# EXPERIENTIAL LEARNINGS INCLIMATE CHANGE MITIGATION AND ADAPTATION THROUGH ORGANIC AND SUSTAINABLE FARMING IN THE PHILIPPINES

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## I. Overall Policies and Strategies on Climate Change

In the Philippines, despite efforts to reduce rural poverty, agricultural communities remained poor and according to the national estimates, 44% of households in such communities are poor. To add to the poverty problem, the country is highly vulnerable to the harsh impacts of climate change (heavy rains and floods, drought and severe to erratic changes in temperature, humidity and wind velocity) since a huge proportion of the rural population and its labor force is heavily dependent on agriculture, and the country, in general, has a very large and dominant agriculture sector.

Droughts cause serious damage to the country's farmlands. In 2005 alone, the Department of Agriculture estimated that damage caused by severe droughts, as well as flooding, amounted to 838 million pesos (more than $20 Million), thus inflicting adverse effects and impact on the livelihood, well-being and socio-economic condition of farmers (adopted from Reyes, 2009). Therefore, the contribution of the agriculture sector to the total economy is challenged by its vulnerability to climate change, and along with the fisher folks, Filipino smallholders are at the forefront where the climate change impacts apparently and directly affect their agriculture-related livelihoods, rural employment and sources of household income.

Since it is apparent that vulnerability to climate change is related to poverty levels, as the poor are least able to respond to climate-related stress and shocks, the resource-poor farmers in the Philippines can be severely affected by the effects of climate change, particularly erratic rainfall patterns or increased intensity as well as occurrence of drought and prolonged dry season.

This paper presents the best practices done by the Sustainable Agriculture and Organic Farmers' Cooperative- KASAMA KA Organik Kooperatib (*Kalipunan ng Sustenableng Agrikultura at Magsasakang Kooperatiba* or KKOK) in Malvar, Batangas Province, to address climate change impacts in agriculture. The issues targeted include 1) food security and access to safe, affordable and health promoting foods; 2) water sufficiency and resilience to drought and prolonged dry season; 3) environmental and ecological stability of an agro-ecosystem; 4) human health and healthy lifestyle; and 5) climate impacts on agricultural productivity.

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## II. Best Practices in Climate Change Adaptation and Mitigation

Since 2009, KKOK has been promoting, developing and advancing Sustainable, Organic and Ecological (SOE) Agriculture as the key strategy for combating climate aberrations and to achieve medium to long term higher yields while maintaining environmental sustainability and contributing to climate change mitigation and adaptation in the agriculture sector. It networks include organic rural farm clusters in Batangas Province and CALABARZON area, and a plethora of existing satellite urban organic mini-farms and food gardens in Metro Manila.

The partners and cooperating organizations include the KKOK as the lead implementing institution, the Meganomics Specialists International, Inc., SAGIP Environment, Inc., Sustainable Agriculture and Entrepreneurship Learning Center, LiMA Technology Center, Local Government Unit of Malvar, Batangas, Department of Agriculture, Department of Science and Technology and the National Agribusiness Corporation, Inc.

### A. Objectives and Goals:

KKOK was organized by people with passion, commitment and conviction in promoting, developing and advancing the practice of Sustainable, Organic and Ecological (SOE) Agriculture with the purpose of not only achieving higher yields for farmers, but also keeping the land sustainable and free from chemicals, as well as contributing to carbon sequestration through minimum tillage, crop rotation of legumes and green manuring, mulching, multi-storey and agro-forestry cropping, livestock and poultry integration and vermi-composting, thus minimizing the effects of climate impacts on agriculture.

The Cooperative aims to be a progressive umbrella organic cooperative in Batangas Province and CALABARZON area with membership of organic farmers and outreach network cooperatives that adhere to the principles and tenets of Organic Agriculture (health, ecology, care and fairness). The Cooperative advocates and showcases the Nucleus and Satellite Organic Farm Cluster (NUSOFAC) and Supply and Value Added Chain (SVAC) optimization concepts and modalities, and its replication within the region and nationwide.

### B. Strategies and Processes/Methods:

KKOK promotes and employs good to best organic agriculture practices, as advocated and promoted by the International Federation of Organic Agriculture Movements (IFOAM) and the Department of Agriculture under the Organic Agriculture Act of 2010 (Republic Act 10068). These include improving soil nutrition by recycling organic matter (i.e., carbon), producing organic fertilizer via enhanced composting using beneficial microbes and adopting vermi-culture and producing vermi-tea, fermented fruits and plant juices, fish amino acid, maintaining mineral and micro-nutrients balance, improving pest and disease control, adopting better water use efficiency, increasing soil organic matter content, using better weed control methods, and adopting eco-function intensification.

For environmental sustainability and climate change mitigation and adaptation, the Villegas Organic and Hobby (VOHO) Farms, managed by the KKOK, is an integrated crop-poultry-fish farming system that practices zero waste management. Resources in the farm are recycled and nothing is wasted or thrown away. Poultry wastes (chicken and turkey dung, brooding materials and chicken feathers) along with garden weeds, vegetable trimmings, twigs, and other bio-degradable materials are composted to produce organic fertilizer for crops, and/or pre-composted and fed to cultured earthworms (African night crawler). The vermi-culture produces vermi-cast and vermi-compost, which is used as soil medium for raising vegetable seedlings and fertilizing or enriching the soil with organic matter and humus. Vermi castings are prepared into vermi tea and used as bio-nutrient foliar spray or soil drench for the growing of vegetables, herbs and other crops.

## C. Results

In VOHO, water from the fish pond, when it becomes murky, is pumped out and used to fertigate the crops and other trees. The recycled water is rich in bio-nutrients for enriching the soils. The farm also maintains plant biodiversity. More than 80 species of plants and weeds are found in the farm. The farm boundaries are planted to medicinal and herbal plants. Those with known pesticidal properties – neem tree, jatropha, lemon grass, citronella, marigold, kakawate, spring onions, lagundi, banaba and oregano – are made into bio-pesticides and used as deterrent or repellents for the control of insect pests. When fermented with molasses or brown sugar, it is also used as biofertilizers since the whole conconction is rich in macro and micro nutrients that serve as food for microbes to fix nitrogen from the air and mobilize fixed nutrients from the soils and make it available for plant nutrition and growth.

Nitrogen-rich plants such as kakawate (gliricidia), malungay (moringa), and ipil-ipil (leucaena) leaves are harvested, chopped, and used as feed supplement to the free range chicken and turkey growing for meat and egg production. Oregano, mint, basil, tarragon, and other herbs like lagundi, yerba buena, and malungay leaves are crushed for its juices and/or mixed with feeds and used as organic medicine to free-range poultry.

Except for some purchased seeds, the farm produces nearly all of its farm inputs from the resources found in the farm, hence making it sustainable and rich in biodiversity. With the technical assistance of its partner- organic farming scientist, the farm maintains its commercial R and D, through an in-house scientist and some organic technologists and scientists on call, where the production technology and practices are continually validated in the farm making these technological innovations and best practices location-specific. Recently the Koop, with the technical and financial assistance from the DA High Value Crops Development Program, has embarked in a community-based organic seed production project, mainly vegetables, food crops and staple crops.

All these technological advances and practices have been transferred to and adopted by a network of at least 30 satellite farms that are members of the KKOK network.

Additionally, in a recently concluded study hosted by PCAARRD and the Organic Producers and Trade Association on organic farmers in selected areas in the Philippines, including members of VOHO, farmers identified a number of things of how organic agriculture can contribute to environmental sustainability and climate change mitigation. Primarily, the farmers stated, organic inputs nourish the living components

of the soil, wherein the microbial inhabitants release, transform, and transfer nutrients, as well as contribute to the reduction of nitrate leaching to the groundwater caused by the continuous use of toxic chemical fertilizers. Organic inputs also improve soil fertility, help ensure environmental sustainability and maintain food safety. The farmers also mentioned that practicing organic farming effectively locks in more carbon into the soil rather than releasing it into the atmosphere, which contribute immensely to the reduction of greenhouse gases.

The benefits of organic farming are undeniable. That is why many people, not only farmers, are getting interested and motivated to go into organic crop production. Its expected benefits do not only cover human health and wellness but the environment (soil, water, air, animals, plants or fauna and flora) as well. However, in Northern Mindanao and many parts of the Philippines, some organic farmers were observed to have little concern on the preservation of nature which demonstrated their limited knowledge on environmental and ecological issues.

The farmers were also asked if they observed any changes in their health conditions after shifting to organic products. Most mentioned that they felt healthier and that there was a significant drop in the incidence of illnesses and diseases in their households. Additionally, the farmers' remoteness from commercial districts encouraged them to use herbal medicine that was readily available within their localities as substitute for commercial drugs.

## III. Key Barriers Met, Lessons Learned, Replicability and Transferability

The key constraints that KKOK have encountered in project execution are as follow:

1. While farm supervisors and laborers have been equipped with knowledge and skills in organic agriculture and farming systems, the major setback being experienced is in the matter of negative attitude and unsatisfactory working habits of laborers that are mostly counter-productive and seemingly lacking of concern for sustainable and ecological agriculture technologies. Thus, the labor-intensiveness of organic farming is further constrained by additonal labor costs resulting in lower labor-output ratio and generally higher production costs attributable to relatively inefficient labor inputs.

2. Organic farm yields tended to be much lower than conventional or chemical farming, particularly in organic in conversion farms, since the build-up of humus and organic matter takes time. However, yields tend to increase over 3 to 4 cropping seasons with build-up in organic matter and employment of science and technology-based plant nutrition and crop protection technologies. However, the initial reduction in yield is compensated by the premium prices received from organic produce (due to shortage in supply and recognition of food safety and health considerations) and the overall lower cost of production associated with low cost organic farm inputs that the farmers could practically produce on farm rather than purchasing from input dealers.

3. Due to lack of economies of scale and lack of easy access to organic markets, farmers find it difficult to overproduce due to problems in handling perishable

organic produce like vegetables, herbs and fruits. There is also very limited support for harvest and post-harvest handling particularly access to cold chain technology of the Philippine Center for Post-Harvest and Agricultural Mechanization Systems of the Department of Agriculture.