed by establishing more meteorological stations at the municipal or even up to the barangay level. This then requires relatively huge investments for the purchase of equipment, establishment of local facilities, and training of the necessary manpower. A possible mechanism to make this more workable and attainable is to collaborate with LGUs in terms of manpower and resource requirements.

Another related course of action is the cleaning and upgrading of the country’s meteorological archives. Local meteorological stations, some with records spanning almost a hundred years, have rich collections of location-specific data. This wealth of data would be of better value if processed and structured in more usable formats.

**Agricultural credit**

The small presence of formal banks/creditors in the rural scene has opened up opportunities for informal entities to grow and service the rural credit market. Although possibly at the expense of small farmholders and rural folks, informal creditors are cashing in on this credit gap. The ability of informal lenders
to adapt to local requirements sets them apart from their formal counterparts. High transaction costs and high loan-risk impair the ability of traditional banks to operate efficiently under a rural setup. The rigid credit requirements imposed by rural banks also do not go well with the rural setting. If formal institutions are to regain a substantial portion of the credit market, they have to adopt some flexibilities.

One way of doing this is to accept substitute collaterals. Informal lenders have long been exploiting this alternative by accepting pawning of cultivation rights, required sale of output to trader-lenders, joint liability or having a guarantor to back up the loan, mutual guarantee by group members, interlinked contracts, and government guarantee (Llanto 2004).

Another possible workable arrangement is shown in government’s attempts to partner with informal lenders in rural credit delivery. QUEDANCOR, for instance, has tapped traders and millers with access to traditional banking as credit intermediaries. Guarantees were given to these traders and millers who, after obtaining bank loans, provided credit to their small farmer-clients. LBP has also been motivated to use NGOs and cooperatives as credit intermediaries to deliver credit to numerous small borrowers. Practical arrangements like these should be considered more seriously to take advantage of the strengths of the informal lending sector.

A promising development is the present popularity of alternative lending schemes like microcredit. Microfinance institutions (MFIs) were left free to charge market-oriented interest rates, enabling them to recover costs and allowing their operations to get a semblance of sustainability. Most MFIs are patterned after the Grameen Bank of Bangladesh. The essence of its operation is joint-liability. Membership is limited to people from the same area with similar economic resources. Loan repayment is facilitated through peer pressure as members borrow in groups. Meanwhile, NGOs have also pioneered the use of lending techniques that draw inspiration from the informal moneylenders such as use of third-party guarantees, timely processing and quick release of loans, lending without requiring traditional collateral, among others (Llanto 2004).

Though market-oriented credit is preferred by experts over DCPs, the role of the government is widely acknowledged. There is a consensus that the financial market should be left to market forces, but Gonzales-Vega (2003, cited in Llanto 2004) believed that exclusive reliance on such might not give optimal results. Proper government interventions are deemed necessary.

Moreover, ACPC recommends that the government should institute policies to reduce intermediation and transaction costs. An atmosphere wherein banks can reduce the effective borrowing rate at which they lend should be provided. Other recommendations include the streamlining of regulatory requirements imposed
by the government, increasing investments in rural infrastructure to lower transportation and communication costs in rural areas, and providing guarantee schemes that would decrease banks’ cost of absorbing defaults.

**Crop insurance**

For almost three decades of existence and operational fluctuations, the Philippine crop insurance program still has relatively modest impact to show. Its mandate of providing security to agricultural producers, particularly subsistence farmers, has been met with logistical and operational challenges over the years.

First, PCIC should have done more to entice more farmer-clients, especially those who are not availing loans from formal sources, to avail of the securities they offer. If PCIC indeed targeted farmers patronizing formal credit, then it should have also tapped the institutional partners of LBP. The market of borrowing farmers should have been exploited more fully.

Second, if the crop insurance program is to survive and become operationally sustainable, it has to operate as an economically viable unit. With the absence of assured financial support from the government, efforts must be made to streamline the program’s operations and install a more aggressive marketing component.

Ultimately, PCIC must go after its mandated target market—the small farmers and fisherfolks. It seems that as it is right now, agricultural credit and crop insurance are intertwined. If the insurance program is not allowed by law to impose commercially competitive rates and profit from smallholder farmers, then the program has no choice but to stick close to formal lenders and avail of promised subsidies. But still, the market for borrowing farmers is big enough for PCIC to generate significant impact. The program only has to find creative ways to expand its market share.

Traditional crop insurance schemes, like the ones existing in the Philippines, have been generally touted as hardly sustainable. Highly subsidized, these programs operate with very high transaction costs and are usually associated with problems of adverse selection, moral hazard, and information asymmetry. A more lasting solution to these difficulties would entail an overhaul of the system and adoption of innovative schemes such as index- and market-based insurance products. Serious efforts have to be exerted to review the present setup and assess the feasibility of implementing the abovementioned alternatives.

**Irrigation**

Adequate irrigation water is among the necessary requirements for greater productivity in the face of climate variability. This is particularly true for rice, wherein increase in yield would entail proper irrigation support. Corn can thrive exclusively on rainfall, but it would be more productive if water during its critical
growth stage is ensured. Sebastian et al. (2006) claimed that with a comparatively small area for rice production, one way to increase productivity is to increase the proportion of irrigated areas. Historical data analysis showed that an irrigated ecosystem has a yield advantage of more than 1 ton per hectare compared to rainfed areas. It is thus important to properly maintain and rehabilitate existing irrigation systems to prevent further deterioration and ensure optimum performance. This, as well as establishment of a new irrigation infrastructure, would require billions of pesos. Thus, the government must decide on the most efficient solution to address this issue.

One feasible option is the use of small-scale irrigation systems, which require lesser investment cost to build and operate. BSWM noted that the cost per hectare of constructing such facilities are as follows: PhP100,000 for SWIPs; PhP20,000 for SFRs; PhP45,000 for diversion dams; and PhP16,000 for STWs. These figures are many times lower than the cost of establishing national and communal irrigation systems. Magna Carta for Small Farmers, which was signed into law in 1991, advocated the use of these small-scale irrigation systems. Part of Section 19 of the Act states the following: “…focus shall also be made on small irrigation systems that are more efficient, cost-effective, and cheaper to establish...”

Meanwhile, PCARRD (2005) also advocated that studies be made regarding the development of irrigation systems for diversified crops to give farmers better income. The most appropriate method of irrigating diversified crops should be determined and the technology standards for planning and designing irrigation and drainage facilities for nonrice crops should be established.

**Seed subsidy**

Provision of subsidies on farm inputs such as seeds is a big help to many smallholder farmers. However, the cost-effectiveness of this intervention must be studied more carefully. The government, through DA banner programs, had already incurred huge expenses in providing highly subsidized hybrid and inbred seeds to farmers but dramatic improvements in productivity and social benefits have not been seen yet. Provision of seeds, as part of relief assistance to areas damaged by droughts, floods, and typhoons, is commendable and deemed necessary, especially for subsistence farmers. However, negative feedbacks from recipients of these seed aids (i.e., low quality and low volume of seeds being distributed) should be investigated. If seed subsidies are to continue, efforts must be made to ensure that the target smallholder farmers are the ones who are truly benefiting from the program. Furthermore, as suggested by David (2006), resources should also be allocated to develop an efficient inbred rice seed system with modest subsidy.
CONCLUDING REMARKS
Ultimately, a lot could be done to alleviate the plight of smallholder farmers and increase their capacity to cope with shocks and environmental stresses. Although different development programs have been set up to tackle specific issues and concerns, one must never miss to look at a bigger picture. The individual interventions, when put together, perfectly complement and justify each other. Climate forecast/information helps in deciding on the type of crop and level of farm inputs; input subsidies and irrigation support help in increasing farm productivity; agricultural credit allows farmers to properly finance the appropriate package of technology; and crop insurance protects farmers from risks as well as increases their chances to avail agricultural credit. Everything fits, and looking at a vantage point, an insured, well-informed, and well-funded farmer has a better chance of surviving the challenges offered by seasonal climate variability.

REFERENCES
Agricultural Credit and Policy Council (ACPC). 2003. Small farmers and fisherfolks: how many are they? 


———. 2003a. Small farmers and fisherfolks borrowing up at 64% in 2002. 


Alcober, M.A. 2006. PCIC insurance coverage tops 2005 by 66%. 


———. 2006a. PCIC enjoins insurance coverage for agricultural projects. 


———. 2006b. Power packages benefit stakeholders and producers. 


Baños (UPLB), College, Los Baños, Laguna: Center for Policy and Development Studies.


Philippine Council for Agriculture Forestry and Natural Resources Research and Development (PCARRD). 2005. Rice and white corn industry cluster strategic plan. Unpublished manuscript. Los Baños, Laguna: PCARRD.


