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Enhancing smallholder resilience through place-based knowledge and resource generation

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Abstract

Rice systems are of particular significance to building climate resilience in the Philippines. This research brief summarizes a case study that comparatively measures differences in climate resilience between organic and conventional rice systems in four neighboring villages in Negros Occidental Province, as well as explores features of smallholder rice systems that are significant to building resilience. Data were collected through surveys, interviews, focus groups, and participant observation. A participatory approach was applied to account for socioecological context and to identify targeted interventions for enhancing climate resilience based on local conditions and farmer experiences. The results indicate that (a) of the participating rice systems, organic systems exhibit greater resilience than their conventional counterparts; (b) the current institutional arrangement prevents smallholders from transitioning to organic; and (c) a polycentric food sovereignty development approach helps Philippine smallholders overcome these institutional barriers, as well as builds smallholder capacities for resilience by supporting place-based knowledge and resource generation. More effort is needed to explore, analyze, and strengthen such polycentric food sovereignty interventions for climate change.

Keywords

Agroecology, Food Sovereignty, Institutions, MASIPAG, Organic, Philippines, Polycentrism, Resilience, Rice, SHARP, Smallholders

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Introduction

The Philippines is one of the foremost countries at risk to climate change, ranked number 3 for the third consecutive year by the 2017 World Risk Index and number 5 by the 2017 Global Climate Risk Index. All regions in the Philippines have been deemed highly vulnerable (Yusuf & Francisco, 2010), and Philippine farmers are struggling to cope with intensified typhoons, changing rain patterns, floods, droughts, and temperature and sea-level rise (Institute for Global Environmental Studies [IGES], Southeast Asian Research Center for Graduate Study and Research in Agriculture [SEARCA], 2012). Smallholders (farmers managing less than 7.4 acres [3 ha] of land) manage nearly 90% of farms, accounting for approximately half the farmland in the country (Philippine Statistics Authority [PSA], 2015). A third of the labor force works in agriculture (Food and Agriculture Organization of the United Nations [FAO], 2017), and half the population relies on income generated through cultivation (United Nations Development Programme [UNDP], 2013). As is the case in many parts of the world, Philippine smallholders suffer from high incidences of poverty (PSA, 2017). Agriculture is also the second largest source of greenhouse gas emissions in the Philippines (United Nations Framework Convention on Climate Change [UNFCCC], 2014), with rice cultivation being the highest emitter (FAOSTAT, 2017).

Rice is not only the main staple crop in the Philippines, but is also a crop that has cultural meaning and significance and has been embedded in the social fabric of the Philippines for centuries (Kilusang Magbubukid ng Pilipinas [KMP], 2007). Over the last six decades, the ways in which rice is grown and the varieties that are grown have changed drastically with the implementation of the Green Revolution, resulting in more homogenous farming systems that are dependent on costly fossil fuel–based external inputs (Ceccarelli, 2012; Lappé, Collins, & Rosset, 1998; Montenegro de Wit, 2015; Patel, 2013). The increased use of agrochemicals and highly monocultured farm systems resulted in the loss of supplemental food resources, such as frogs, mudfish, tilapia, birds, crabs, snails, and insects, as well as water spinach and water chestnuts found in rice paddy systems prior to the Green Revolution (Medina, 2004; Mendoza, 2004; Ong'wen & Wright, 2007).

In the last four decades, however, there have been grassroot farmer-led mobilizations aimed at revitalizing indigenous or traditional rice varieties and the organic agroecological systems from which they are derived (Medina, 2004; Sanchez, 2011). Born out of social unrest and rural mobilizations, organic agriculture emerged in the 1980s as an alternative to the Green Revolution regime. Advocates believed that organic agriculture was capable of addressing the social, economic, and political root causes of food insecurity and inequity by reducing dependence on capital-intensive chemical inputs, restoring sociocultural processes (e.g., *bayanihan* [communal work] and farmer-to-farmer exchange), and facilitating self-sufficiency and farmer empowerment through increased farmer control over agricultural resources (Bachmann, Cruzada, & Wright, 2009; Frossard, 2002; Olano, 1993; Sanchez, 2011). Efforts to promote organic agriculture recently gained institutional support, first among local governments that passed ordinances in support of organic agriculture (Aruelo, n.d; Salazar, 2014), and later culminating with the passing of the 2010 Organic Agriculture Act (Republic Act 10068) (Sahakian, Leuzinger, & Saloma, 2017; Salazar, 2014). The act mandated local government units to put in place their own organic programs and establish a technical working group to oversee the promotion of organic agriculture (National Organic Agriculture Board [NOAB], 2011).

To date, despite the apparent effort to support a transition to organic agriculture, less than 2% of the agricultural landscape is considered organic (Willer & Lernoud, 2017). This is in stark contrast to the Green Revolution, which was responsible for transforming 40% of the Philippine rice growing area in three years from 1966 to 1969 (Bautista & Javier, 2005) and 90% of the area by 1987 (Estudillo & Otsuka, 2006; Hayami & Kikuchi, 1999).

The considerations being underscored here are the sense of urgency and gravity of the situation in the Philippines and also tensions surrounding the development and deployment of agricultural

interventions (see Stone & Glover, 2017; Vidal, 2014). Given that the agricultural sector is crucial for reducing poverty and improving environmental management and that any loss or damage has serious adverse implications on farmers as well as the general population, my interest lies in informing the development and deployment of climate interventions in the Philippines. I do this by identifying multiscalar implications of development initiatives. This research brief, therefore, summarizes the processes and outcomes occurring at the farm, community, and institutional levels that are either facilitating or obstructing smallholder capacities for building resilience. Here, "resilience" refers to farming system processes and outcomes that serve to improve smallholder adaptation and mitigation capacities, as well as reduce their vulnerability to climate-related disturbances (Heckelman, Smukler, & Wittman, 2018).

Applied Research Methods

The research design and analysis took an integrative and collaborative approach, relying directly on contributions of participating smallholders, as well as the insights and feedback provided by representatives from government and nongovernmental organizations (NGOs) driving agricultural development in the Philippines.

A survey tool developed by a team at the FAO called the Self-evaluation and Holistic Assessment of Climate Resilience of Farmers and Pastoralists (SHARP) (Choptiany, Graub, Dixon, & Phillips, 2015) was adapted and used for the purposes of this study. The survey tool measures 13 agroecosystem indicators of resilience identified by Cabell and Oelofse (2012). The indicators are behavior-based, integrate core aspects of socio-ecological systems, and encompass the four phases in the adaptive cycle: growth/exploitation, conservation, release, and reorganization/renewal (see Walker, Holling, Carpenter, & Kinzig, 2004). Similar to biotic indicators typically employed to monitor ecosystems, Cabell and Oelofse (2012) suggest that the presence of these 13 agroecosystem indicators in a farming system indicates a capacity for adaptation and transformation, while their absence signals vulnerability and the need for intervention.

In addition to collecting 40 SHARP surveys completed by organic (n=18) and conventional (n=22) smallholders from four neighboring villages located in Negros Occidental, data was also collected through focus groups, smallholder interviews, key informant interviews, and participant observation that occurred between August and December 2016. Three focus group discussions were facilitated with participating smallholders. The focus group discussions were used to characterize socioecological conditions and identify appropriate interventions for enhancing resilience. Ten semi-structured farmer interviews were conducted to gather personal perspectives on rice farming in Negros Occidental, including insights on farm management practices, current socioecological conditions, and challenges related to climate change. Seven key informant interviews were carried out with representatives from universities, NGOs, and the Philippine Rice Research Institute (PhilRice). Questions posed to key informants were designed to explore how smallholders are affected by the governance environment (or institutional arrangement), facilitating consideration of relevant policies and laws occurring at the national, regional, and local levels. Key informants were also asked to discuss how their respective organizations are navigating and responding to climate change given social, environmental, and institutional conditions. Participant observation included attending an impromptu meeting with the residing governor of Negros Occidental, attending the 2016 Negros Island Region Organic Summit, a meeting at the Vice Chancellor's Office for Research Extension at the University of Philippines Los Baños, a Department of Agrarian Reform (DAR) Dialogue held in Bacolod, several farmer association meetings, and a farmer breeder training.

Results and Discussion

I summarize here three key findings from the overall study: (1) organic rice systems exhibit greater resilience than their conventional counterparts; (2) the institutional arrangement responsible for supporting organic transition remains locked in the Green Revolution paradigm; and (3) a polycentric food sovereignty development approach is key to addressing these institutional lock-ins and creating pathways for smallholder resilience.

Key finding 1: Organic rice systems exhibit greater resilience than conventional

Organic rice systems contain higher crop, farm, and landscape diversity, which serves to enhance adaptive capacity; employ more land- and soil-improvement measures that increase mitigation potential; and are governed by household and community mechanisms that serve to reduce vulnerability (Heckelman et al., 2018). This finding is consistent with Philippines-based research indicating that organic systems outperform their conventional counterparts due to yielding similar or sometimes higher production levels (Bachmann et al., 2009; Broad & Cavanagh, 2012; Icamina, 2011; Mendoza, 2005, 2016) and being more profitable due to lower production costs and higher returns (Bachmann et al., 2009; Lamban et al. 2011; Mendoza, 2004; Pantoja, Badayos, & Agnes, 2016; Rubinos, Jalipa, & Bacaya, 2007). It is also consistent with systematic reviews of comparative research on organic and conventional systems across the globe that suggest the former often performs better under adverse environmental conditions (see Badgley et al., 2007; Seufert, Ramankutty, & Foley, 2012), as well as exhibits greater adaptation and mitigation capacities (see Fließbach Oberholzer, Gunst, & Mäder, 2007; Harvey et al., 2013; Rodale Institute, 2014).

When smallholders were asked to share their recommendations for climate interventions, their responses centered on building individual, collective, and local capacities for enhancing resilience through increased farmer control of agricultural resources, and improved government provisions to ensure that smallholders have access to land and tenurial security, veterinary and paraveterinary services, crop and livestock insurance, and financial support (Heckelman et al., 2018). Such recommendations counter the current institutional trend and tendency to direct government funds for the purposes of developing technological innovations that are eventually made available through commercial and market mechanisms.

Given the accumulating empirical evidence that smallholder organic rice systems outperform their conventional counterparts, and given the persistence of an organic movement in the Philippines that recently gained some institutional support (Sahakian et al., 2017; Salazar, 2014), why do organic systems occupy such a small fraction of the agricultural landscape?

Key finding 2: The institutional arrangement remains locked in the Green Revolution

To explore why organic agriculture remains in the margins, I conducted a critical institutional analysis of agricultural transition in the Philippines, relying on Ostrom's (2011) Institutional Analysis & Development (IAD) Framework to explore the dynamic interactions between institutions, key actors, and social and biophysical conditions that drive human behavior and socioecological change. Resilience theory was integrated into the framework to clarify the suite of farming system processes and outcomes necessary for simultaneously augmenting adaptation and mitigation capacities (see Cabell & Oelofse, 2012; Harvey et al., 2013; Thornton & Mansafi, 2010), as well as reducing farmer vulnerabilities (see Barret & Constas, 2014; Berkes & Ross, 2013; Magis, 2010; Miller et al., 2010).

Beginning in the 1960s, a substantial amount of foreign funding was directed toward the development and deployment of Green Revolution technologies in the Philippines (Chandler, 1992; Patel, 2013; Putzel, 1992). Since then, Philippine agrarian reform programs and national agricultural development programs have been largely oriented toward farmer adoption of these technologies. For example, Marcos' land reform program (Presidential Decree 27) required beneficiaries to become members of cooperatives, called *Samahang Nayon*. These were used as an organizing mechanism for not only providing trainings on how to use Green Revolution technologies, but also to enforce the adoption of these technologies (Araullo, 2006; Putzel, 1992). These early policies and programs established the administrative infrastructure for developing and deploying Green Revolution technologies in the Philippines, which was not only maintained but expanded upon by subsequent agrarian reform policies and national agricultural development programs (i.e., national programs for rice self-sufficiency). Consequently, locally adapted cultivars, landraces, and the traditional and indigenous knowledge associated with their cultivation, utilization, and conservation eroded over time

(Altoveros & Borromeo, 2007). Farmers became "passive recipients of technology, to the extent of even forgetting how to farm" (Medina, 2004, p. 2) as all technologies and problems were supplied and solved by extension workers.

When we examined the institutional arrangement responsible for supporting organic transition, we found that key agricultural organizations remain locked in the Green Revolution paradigm, as the same government agencies and research institutions that were (and are) responsible for promoting Green Revolution technologies are now the same ones that are charged with supporting and facilitating organic transition according to the passing of the 2010 Organic Agriculture Act (Republic Act 10068). These key agricultural organizations, such as the Department of Agriculture and the Philippine Rice Research Institute, are regarded as inappropriate and inadequate champions of organic agriculture. For example, experts and representatives at the Department of Agriculture are perceived by smallholders and government and non-government civil society representatives as having limited to no training in organic agriculture. According to an NGO representative, "most of the Department of Agriculture and extension agents don't know how to implement organic agriculture; they are trained in conventional agriculture but not in organic agriculture" (Key Informant 3, personal communication, Dec. 16, 2016). Another government representative indicated that "there are also various groups within the Department of Agriculture who are not really supportive of integrative farming" (Key Informant 1, personal communication, Oct. 18, 2016). Furthermore, the way in which organic research and development have been taken up by PhilRice has been to develop high-yielding organic rice varieties and inputs that are to be made available to farmers commercially. This mimicks the Green Revolution model and contradicts smallholder motivations for transitioning to organic, which center on severing dependencies on costly external inputs through increased farmer control over agricultural knowledge and resources (Medina, 2004; Sanchez, 2011).

If the goal is to genuinely enhance smallholders' capacities for building resilience through organic transition, then there is a need to overcome and address these institutional lock-ins, including barriers to (re)generating agrobiodiversity, place-based knowledge, and local resources. The question is, how?

Key finding 3: A polycentric food sovereignty approach builds pathways to resilience

To better understand how to address these institutional lock-ins and barriers to smallholder resilience, I turned my attention to existing organic smallholders and asked how they were able to transition despite the existing institutional arrangement. To answer this question, I examined *Magsasaka at Siyentipiko para sa Pag-unlad ng Agrikultura* (Farmer-Scientist Partnership for Development, MASIPAG), a grassroots, farmer-led network that mobilized over 30,000 farmers to transition to organic and agroecological farming systems in 63 provinces across the Philippines without the support of the state and despite antagonistic development policies (MASIPAG, 2018). The network subscribes to a food sovereignty development approach, meaning it is broadly oriented toward ensuring the right of peoples to healthy and culturally appropriate food produced through ecologically sound and sustainable methods as well as their right to define their own food and agriculture systems (Nyéléni Forum for Food Sovereignty, 2007).

MASIPAG utilizes a polycentric system as a mode for developing and implementing food sovereignty initiatives across the Philippines. That is, it subscribes to a bottom-up, dispersed, multilevel pattern of governing (Jordan, Huitema, van Asselt, & Forster, 2018; Ostrom, 2010). For example, MASIPAG's decentralized structure is oriented toward local empowerment and cultural sensitivity. This has not only translated to helping over 30,000 farmers transition to organic, but has also resulted in the training of 70 farmer rice breeders and the establishment of two national back-up farms, eight regional back-up farms, and 188 trial farms that are maintaining a minimum of 50 traditional rice varieties (MASIPAG, 2018)—all of which contribute to the *in situ* conservation of 2,000 traditional rice varieties that are freely exchanged and propagated among farmers. The local trial farms are established and maintained by members, ensuring that they have a shared space to gather and carry out

observations and experiments as part of the effort to promote farmer-developed agricultural technologies and innovations. In this way, farmers are treated as fully capable of developing their own organic cultivars that are drought, flood, and saline resistant; establishing their own local seed banks; and developing their own composting and vermiculture systems—and all such place-based knowledge and subsequent innovations are shared and taught freely (Frossard, 2002; Medina, 2002, 2004, 2009, 2011; Olano, 1993; Oram, 2003).

What the MASIPAG example ultimately reveals is that polycentric food sovereignty initiatives help smallholders overcome adverse socioecological conditions, including institutional barriers to organic transition. Further, if we understand resilience to be multiscalar and interdependent processes and outcomes that support smallholder capacities for simultaneously addressing adaptation, mitigation, and vulnerability (including building local resources and capacities for social learning and collective action), then what we have learned is that MASIPAG's polycentric food sovereignty development approach, which centers on revitalizing place-based knowledge and resources, is creating pathways for smallholder resilience in the Philippines.

Conclusions

There is much to be learned from grassroots farmer-led mobilizations, especially among marginalized communities and developing countries where smallholders have been contending with centuries of development policies responsible for their plight and vulnerability. How they organize, cooperate, and strengthen community capacities in spite of adverse socioecological and political economic conditions is something to which we should be paying attention. What the MASIPAG example tells us is that resource-poor smallholders are often at the front lines of community development, agricultural transition, and resilience building, and we should be exploring, analyzing, and strengthening such polycentric, localized, place-based interventions.

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