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Practice of Biodiversity Conservation and Agroecology Enhance Climate Change Resilience of Organized Small Scale Organic Farmers in the Philippines

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Author's Background

Charito Medina is the national coordinator of MASIPAG, a network of farmers, scientists, and NGOs in the Philippines working on biodiversity conservation and for the empowerment of small-scale farmers. MASIPAG has 28 years of experience in organic farming, participatory and farmer-led research including breeding of crops and improvement of indigenous livestock. He is the NGO representative of the National Organic Agriculture Board (NOAB) in the Department of Agriculture, a policy making body for the implementation of organic agriculture programs. He was one of the lead authors of the International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD) ESAP subglobal. He also served in the Panel of Experts during the preparation of the assessment at the Global, ESAP regional, and Integrated design. He is also part time faculty in two universities in the Philippines teaching environmental science and natural resource management, ecosystem dynamics, and biodiversity conservation. His interests include sustainable organic agriculture, food systems, participatory research, and rural development. He holds a PhD degree in Environmental Biology from the University of Guelph, Canada.

Summary

Small scale farmers in the Philippines have been retrieving traditional rice varieties for more than two decades and it has led to the conservation and utilization of more than a thousand varieties of rice. Rice plant characters like performance under organic farming, differential resistance to pests and diseases, and adaptation to climate change have been done by the MASIPAG farmers. They also learned breeding and selection. As a result, more than a thousand improved rice varieties were developed and about 500 cultivars were developed by farmers themselves. Farmers maintain the rice varieties in trial farms which contain at least 50 varieties. MASIPAG has developed a conservation support system through a national backup farm, regional back up farms, provincial back up farms, and trial farms.

In the social dimension, farmers and their organizations are indispensable in the development and practice of agroecology . Consequently, many farmers have developed and adapted technologies on seeds, agronomic, soil and nutrient management, alternative pest management, storage, processing and marketing. Organic farming is then more sustainable with nutrient integration, and cultivation of biodiversity with a resulting ecosystem of enhanced biological interactions and synergism. All of these are better adapted to extreme weather events and climate change, making the farmers more resilient.

Farmer-to-farmer diffusion of seed and agroecology approaches has made organic farming diffuse in Farmers' Organizations (PO/FO). This is very effective because the users of technologies are right there where the technologies are developed. Also, the technologies developed focus on what the farmers need. The organized farming community enhances self confidence of other farmers in converting into organic and agroecological approaches based on the actual experiences and testimonies of other farmers.

The use of agrobiodiversity makes seeds in the hands of the small scale farmers resulting to less external cost in production and the differential responses of varieties, crops and livestocks to climate change is a built-in insurance and reduce exposure to losses. These contribute to greater economic resilience of farmers in the face of climate change.

Background

Farmer-Scientist Partnership for Development (MASIPAG) started in 1986 as response to the Green Revolution chemical farming that caused ecological, health, and economic problems (Frossard, 2002, Medina 2009). It focused on small farmers' empowerment through control of their productive assets and participatory development. Rice, being the staple food, was the initial crop in focus and retrieval of the traditional rice varieties was the first activity undertaken.

More than two decades after MASIPAG had been organized, the organization has evolved into a network of more than 600 farmers' organization in 49 provinces in the country. Currently, MASIPAG has collected more than a thousand traditional rice varieties, and developed about 1,500 rice cultivars from participatory and farmer-led rice breeding. Farmers have developed agroecological methods on soil fertility management, alternative pest management, diversification and nutrient integration under organic farming. Also, MASIPAG has its own Participatory Guarantee System (PGS).

The outcome had been better ecological, social and economic performance reinforcing the assertion that agroecology contribute better to food security (Altieri et al. 2011; Benessia et al. 2012). The network also has good contribution to environmental justice (Glotzbach, 2012).

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The coupled approach of technological development and social (farmer-centered / farmer-led approach) has become an effective approach in the development of solutions to address climate change problems. It contributed to greater farmers' resiliency.

Main Chapter
Discussion

The organic farmers' adaptive strategies to climate change that makes them more resilient are part and parcel of organic farming. It is essentially a 'no regrets adaptation' which means that with or without climate change, the practices are still needed for the agronomic requirements in growing the crops. They don't entail additional cost as climate change adaptation.

1. Conservation and Utilization of Traditional Rice Varieties (TRVs). Since 1986, MASIPAG farmers have collected 1,200 TRVs, conserved in the back-up farms, and distributed to farmers for selection of best varieties under localized agroclimatic conditions. This way, MASIPAG farmers have made their farms into living seed banks and making every unique variety accessible to farmers in time of need. Many of these varieties are adapted in different agroclimatic conditions. Increased yield and less dependence of farmers to purchased seeds has increased small farmers' economic resilience (Bjorklund et al. 2012).

Breeding. Breeding rice was done initially through participatory breeding resulting to the development of 1,140 improved rice cultivars. Likewise, MASIPAG has now evolved into farmer-led breeding wherein farmers breed rice in their own farm on their own initiative. Currently, there are 67 farmer rice breeders located throughout the country and they have developed more than 500 rice cultivars (Medina 2012). Both, Masipag bred rice and farmer-bred rice are given to farmers for screening of local adaptability at the trial farm and many of these improved cultivars were selected.

Trial Farm. Trial farm strategy is planting at least 50 rice varieties in adjacent plots to select varieties adapted to different agroecological conditions (Medina 2004). The trial farms also serve as farmers' seed bank. There are 188 trial farms currently maintained by MASIPAG farmers. Through the trial farm approach, varieties were also selected tolerant to specific climate change such as flood tolerant, drought tolerant, saline water tolerant or pest tolerant varieties (Table 1).

Table 1. Number of rice varieties adapted to climate change.

	Traditional Rice Varieties	MASIPAG Rice	Farmer-Bred Rice
Resistant to Drought	9	8	8
Resistant to Floods	4	5	4
Resistant to Saltwater	8	12	1
Resistant to Pests/Diseases	6	17	-

Rice Varietal Diversification. From the results of the trial farm, MASIPAG rice farmers plant at least three varieties to benefit themselves from differential tolerance of varieties to climate change and differential resistance to pests and diseases.

2. Diversification of crops and livestock. Diversification is an important component of organic farming, not only for nutrient integration but also for differential responses to climate change. MASIPAG farmers, on the average, cultivate 45 crops and other plants compared to conventional farming of 30 crops (Bachman et al. 2009). MASIPAG farmers have also embarked on livestock, especially native chicken and goats as part of its diversified and integrated farming systems These agroecological systems with tremendous diversity of crops and animals nurtured and enhanced by nutrient integration and cycling, indigenous soil, water and biodiversity management regimes and nourished by complex traditional or local knowledge systems have great contribution to food security and offers greater resiliency to climate change (Altieri et al. 2011).

3. Survival crops. Root crops are more tolerant to drought as well as typhoons, thus they serve as food insurance and survival crops in any event of calamity brought about by climate change. Cassava, sweet potato, and taro and yam are the most common root crops grown. In the Philippines, it takes two to four days after a strong typhoon for food relief to reach remote communities. During this critical period, root crops are the food for survival. Development as well as farmers organizations are now incorporating root crops in farming systems. Local government units in risk prone regions are now encouraged to develop policy to require root crops in every farming family.

4. Organic farming as adaptation and mitigation to climate change. Organic farmers need less capital expenditure compared to conventional farmers because of the savings from seeds, chemical fertilizers and pesticides. As such, they have less financial exposure and these are more economically resilient to environmental shocks. While organic farms can be damaged by natural calamities brought about by climate change, at least they are not indebted. In contrast, their conventional farmer counterparts, in the event of natural calamities, not only have damaged farms, but also indebted and that their loans continuously eat up interest. Likewise, organic farming contributes to climate change mitigation because of longer residence time of carbon in the soil. Organic farms can store 2 to 4 t CO2 equivalent/ha/year. Furthermore, the non-use of chemical fertilizer, particularly urea, avoids emission of nitrous oxide which is almost 300 times the greenhouse gas potential compared to carbon dioxide.

5. Organizations as adaptation to climate change. Most climate change adaptations and resilience are focused on structural and technological components. But in the MASIPAG experience, the organizations is a medium for farmer-to-farmer diffusion of knowledge on climate change resiliency. Also, with a membership of more than 600 farmers' organizations located throughout the country, MASIPAG have many farmers organizations willing and ready to send seeds/ planting materials for free to network members affected by calamities. This way, the affected farmers were able to plant the soonest possible time, hence greater resilience. In other places, communal work was also done in land preparation or harvesting to facilitate farm operations before or after natural calamities.

Core Messages and Conclusions

Conservation, improvement and utilization of traditional rice varieties are practical and effective adaptation to climate change. Diversification and integration of farm components also contribute to resiliency because of the differential adaptation and tolerance of species to climatic factors. Less capital expenditure in organic farming also contribute to less financial exposure of farmers resulting to greater financial resiliency of farmers.

Climate change resiliency has social solutions like empowerment that contribute to the confidence of farmers to address their problems. Also, organizations can be a climate change resilience strategy because members can contribute start up seeds and other support needed by farmers affected by climate change.

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