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Eco-Friendly Indigenous Farming Practices among Sorsoguenos in Sorsogon, Philippines

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ABSTRACT

Indigenous practices are part of people's life and culture. In Sorsogon province, Philippines, numerous indigenous practices are observed, but only few are documented. This study delved specifically on documenting the eco-friendly indigenous farming practices on seed preservation and storage, land preparation, fertilization, crop protection and organic farming. This descriptive research utilized surveys, interviews, and observation. Respondents are farmers with ages 55 to 75 coming from rural communities in Sorsogon province. Among the eco-friendly practices on seed preservation and storage include placing unthreshed seeds above wood-burning stoves or hanging them in smoky areas of the kitchen until the next planting season. Rice are preserved by air-drying and mixing them with leaves like kilala, alagao (*Premna odorata)*, lagundi (*Vitex negundo*), or

charcoal. Spraying with achuete (*Biya orellana*) leaf extract or powdered fruits of *siling labuyo (Capsicum frutescens)* is also practiced. To protect crops from insect infestation, farmers collect, grind and spread rice bugs in the field to make the soil fertile. Dead animals are buried near the tree. These gathered alternative farming practices could contribute to the global concern of mitigating climate change. However, with the influx of modern technology, these practices may be forgotten if not documented and advocated.

Keywords **-** Social Science, indigenous knowledge system (IKS), Indigenous farming practices, seed conservation, descriptive-qualitative design, Sorsogon Province, Philippines

INTRODUCTION

Natural disasters pose great threats to man's economic and social activities as it can cause severe damages to the environment and the lives of many people in different aspects. The adoption of modern agricultural technologies using inorganic fertilizers, pesticides, insecticides and other chemicals have been proven to harm man's health and the environment. Thus, it is a must to have an alternative farming system that would minimize or avoid the use of chemicals. These are the indigenous or cultural farming practices which started to be practiced long time ago by many old folks and are still being done in some rural communities even up to this time. These knowledge, skills, and strategies of farmers have been ignored by outsiders promoting modern agricultural technology.

However, increasing awareness of the limitations and hazards of modern agriculture has prompted a growing number of scientists to recognize indigenous knowledge as a major untapped resource for developing sustainable agriculture (Voss, 1994). Even the United Nations suggests the use of ancient indigenous technologies from the Americans as means of mitigating the effects of climate change.

Although increasing number of development professionals have come to realize the potential of indigenous knowledge, the concept is still not widely recognized or systematically utilized in the development. One key reason for the failure to build development efforts in rural and urban areas is the lack of profile of indigenous knowledge system (IKS) and its implication to development. Nevertheless, in the absence of appropriate "modern" alternatives, conducting research on indigenous knowledge will become a starting point for academic and other institutions in their search for solutions. Indigenous knowledge can be

used to actualize the principle of cultural appropriateness, a feature of sustainable agriculture, incorporating into it the wealth of facing the knowledge that resides with local people.

The present study is, therefore, conducted for the purpose of documenting some eco-friendly indigenous farming practices on seed conservation and other agricultural activities performed by farmers in the province of Sorsogon. This also aimed to contribute to the existing body of knowledge on developing sustainable agriculture in the midst of the global environmental crisis. Results of this study may increase the awareness of the indigenous peoples' practices as "a means of mitigating climate change", without sacrificing agricultural productivity but rather contribute to the preservation of the environment.

The Philippines is rich in indigenous practices on various fields of human endeavor covering agriculture, health and nutrition, fisheries, politics, education and culture and a lot more. However, this present study is mainly focused on farming practices that are ecology-friendly as these are significant to the present global crisis of climate change.

FRAMEWORK

Indigenous culture requires people to be environment-friendly. They have to take into account that the earth has limited capacity to provide their needs. This concept has been considered by farmers in Panay, Philippines for several centuries prior to the practice of "modern methods of farming".

Although they did find commercial fertilizers effective yet because of their cost and difficulty in transporting those to the farm fields, farmers often utilize organic fertilizers. Some of these natural fertilizers are animal manure, dried leaves, compost and decayed plants and others. Lamique's (2010) study focused on the implementation of organic fertilizers in Negros Occidental. The results showed that the community moderately used the organic fertilizer in their farming practices. However, local consumptions show that there is no significance difference on those products that were organically prepared and not. This result denotes that despite the existence of the commercial fertilizers, local farmers still practice the indigenous way of farming especially the use of organic fertilizers.

This indigenous knowledge in agriculture, livestock rearing, food preparation, education, institutional management, and the like provides valuable resource for development activities. Under certain circumstances, these may be equal to or even superior to the knowledge introduced by outsiders. Those involved

in development projects and programs should, therefore, consider indigenous knowledge and apply it whenever suitable. On cases where using indigenous knowledge is harmful, development practitioners should be knowledgeable about it so they can respond better to the newly-introduced technologies.

Studies on the indigenous farming practices were also undertaken by Benguet State University (BSU) which documented indigenous farming practices in Kapangan, Benguet Province and Sagada and Bagyo, Mountain Province. Data were gathered using questionnaires and interview with community leaders, influential village leaders/elders, and subsistence farmers. Results showed that traditional methods were being used in rice and sweet potato production in the study areas. Majority of the surveyed participants (with an average age of 61) used local/indigenous farming practices, which they learned from their forefathers. Most of the sweet potato farmers were women who took the role of teaching the younger generation about indigenous farming practices. However, these practices were slowly fading because of the changing interest of the younger generation and the influx of new technologies which claim better and higher production.

The previous study of BSU links with the present study in its aim of documenting indigenous farming practices. Their study was done in Benguet and the Mountain Provinces while this study is in Sorsogon province. They focused primarily on those which relate to the traditional practices in sweet potato and rice farming. However, this present study is concerned with the indigenous farming practices which are ecology-friendly and dealing with many traditional agricultural activities in Sorsogon province.

In a study on rice production practices, Farol (2011) showed the common practices in Philippine rice production over the last 100 years which were brought about by government programs to meet the needs of the Filipinos. He claimed that before, traditional rice management practices of Filipinos were less influenced by technology or chemical inputs, but by farmers' direct experiences and field observation.

On the other hand, Ventura (2010) investigated the sustainability of the Hanunoos upland farming system in Occidental Mindoro. Hanunoos practice multiple cropping system *(lumundaan). Lamundaan* system considers that patches of forest are left untouched or uncut; however, the surrounding portion is cleared and planted with agricultural crops and fruit trees. It is their belief that the patches of forests are left because spirits of dead relatives stay there. Planting time is in consonance with a specific month favorable to their growth and development. Likewise, they practice *Pagandan* or their soil erosion control

practices by planting the affected area with bamboo and other tree species that can stop the erosion.

The University of the Philippines (Zamora et al., 2013) also made a profiling on the indigenous agricultural knowledge and climate change adaptation in selected areas in the Philippines. They documented the indigenous farming practices of the Bagobos and the Manobos in Davao, the Suludnons and Atis in Iloilo and Ivatans in Batanes. Non-structured interviews, focus group discussions, and actual observation of the area/people showed that the indigenous agricultural practices on cropping systems and livestock rearing enabled the people to sustain food production even with climate variability in the past. Their long-term adaptation strategies included the maintenance of high-level crop and livestock diversity and low dependency on external inputs. They rely more on the available resources, use of traditional varieties as well as indigenous storage practices. The Sulodnons and Atis of Iloilo, and other IPs practice multiple cropping.

Magoro and Masoga's (2005) study collected the key aspects of indigenous knowledge of farming practices to promote its usage which will conserve agricultural resources and intensify production in Magatle and Madisha Leolo villages. These key ideas serve as the basis and guidelines in implementing training activities to other farmers. However, its results suggest that farmers should be open-minded and understanding the reasoning behind the indigenous farming practices.

The same study also described the IP practices in Bolivia's Altiplano. In the said place, huge areas are covered by raised farming platforms (Waru Waru), causeways, canals, and man-made islands which are all done by hand. Further, the study mentioned that ancient Mexicans built their city over a lake, on which the Aztecs constructed thousands of floating platforms (*Chinampas*) where they grow their crops. Other farmers directed rainfall into spiraling holes that led to underground storage chambers. Moreover, indigenous cultures constructed irrigation canals.

Zamora, et al. (6,7 authors- Cite only the surname of the first author followed by et al.) (2013) also documented the land improvement strategies such as the use of raised beds, covered with thick layers of organic matter, or mulch. It was their most important method of coping with the climate variability caused by the El Niño/La Niña cycle.

All literature and studies point to the idea that indigenous practices particularly on agriculture are still being practiced in many parts of the country and other parts of the globe. It is quite surprising to note that despite the influx of modern

technology, many people still observe and practice these traditional activities. The studies conducted only show that the said practices continue to exist because of the various benefits that they offer to farmers and the whole mankind. However, there is a need to gather, document and advocate these practices for various advantages that can be derived from it.

OBJECTIVES OF THE STUDY

The study aimed to document and describe the eco-friendly indigenous farming practices on seed conservation and other agricultural activities performed by farmers in the province of Sorsogon, Philippines. Moreover, this study is intended to contribute to the existing body of knowledge towards developing sustainable agriculture in the midst of global environmental crisis.

METHODOLOGY

Research Design

This is a descriptive-qualitative research utilizing interview of key informants and observation of their eco-friendly farming practices.

Research Site

The study was conducted in the upland rural farming communities in the 16 municipalities of Sorsogon Province: Donsol, Pilar, Castilla, Sorsogon, Bacon, Gubat, Barcelona, Prieto Diaz, Irosin, Bulan, Sta Magdalena, Casiguran, Juban, Bulusan, Magallanes, and Matnog.

Participants

The key informants were selected purposively. They are farmers with ages ranging to 55 to 75 coming mostly from rural farming community in Sorsogon Province.

Instrumentation

The interview questionnaire was constructed by the researchers and validated to a group of researchers and faculty of the college of agriculture. Farmers from the neighboring province of Albay also participated in the try-out. Revision was made based on the results and comments of the participants' dry run.

Research Ethics

Prior to the actual conduct of the survey and interview, the researchers sought permission from the local government officials and discussed to them the objectives of the study. It was made clear to them and to the farmer informants that the responses that will be provided as a result of the survey will be treated with utmost confidentiality. Knowing the noble intention of the researchers to advocate eco-friendly practices in the province, the College Ethics Review Board has granted its consent to undertake the study after the technical aspect of the research has been considered.

Data Collection

The researchers started gathering the data through structured interview to the farmers' responses on January 2013 to June 2013. This was supplemented by their observations on the eco-friendly farming practices.

RESULTS AND DISCUSSION

The first part of the discussion is on practices related to seed preservation while the second is on other agricultural practices like land preparation, fertilization, crop protection and organic farming. The said activities may or may not have scientific implications, but these have been practiced by Filipino farmers for many years and had been handed down even to this present generation. As such, they have become a part or way of life and culture of the Sorsogueno farmers. However, with the influx of modern agricultural technology, most of these traditional practices are slowly fading away.

Anent to this, researchers from the University of the Philippines claimed that indigenous knowledge can significantly contribute to the body of knowledge on building climate change-resilient farming communities to ensure a food-secure future for Filipino households. Hence, there is a need to document continuously and promote such knowledge for its sustainable use (Zamora et al., 2013).

I. Eco-friendly indigenous farming practices on seed preservation and storage

Preserving the seeds for future use is an utmost concern of many farmers. Seeds should be viable for planting since they carry the potential for improved crop productivity. In the absence of modern technology several decades ago, farmers resorted to indigenous practices to preserve the seeds for future use - either for food or planting purposes. Most of these practices have been proven effective.

Hence, they pass these on from their generation to the next generations.

This is evidenced by the availability of old rice varieties like *kabudit, wagwag, sinandomeng, kalansing,* and *pinipita* in the farm market and everyone's table for food consumption. The consumers can still savor the taste of old varieties because of indigenous farming system. It is, therefore, necessary to document the ecology-friendly farming practices and advocate them to the younger generation in the midst of the environment-related crisis being faced in the global setting today.

Among the most popular eco-friendly practices in Sorsogon province which are practiced by farmers are those related to seed preservation. Such practice includes storing unthreshed seeds like *palay* (rice) and corn-ears above wood-burning stoves or at times, hanging them in a smoky area of the kitchen until the next planting season or even beyond. The seeds are also placed in covered baskets made of *rattan, nito, siloan, or buri* and also placed above a smoky area. Some dried cereal seeds are placed in jute sacks and hung inside their houses particularly in the kitchen using the rat guard to avoid attack of the rodents and save for the next cropping seasons or to be bartered with their relatives and friends for other varieties.

These indigenous practices in the Philippines on preserving and storing the seeds are similar with the practices of the African farmers in storing their harvest to ensure that adequate seed is available for next year's planting. The Aten people in Nigeria used the *rumbu*, a clay and thatch granary to conserve their staple cereal, *acha* (*Digitariaexilis)* for three years or even longer without using any chemical to control pests. Along with this, the study of Engle (2002) revealed that farmers in Taiwan collected and stored the indigenous vegetables for production purposes. They were able to preserve and improve the quality of the collected indigenous vegetables by genetic diversity through its germplasm.

The *rumbu* is a three-storey circular or oblonged structure with the ground floor as the kitchen. It has a staircase to the upper floors where small chimney-like compartments hold the cereal. The roof is a small removable cover. As the women cook, the heat and smoke from the stove drive out or kill pests in the grains. The heat also reduces the moisture content, preventing microbial or fungal growth. Meanwhile, the Moru people of Sudan used the *kiro* to store their staple crops, *sorghum* (Garcia, Fernandez, & Teng, 1991).

It is also a common practice for rural farmers in Sorsogon to preserve the corn kernels by hanging corn ears along the walls of the house or by placing them horizontally on bamboo poles at the kitchen chimney. At times, the seeds are

stored inside the bamboo poles with pungent leaves or grass and baskets and are placed above open stoves.

Figure 1. Locally prepared seeds are usually preserved by hanging near the smoky and dry places.

These practices are believed to be effective in preventing the attack of rats, mice, or insects like bean weevil¸ flies and other carriers of bacteria without using insecticides or pesticides. Old folks also preserve *palay* (rice) by air-drying them. When dried, the palay is placed inside the sack and is mixed with some leaves like, alagao (*Premna odorata)*, lagundi (*Vitex negundo*), bamboo leaves, charcoal, and *shell*.

They also used charcoal as a preservative of many seeds like ampalaya and beans. They remain viable up to six or more months. According to Garcia, Fernandez, and Teng (1991), using dry ash and charcoal helps in the absorption of moisture inside the container and prevents the growth and mass multiplication of weevils.

Another method used in maintaining the viability of vegetable seeds is spraying them with achuete (*Biya orellana*) leaf extract or powdered fruits of hot pepper. The estimated ratio being used is five pepper fruits per three gantas or about seven kilograms of seeds. In the absence of achuete (*Biya orellana*) and siling labuyo *(Capsicum frutescens)*, extracted juice from the vines called Tubli is sprayed all over the seeds to prevent attacks from pests. Villiers (1974) claimed that the viability of the seeds can be extended if it will be stored in a fully imbibed, but unable to germinate allowed a high germination capacity to be maintained

for long periods, together with a very low incidence of chromosome aberrations. Moreover, Vertucci (1990) further disclosed that the higher capacity of the seeds for its germinations, the moisture content and physiological status of the seeds should be highly taken into consideration to prevent lower mortality rate of the seeds.

Figure 2. Locals extend the viability of seeds by storing them in a jar with a naphthalene balls for longer preservation and protect them from insect attacks

Some common indigenous practices also include hanging the bundled rice stalks over the hearth without being sundried. Fruits like mangoes and vegetables (eggplants and winged beans) are stored inside moistened or wet clay jars. Small seeds from tomatoes, eggplants and sesame are stored inside airtight and sterilized bottles to prevent attacks of ants and other insects. Some farmers also use "*alkampor*" or naphthalene balls to maintain seed viability for about a year in open storage. This is done by placing one or two pieces of alkampor in one kilogram of seeds. Garcia, Fernandez and Teng (1991) explained that seed sources of camphor are rosewood (*Tavebuia rosea*), sandalwood (*Santalum album*) and camagong (*Diospyrs philippensis*).

Figure 3. Local farmer put the root crops underground for storage purposes

For root crops like cassava (*Manihot esculenta*), storage is done by placing them underground and covering them with soil. Asexual propagules like *ubi* (*Dioscorea alata*) and *luya* (*Zingiber officinale*) are placed inside the sack and stored underground.

II. Other eco-friendly indigenous agricultural practices

Aside from seed preservation and storage, there are other Indigenous practices commonly observed by farmers in Sorsogon province. These are along crop protection, soil fertilization, seed preparation and most especially, organic farming.

On crop protection. Natural IKS of farmers includes collecting rice bugs, grinding and spreading them in the field. These practices are being done to protect crops from insects/disease infestation. There was an indication also that the repellant factor could be the smell of the bugs to control the same or some other insect pests. Farmers also extract from roots of horseradish trees and leaves of tobacco to control golden snail and some pests.

Figure 2. Common insect repellant for the local farmers

On Soil Fertilization. There are various practices that result to the unintentional or conscious practice of organic fertilization. To make the soil fertile, Sorsoguenos tie the animals on the tree trunk where said animals can dispose their animal waste, and bury the dead animals near the tree. They plant the seeds in areas where dead animals have been buried, collect rice bugs and carrying them around the field three times before burying them on the ground. They also sprinkle urine on the rice especially during booting stage for flower induction.

Animal wastes like urine and manure also add to plant nutrition just like the leaves. Likewise, old folks believe that these practices would enable the trees to produce sweeter fruits. Similarly, the Aetas of Central Luzon also practice the same IKS with the knowledge that green manure adds to plant nutrition (Ahmed, 1993). Farmers also mix the weeds, sunflower, and rice straw during land preparation to make the soil fertile.

On seed preparation. Prior to actual planting, some IKSs are performed to retain the viability of the seeds. One common practice is coating the seeds with ash. According to Fernandez (1994), the seeds coated with ash tend to blend well with the soil and become undesirable to pests. Aside from this practice, seed preparation is also done by dipping seeds in substances like kerosene or plant extract having pesticidal properties like cayenne pepper, lemon and azuete. Few farmers soak or dip the rice seeds in the blood to control pests and diseases.

On organic farming. Even before the introduction of commercial fertilizers and chemicals as pesticides and insecticides, farmers already practice organic farming. They commonly use botanicals like fresh madre de cacao leaves

(Gliricidiasepium), lagundi *(Vitexnegundo*), neem (*Azadirazhtaindica*), alagao (*Premnaodorata*) and makabuhay (*Tinospurarumpii)* as insect repellants. The said leaves or botanicals are dried and powdered thoroughly. As revealed in the seed research results, several natural seed protectants and its effectiveness were discussed.

Madre de Cacao/kakawate(*Hiricida sepium*), neem (*Azadirachta indica*), powdered leaves of lagundi (*Vitex regundo*), protected seeds from insect infestations and were found good and surpassed the effects of common chemical insecticide in controlling insect infestations and maintaining seed viability.

It was found out that achuete (*Bixa orellana*) leaf extract was found effective in pre-germination treatment (pre-soaking for 3 hours) in protecting corn and mungbean seeds from fungi during germination. The powdered fruits of *siling labuyo* or hot pepper can maintain viability of vegetable seeds for about a year.

The following steps in preparing the seed protectant were considered in this study: 1) For neem which is very common in India and in some parts of the country, the following procedures are done: a) matured leaves or seeds are gathered and sun dried until they reach the required moisture content; b) using the manual method, the neem seeds or leaf are powdered thoroughly and mixed using 3-4 teaspoon in a 1 kg seeds intended for storage.

For hot pepper (*siling labuyo*) and black pepper (*paminta*), these fresh and natural seeds are more effective than a full-sized matured fruit in controlling pest and preventing its rapid multiplication. In preparing the seed protectant, the following are done: a) harvest or select hot pepper or black pepper seeds; b) mix 4-6 teaspoon of powdered hot pepper to 1 kg of seeds. For black pepper, use 6 teaspoon powdered seeds (or twice of the powdered leaf) for every 1 kg of seeds intended for storage.

Crop rotation is also practiced. To restore old rice varieties in the upland area, farmers practice crop rotation to avoid allelopathy of the soil. This activity is also done to prevent the multiplication of pests and diseases harboring the plants.

The eco-friendly farming practices that were documented in this study are applicable on a small scale farming only. Hence, some of these practices may not be applicable on a wider scope like storage of bundled rice or un-threshed corn above smoky areas in the kitchen or spraying vegetable seeds with achuete (*Biya orellana).* Such practices are only manageable on smaller plantation or farm.

CONCLUSIONS

Sorsogon has rich eco-friendly indigenous farming practices which are handed down by ancient farmers several years ago. Among these are on seed preservation and storage, seed protection, soil fertilization and organic farming. Knowledge on these cultural practices offers additional input to young farmers which may enable them to produce higher growth rate and viability of seeds for planting. Some of these practices are still being observed by some farmers nowadays despite the advent of modern agricultural technology. These also support the cited theories of this study that alternative farming system can contribute to the global concern of mitigating climate change. The said indigenous practices may be forgotten if not properly documented and advocated to the concerned practitioners.

Observing the IKS or the natural method of seed preparation, protection and organic farming could help mitigate climate change due to natural concoctions as insecticides and fertilizers which are safe for human existence. This would also minimize or even stop the loss of biodiversity and habitat degradation.

TRANSLATIONAL RESEARCH

Many indigenous practices have become part of people's culture, but because of the influence of technology, some of these practices are slowly fading away. The documentation of the eco-friendly farming practices is one step to make them available to the people. Such initiative may enable the young farmers to realize the cultural, economic and ecological benefits that man can derive from the indigenous practices.

Despite the emergence of modern technologies, indigenous ways of planting still exist especially those farmers in the developing countries. Most of the farmers in these countries will not be able to avail the synthetic fertilizers in their farming so local farmers can still use the Sorsoguenos way of farming practices to produce and harvest plants that were organically prepared. Thus, practices showed and discussed in this paper can be replicated in the local farming where the same characteristics of Philippine environment can be applied.

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