BUILDING CLIMATE-RESILIENCE OF SMALL-SCALE FARMERS IN MINDANAO, PHILIPPINES

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As we walked towards the village Katalelan in Sibulan, we stopped at one of the community basins where indigenous Tagabawa Bagobo women and children gather to fill their jugs with fresh water. Dennis Amad, one of the village leaders, recounted that during the recent El Nino drought in 2016, it would take 20 minutes to fill one gallon of water from the community water supply and sometimes, women and children had to walk further if the source dried up. "During the drought, we were only able to drink one cup of water a day," says his wife Rosalinda. Health concerns caused by the drought compelled us to conduct an emergency medical mission which served 519 indigenous Sibulan Tagabawa Bagobo community members including children.

Photo: Tagabawa Bagobo children wait for water from community basin (FARMCOOP)

Local to Global Food Security

During the mission, our team found that the lack of access to clean water and poor sanitation over the years led to many illnesses, such as diarrhoea and urinary tract infections among girls and women. In addition to respiratory diseases, the medical mission also found malnutrition to be common amongst children and adults, including signs of stunting (low height for age), an effect of long-term poor nutrition and long-term dehydration.

This situation of undernourishment unfortunately exemplifies the current state of small-scale farmers globally. According to FAO 2015 report, there are 795 million people in the world who are suffering from chronic undernourishment, 98% of them live in developing countries. Half of the people suffering from undernourishment live in small farms. Though studies suggest the pivotal role that small holder farmers have in global food security, small scale farmers' potential to fill this role is constrained due to their marginalization, their limited ability to access capital, technology, information, and resources to fully develop the potential of their farms.

Environmental changes as a result of extreme weather patterns further exacerbate their marginalization when factors such as pests and diseases, drought, typhoons and flooding can damage their crops. *In addressing food security at the local, national, and global levels, building the resilience of small scale farmers in the face of climate change is paramount.*

Organizing: A Step to Collective Resilience

One of the first steps towards resilience for small-scale farmers in the Philippines, particularly for agrarian reform beneficiaries (ARBs) in Mindanao, is to organize themselves; failure to do so

weakens their bargaining power which can lead to market exploitation. Our non-profit organization Foundation Agrarian Reform Cooperative in Mindanao, Inc. (FARMCOOP) was founded under this premise.

Since 1995, FARMCOOP assisted in: 1) organizing small scale farmers into cooperatives; 2) facilitating the redistribution of land to agrarian reform beneficiaries (ARBs); 3) abrogating onerous contracts; and 4) negotiating for fair pricing of farmers' cooperative products.

Realizing the educational, technological, and capital constraints of small holder farmers, FARMCOOP, with international support, expanded its scope to include not only legal but also farm to market technical, administrative, and management services which supported the small scale farmers' capacity to deliver high quality products for export.

In addition to assisting 14 conventional banana farming cooperatives, FARMCOOP has organized two organic banana cooperatives owned and operated by the indigenous Tagabawa Bagobo in Sibulan, Davao. And within the last 3 years, indigenous and ARBs small-scale farmers have approached FARMCOOP seeking assistance in developing organic agroforestry farms. We are currently working with: 259 indigenous Tagabawa Bagobo farmers in establishment of 220 hectares of agroforestry farms in the upland Sibulan ancestral domain; 1,153 ARBs in Agusan in transforming 2,062 hectares of monocrop palm oil plantation into diversified agroforestry system of organic bananas, cacao, vegetables, and rice; and 2,436 coconut farmers with 3,309 hectares in organic conversion, value-addition and diversification. In sum, FARMCOOP is providing services to over 6000 small-scale farmers with farm lands ranging from less than one hectare to less than three hectares.

Impact of Climate Change

The international banana industry continues to be a niche export market for thousands of small-scale farmers in Mindanao, Philippines yet their main source of livelihood has become increasingly at risk due to climate change. The droughts and typhoons within the last 20 years have severe impact on the farms, farmers, and future sustainability of small-scale farming.

Rainfall in the Philippines is strongly influenced by the El Nino Southern Oscillation (ENSO), in which the country experiences lower rainfall during El Nino years, followed by increased amount of rainfall during La Nina. This weather pattern recurs every 2 to 7 years and over the past decades ENSO has become more extreme.

Typhoons and Floods

La Nina has become wetter with rainfall more intense and typhoons more frequent and destructive. Floods and storms in the Philippines have increased from less than 20 floods recorded from 1960 to 1969, (affecting less than 3 million people), to more than 110 floods/storms from 2000 to 2008, (affecting an estimated 35 million people). The once typhoon-free Mindanao was devastated by typhoon Washi in 2011 which affected an estimated 695,195 people in 13 provinces, causing estimated 1,292 deaths, and US$ 11.3 million in damages. Three years later, a category 5 typhoon Pablo, one of the strongest recorded in history, hit Mindanao. An estimated 6.2 million people were affected in Mindanao and the Visayas. In Mindanao, the two most affected provinces are Compostela Valley and Davao del Norte which are the largest producers of export Cavendish banana and coconut. 10,000 ha of banana were destroyed, costing the industry US$ 318 million. Three of FARMCOOP's partner conventional banana cooperatives in Davao del Norte were severely affected: AMSKARBEMCO, MARMBMCO, and SFARMBEMCO. Collectively, these smallholder farmer cooperatives are called the CASAMA coops with a membership of 416 farmers. They own a total of 385 hectares of which 40% of the bananas in their farms were toppled by typhoon Pablo and 41% of the area was flooded.

FARMCOOP and UNIFRUTTI assisted the CASAMA coops to obtain a loan from the Landbank

to rehabilitate their land for the amount of US$ 6,846 per hectare but they have not been able to pay the amortization because of lowered production caused by the fungal disease Fusarium Wilt which has affected many of the conventional banana farms. With Fusarium wilt being soil borne, the disease can be easily spread with the flood and cause further crop damage. As of June 2017, banana production of AMSKARBEMCO, MARMBMCO, and SFARMBEMCO had dropped down to only 51%, 6.3% and 6.4%, respectively.

Drought

In 2016, El Nino drought impacted 16 of the Philippines 18 regions, affecting 413,456 farming households, 556,721 hectares of land and costing US$ 325 million damage due to crop production losses. The drought's impact was strongest in Mindanao affecting farmers in 26 provinces including all of FARMCOOP's partner conventional small-scale farmers. During the drought, organic banana farm production appear to be stable but production in 13 of 14 conventional banana farming cooperatives dropped. However, the sudden onset of heavy rains in the following months brought about red rust pests which made the organic bananas cosmetically unfit for the export market. Organic production dropped by an average of 25 percent for the next three months. The World Food Programme 2016 report succinctly reports the serious impact of El Nino to agriculture:

"The causal links between drought risk and food security are complex and are linked to a number of phenomena: water, scarcity, salinization of agricultural lands, destruction of crops, and increased incidence of pests and diseases."

For FARMCOOP's newly formed partner Sibulan Ancestral Domain Organic Cooperative (SADOPCO), the drought caused the death of thousands of cacao and coffee seedlings, delaying the establishment of agroforestry farms.

Challenges in Organic, Diversification, and Soil and Water Management

The increasing trend in extreme weather patterns affecting the Philippines has placed it under the Global Climate Risk Index 2017 list as one of five countries in the world most affected by climate change. There is a critical need to reduce the vulnerability of marginalized farming communities by managing the risks posed by climate change. FARMCOOP's venture into organic agriculture since 2004 and more recently agroforestry, crop diversification and soil and water conservation are aligned with adaptation strategies to promote climate-resilience in agriculture. However scaling out these practices to be practical for small scale farmers faces major technical, financial, resource, and social challenges.

Photo: diversification of mono crop palm oil to organic banana (FARMCOOP)

Technical: All the smallholder farmers, including indigenous farmers that we work with had

become accustomed to decades of conventional agriculture's use of pesticides and fertilizer. The upland indigenous culture of "slash-burn" agriculture is no longer appropriate. This practice, coupled with deforestation and open-tillage conventional agriculture, has exposed land to soil erosion, resulting to poor fertility of soils. Local knowledge, cultural practices, and experience in effective organic approaches to revive soil health are scarce and not fully studied. Moreover, at the time of FARMCOOPs venture into experimenting with organic approach to banana production in 2000, there was little to no expertise or field-tested research for improving soil conditions and plant fertility, particularly for "high-market value" crops such as Cavendish bananas in the Philippines. Finding skilled scientists and technicians with years of empirical experience in successful organic farming in the Philippines continues to be a challenge.

There is also a lack of available technical local/national field-tested specific information on organic pest/disease control and appropriate specie combination for optimum diversification of Cavendish bananas, cacao, and other fruit trees with cover crops. Local weather data or early warning technology critical for farmers to plan are also lacking or non-existent.

Resources/Financial: In our experience, small scale farmers do not have enough resource materials from their farms or even collectively to create the right balance of C:N ratio for compost. The cost of external organic concoctions, additional labour for pest and disease control, the high cost of organic certification, and the 3 year certification process—all posed financial barriers. Furthermore, many of the farmers have long adopted conventional methods of applying pesticides and fertilizers for immediate results, making the lag time of slow-release organic fertilizer seemingly ineffective. In terms of soil and water management and agroforestry, for upland farms-- capacity building, community organizing, material, and labor costs to implement Sloping Agricultural Land Technology (SALT) and terracing can be prohibitive, especially when there are multi-farms and multi-stakeholders involved. For service NGOs such as FARMCOOP, conducting field trials to study the effect of compost, improve compost quality and compost recommendations on bananas are hampered by high cost of soil, microbial, and plant laboratory analyses.

Capacity Building and Application: There are variabilities in which prescribed organic practices (i.e., amount and timing of organic application and pest and diseases biological control) are dutifully and consistently followed by the smallholder farmers or their hired field help. These variabilities affect consistency and progress in organic farm production.

Mitigations and Call for International Support

With the aid of local in international support, over the years, FARMCOOP was able to develop: 1) a facility to create organic certified organic inputs; 2) establish vermi-compost sheds in pilot areas; 3) subsidized the organic certification of farms; and 4) expand its technical services to organic, value-addition, and crop diversification. Soil and water conservation such as mulching and water catchments are being tested in pilot areas. We are also conducting community discussions on indigenous cultural practices in farming and seed storage to make organic practices culturally appropriate. After witnessing that only the indigenous vegetables survived the 2016 drought in FARMCOOP's food security and nutrition pilot family project, training of seed saving of indigenous vegetables and crops to the small-scale farmer households are being prioritized. Women village leaders are leading the seed saving technology transfer with 32 women trained who have provided indigenous seeds to 720 neighbouring farm households. These can potentially have a significant impact on local food security and perhaps globally should these particular indigenous products find their way to the international market.

However the current efforts are overall insufficient to effectively counter the significant impact on livelihood and farm production inflicted by pest and diseases, typhoons, floods, and drought. Moreover, organic banana production is lagging considerably. There is a great need to improve and develop more appropriate organic methods and applied research in the following areas: quality and cost of organic input; effectiveness of organic pest/disease control; appropriate diversification and cover crop integration to maximize farm productivity; soil and water

conservation methods and management; integration of indigenous or appropriate drought-resistant crops.

Whereas some individual small-scale farmers from our partner conventional banana cooperatives have volunteered to apply organic compost in their farms, a full transition of these farms to organic will only occur if the majority of the farmers themselves are convinced by empirical and local evidence, demonstrating directly the long-term economic benefits and farm productivity of organic, diversification, soil/water management and drought-resistant crops.

In this light, we hope that more active collaboration with international institutions, researchers, non-profits, businesses, and networks in the industry such as World Banana Forum, EUROBAN, and others can assist us in our efforts. Of urgent need are robust field applied research and transfer of information, technology, and skills in order to develop climate-resilient strategic approaches that can be practical for small scale farmers in the short and long-term.