Keepers of Diversity: Cultural and biodiversity preservation for climate change adaptation among the Tagbanua

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Abstract:

Since time immemorial, the Tagbanua subsisted on swidden agriculture, hunting, and foraging at the West Coast of Palawan province and these traditions are still being practiced today. The authors argue that preservation of traditional practices is a crucial element for climate change adaptation, particularly in the preservation of genetic diversity. The Tagbanua ensured resiliency of their major staple by preserving a diversity of traditional rice cultivars. However, this has been achieved largely by maintaining the traditional agricultural system that not only includes material culture and technology, but also founded on social relations, dynamic decision-making, and a rich background of "performative knowledge" developed within the cultural framework of the Tagbanua. Traditional systems have sufficed, but for how long will these traditions last?

The Tagbanua ensured resiliency of their major staple by preserving a diversity of traditional rice cultivars. This can be attributed to a thriving swidden agricultural system, a background of "performative knowledge", and adaptive human agency developed within the Tagbanua lifeworld.

Key words: Tagbanua, swidden agriculture, indigenous knowledge systems and practices, climate change

1 INTRODUCTION

The province of Palawan is very rich in natural resources relative to other parts of the Philippines. As such, Palawan is an interesting area where its "diverse frontier and social landscape [offer] strategic opportunities to conduct research" (Eder, 1996) specifically in the context of development and its social, ecological, and cultural impacts. For this paper, the focus is primarily on agriculture and analyzing the Tagbanua swidden as a local adaptation and mitigation to the effects of climate change.

Different indigenous ethnic groups of Palawan – Batak, Tagbanua, Palawan – continue to practice traditional modes of procurement such as hunting game, gathering forest products (whether domestic or commercial use), and shifting cultivation, which serves as their main source of food (Novellino, 1998). Shifting cultivation or "swidden agriculture" refers to a cultivation method that involves burned clearings (Merriam-Webster, 2012) and it is known as "kaingin" or "slash-and-burn".

Many studies have been conducted arguing the sustainability (Conklin, 1958; Olofson, 1981; Warner, 1981; Marten, 1986; Roncoli, Crane & Orlove, 2009) or unsuitability (Rambo, 2009; Suarez & Sajise, 2010; Carandang et al., 2012) of swidden agriculture, but regardless of the differences in opinions on swidden agriculture, it cannot be denied that these traditional agriculturists are invariably the keepers of crop diversity. In contrast, conventional farming means may have achieved stable and high productivity levels, but it resulted in serious ecological consequences (Marten, 1986: 13) and invariably at the expense of reduced crop diversity with the adoption of modern seed technology.

In the context of a changing climate, "loss of crop diversity, both of crop species and cultigen diversity, has become a serious problem … [these] are a vital legacy necessary for a sustainable food supply" (Minnis, 2001: 41). What can small traditional communities contribute to addressing this problem?

This paper would like to argue that the continued utilization of the Tagbanua traditional system inherently allows the community to mitigate the risks brought about by climate change through the utilization of various strategies in order to hedge particular risks and its inherent malleable feature allows greater freedom vital to adapting to the changing climate. More importantly, in the preservation of local culture, the local community is able to contribute to the preservation of cultigen diversity, vital to the sustainability of food supply.

Beginning with a short discussion of methodology, followed by discussions of the role of swidden in the local economy, indigenous knowledge systems and cultural legacy, then the role of cultural preservation in adaptation. Next, in considering these findings, the paper argues the parallel symbiotic relationship of cultural and biological diversity. In recognizing this relationship, the paper concludes that not only do cultural systems provide a framework for local adaptation, but also highlight the role of traditional subsistence communities in preserving cultigen diversity for sustaining the nation's most important staple: rice.

2 METHODOLOGY

Ethnography had been vital to developing a body of literature arguing for the relevance of traditional systems in conservation (Ford, 2001). In writing this paper, field research methods were used to gather primary data conducting ethnographic interviews and focused group discussions among 43 farmers in Barangay Aporawan in Aborlan, Palawan across a period of 11 months. Ethnographic data and review of literature were been synthesized to generate the final report to document the

traditional agricultural system of the Tagbanua and other allied economic systems, the community profile, and socioeconomic situationer.

The study is unique because it focuses on the value of maintaining the traditional economic system of the Tagbanua in the context of valuing its diversified nature, its ability to preserve cultigen diversity of rice, and its inherent flexibility allowing for adapting to the effects of climate change. This is a system developed through time within the cultural framework of the Tagbanua lifeworld.

In the past, traditional systems such as these were "considered unproductive, wasteful of resources, and environmentally destructive" and the ultimate goal of agricultural development was to convince the farmers to abandon these practices (Rambo, 2009). This paper argues the value of traditional systems such as that of the Tagbanua in the context of their own survival and also its potential contribution in advancing biotechnology.

3 RESULTS AND DISCUSSION

Many Southeast Asian cultures practice swidden agriculture but each cultural group has its variations based on the local conditions since swidden practices are malleable enough to adapt to the community's subsistence patterns and aid in the survival of the community (Olofson, 1981).

Currently, the upland areas are home to some of the most marginalized farmers in the Philippines. In Aporawan, the upland agricultural area is called Sitio Daan and the residents of this area are exclusively Tagbanua, with the only exceptions are the non-native spouses, with an approximate population of 187. Collectively, the Tagbanua indigenous cultural community filed an ancestral domain claim on approximately 1,700has of forest and upland areas in order to protect their interest in cultivating the land. In protecting their interests, they prevented non-Tagbanua from conducting any economic activites in the claimed territory.

While they isolated themselves, the move also allowed the Tagbanua avoided the cultural influence of outsiders, but also practiced their traditional subsistence activities with relatively more freedom (Conelly, 1996). Many Tagbanua continued to reside in relative isolation at Sitio Daan with the convenience of easy access to the forest or *gubat*, their swidden fields or *uma*, and primary school for their children.

However, the Tagbanua were not limited only to Sitio Daan as many other Tagbanua lived in scattered areas of Barangay Aporawan. For example, when the children would need to go to highschool, they would need to "go down" and live in the same neighborhood as the *diwan* (a term used to refer to non-Tagbanua). Sometimes, the whole family would move out of Sitio Daan, but this added strain to the parents who would need to go back to the fields several times a year.

3.1 Tagbanua swidden and heirloom seeds

The system of rice cultivation is a crucial element of Tagbaua existence. Interwoven within this system are elements from the religious-spiritual beliefs, environmental cognition, social organization, kinship system, and subsistence. As such, the annual agricultural cycle of rice cultivation monopolizes the time of the Tagbanua whose main occupation remain to be rice farmers (Cuevas et al., 2015). Every year, January to February is the time when the field have to be cleared, March is when the fields are burned before the seeds are sown in April. From May and June, a cautious eye needs to be constantly roving to make sure the weeds do not choke the rice, and even in July through September when the staggered harvest needs to be conducted the farmer is already planning the next field to be cleared the following year.

Although swidden agriculture continued to be the most important traditional subsistence activity—particularly the production of rice—the need for cash affected some of their gathering activities which became more focused on products based on market demands such as yantok (*Calamus spp*., rattan), copal, bagtik or almaciga (*Agathis philippinensis Warb*., resin), and honey. To address the needs of the family, Tagbanua farmers employed various economic activities simultaneously, capitalizing on their traditional knowledge, fulfilling the demands of modern living—heavily dependent on cash, such as providing education for their children, purchasing non-food products. Basically, the Tagbanua relied on gathering forest products to produce income while the swidden fields and other agricultural activities provided their subsistence.

All Tagbanua farmers began their rice fields when they were given seeds by their parents, either upon marriage or having reached an age of being responsible for their own swidden. These farmers, most of whom are beyond their middle age, learned swidden farming from their parents who would bring them to the field—first, to observe; second, to help out with the work; third, allowed to work on their own fields. The modality of the lessons was praxis or performative rather than abstract or theoretical. Cognition borne out of these experiences shaped the landscape of Sitio Daan for generations.

When parents determine that their children can take care of their own fields, they provide them with seeds to for sowing on the first year. After which, it will be up to the farmer to expand his collection. The seeds inherited from one's parents can be a single or different varieties. A local elder inherited five different seeds from his parents.

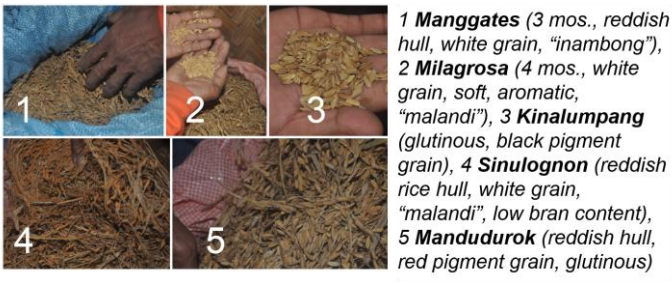

Fig. 1 Heirloom rice collection of local elder

Culturally, these filial values are embodied by the seeds whereby cultivating these heirloom seeds are tantamount to keeping the legacy of their families alive, while knowing that they can pass on the same gift to their own children in the future. Not planting these seeds for even one year,

cutting off the lifeline of the heirloom seeds, is an act against one's ancestors and such lack of filial piety is unacceptable to the Tagbanua. Through this cultural narrative, traditions and crop diversity are maintained.

Swidden agriculture could not be described as an easy life: labor-intensive, dependent on clement natural conditions, and not profitable. Many of the Tagbanua farmers, when asked why they continue to plant rice despite the challenges, they simply replied that a Tagbanua cannot be a Tagbanua without the swidden because that is their way of living. Thus, the swidden was not only important for their survival in the sense that they have food to eat, but the swidden was vital for their identity and survival as culture.

The value of the swidden field, also could not be divorced from the people's physiological struggle to survive. In an area where not only is the market inaccessible, but what small pockets of commerce are made available, the prices were steep. Subsistence farming was a vital tool for the survival of the Tagbanua household. The rice produced was further augmented by corn and kamote to be harvested. The farmers said that corn and kamote may also be sold to the market in order to buy rice when the rice supply runs out.

3.2 Culture as an adaptive mechanism

In highlighting the value of swidden agriculture, "social and cultural beliefs associated with such resource uses are a core component of human agency, that is, how Tagbanua shape the outcomes of uncertain social, political and environmental changes" (Dressler, 2005). The preservation of folk wisdom and cultural practices stored in the memories of farmers served as sources of knowledge from which the people draw insight to face various circumstances (Nazarea, 1998). Local adaptation strategies would not only be limited to seeking technical solutions, but a rather complex web involving social relations, dynamic decision-making, and a rich background of "performative knowledge" developed within the cultural framework of the Tagbanua (Roncoli et al., 2009: 99-100). This section would discuss the different cultural mechanisms that the Tagbanua used for adaptation: cultivating different rice varieties, a semi-nomadic lifestyle, and diverse diet.

With the practice of continuously planting rice and other crops in the swidden, the farmer is able to ensure food security for the family. However, planting several varieties also allow the farmer the opportunity to identify other rice varieties that have the potential of performing well under various conditions. While farmers did not design their field within the framework of a formal scientific protocol, the Tagbanua continually and informally conduct varietal trials, compare the performances of different rice varieties in various aspects: palatability, natural resiliency and resistance, and yield levels.

In very pragmatic terms, the Tagbanua plant the seeds that are available to them. Due to their particular agroecosystem, not all seeds can be used to cultivate in the uplands, because of these critical conditions, they need to be particular about the sources of their seeds. As such, the sources of seeds are limited and they would have to rely on kinship ties, social connections, or money to obtain them. Most farmers would cultivate and try to preserve several varieties to hedge against the risk of losing seeds. Seed selection and purification were requisite skills of swidden farmers. They would separate seeds borne of cross-pollination of different varieties, locally referred to as *pulot*. These were invariably rejected, but in the instance that these plants had more robust characteristics they would be saved and perhaps cultivated again the next season to see if this new breed would perform better. Farmers needed to keep variety with the knowledge that circumstances could change and not all rice varieties could survive.

In the late 1950s, the elders remembered a strong flood that overtook the lower areas of Barangay Aporawan. Swelling of the sea levels destroyed much of what they established on the lowlands and with the losses the Tagbanua made the decision to go back to the uplands. Their nomadic lifestyle allowed them to relocate to seek safer grounds. Traces of this nomadic lifestyle could still be seen as farmers maintained different households with different functions. Farmers could maintain homes in Sitio Daan to be near the forest and the swidden, but also reside with relatives in Sitio Sto. Niño when their children would need to be closer to the local high school.

When El Niño struck in 1998, the climate was so dry that it was conducive to forest fires (Lacuna-Richman, 2006) and caused the planting calendar to be moved to June, two months behind the ordinary agricultural calendar. Families survived in the two months of delayed rice production through subsistence of alternative staples—particularly of root crops. A diverse diet could also be a form of adaptation—unlike the majority of Filipinos who would be unable to adjust to a radical change in the diet.

A flexibility inherent in their cultural system allowed them to produce their crops following the climate without the pressure of the market. The Tagbanua rice system provided subsistence, independent from the market system, unlike the modern rice agricultural systems that aimed to generate income in order to offset the expenses incurred from the inputs used on the fields. Ironically, after the severe drought, the farmers were able to break local yield records. Consequently, the Tagbanua sold some of the surplus for money simply because there was more rice produced after a long dry season.

The foregoing discussion illustrated why the Tagbanua continue to stick to their traditional models and why they refused to leave Sitio Daan for other locations that will make modern infrastructure more accessible. Retaining and continuing to practice their traditional ways of living provided far greater advantage than detriments, an enviable position among Tagbanua and non-natives within Barangay Aporawan.

3.3 Changing values, changing cultures

Unfortunately, the idea of convenience altered the attitudes of some of the Tagbanua farmers who admitted that they simply decide to plant whichever variety was available on hand, since it is most convenient. Farmers minimized the number of rice varieties that they plant on their field because it was easier to keep track, reduced the laborious process of

segregating the different varieties and the expense of storage. Practicalities compelled farmers to sacrifice the variety with high productivity and more marketable varieties that the *diwan* prefer to purchase.

Some farmers also admitted that if only they were not obligated to continue cultivating the seeds that their parents gave them, they would minimize the number of varieties that they plant. However, culture required farmers to plant at least two varieties: glutinous and non-glutinous for the needs of the family. Ultimately, the convenience had become inconvenient when the number of total rice varieties in the area diminishes and only the elders remembered the times when more varieties flourished in the swidden fields.

4 CONCLUSION

Human societies across the globe developed diverse cultural systems as a method of adaptation to current and future exigencies based on their experiences. Economic activities like hunting, gathering, and farming were developed as a means to survive. Agriculture has dominated the global economy throughout the history of human existence (Rhoades, 2005) Through time, these systems were refined and improved, but perfection of any system could not be claimed. However, locally developed solutions often had the greater probability of efficiency that maximized resources and capitalized on opportunities. The Tagbanua system is a result of the confluence of various factors.

First, the ancestral domain of the Tagbanua contained the most fertile soil and a large part of it had widest forest coverage found in Barangay Aporawan. Conservative and sustainable resource management practices founded on Tagbanua culture, and perhaps even the controlled population, served to maintain the natural environment.

Second, the traditional system allows for a freer time table because the activities are not strictly based on the dates, but they are assessed based on the weather. Although they can be guided by the calendar, they still rely on reading the weather in planning and executing their farming activities. If they are not taking care of their swidden, they can allot their time for other activities such as foraging. Other activities include seeking temporary employment and the daily wages can range from Php 200 to Php 400, depending on the job. The more modern agricultural system dependent on the demands of the market follows a rigid schedule, is capital intensive, and entails high risk. Any delays in production are considered losses. The modern system also requires full attention from the farmer who is unable to divert his focus for any considerable amount of time.

Thirdly, the freedom to allow for diversified crops on the swidden field supported by a diverse diet allows for hedging risks against the possibility of crop failure and continued food security. If the rice plants fall prey to a particular disease, the family can still subsist on the root crops and corn that they plant on the field. The monocrop system of the modern rice farm is unable to provide any hedges against the risk of crop failure.

Lastly, the freedom to move is also one of the strategies that the Tagbanua employ and is embedded within their culture. Every year, they change locations for their swidden so that rice pests will have no time to make a permanent habitat of the fields. Generally, pests are not a problem for the Tagbanua. They do not usually use pesticides or fertilizers or any chemicals on their fields because they believe that those are unnecessary expenses especially since they are able to produce enough for harvest in most cases. In fact, studies have shown that swidden fields produce high yields per hour of labor compared with permanent wet rice farming (Rambo, 2009).

However, this form of freedom is slowly facing strong pressure against the rising population and the shrinking land area available to the farmers. These changes are forcing many farmers to abandon their upland fields because the traditional land fallow lengths are no longer realistic. Basically, the effects of climate change are numerous: flooding, drought, pests and diseases, and while the traditional system can allow the Tagbanua to adjust and adapt freely depending on the situation, other constraints may prevent them from practicing these in the future.

The argument of this paper, however, does not end with validating traditional systems but it ends with a sober note that traditional systems may be fading. The loss of these systems will bring with them the bank of genetic material that could be found in traditional rice varieties. The loss of knowledge is inevitably followed by the loss of germplasm, and knowledge disappears faster than the losing biodiversity (Nazarea, 2006). Also, there may soon come a time when traditional systems may no longer be relevant given the increase in population pressure and the diminishing land available, particularly since Barangay Aporawan will soon be available to a wider population when the road construction is finished. Despite the restrictions that the Tagbanua has placed on access to the lands at Sitio Daan, they may be unable to keep the population at a manageable level and be able to maintain their traditional systems. There is a narrow window now between access to local knowledge of the Tagbanua and losing that opportunity.

5 RECOMMENDATIONS

How can cultural systems help societies become better adapted to the changing climate and mitigate its debilitating effects? It is the position of the paper that while traditional systems are not perfect solutions, and may only achieve its full value under prescribed conditions, there are lessons to be drawn from them—particularly in their contribution to development (Alcorn, 1995). When the government implemented the Green Revolution program, the introduction of modern rice varieties has diminished not only the cultural significance of rice in everyday living but also the utilization of traditional rice varieties by rice farmers (Aguilar Jr., 2005). The advent of high-yielding modern and hybrid varieties encouraged most farmers to favor high production output over the preservation of traditional landraces (Tuxill, 1999). The loss of traditional rice varities also reflected the loss of local cultural practices and even some of the traditional motivations for rice cultivation. The underlying value of the traditional practices of the Tagbanua is the preservation of vital sources of plant biodiversity, particularly for traditional Philippine rice

varieties.

The development of biotechnology is dependent on the availability of raw materials, and a rich source of these can be found among traditional rice varieties that, at present, can only be found in the uplands. Research can begin with recognizing the value of traditional systems, documenting these practices, collecting plant specimen, and integrating sustainable practice with the mainstream. Ethnobotanical and anthropological researches examining how farmers decide on variety choices often address three categories of concerns: agroecological, technological, and use that could be addressed by maintaining diversity, a factor that has yet to be incorporated in quantitative and economic models (Brush & Meng, 1998).

Perhaps the future of agriculture can be found in neither the traditional systems nor solely in modern agricultural science, but rather in a synthesis of both. Collaborative knowledge exchange between farmers and scientists may be the key to looking for a more sustainable future for agriculture that will ensure food security for future generations. Communication is the means of how knowledge is transmitted, otherwise, untapped knowledge will always remain as individual cognition (Mundy & Compton, 1995).

The rise and proliferation of organic agriculture is already one step towards mainstreaming sustainable practices. Promoting and marketing responsible consumption of fairly traded and organic products completes the full circle. Unfortunately, with the growing population and demand on food supply, organic food systems will not be able to supply the needs of the world. As large-scale commercial food production addresses the needs of the majority, agricultural systems need to be more energy efficient and resilient to natural disasters. The global agro-industry of today demands streamlined products that has no place and need for diversity. This rigid model confronts multiple problems due to climate change causing unpredictable natural disasters that biodiversity can provide solutions. In the same way that genetic diversity allows for a sustained food supply, diversity in food production modalities can also present a similar model of resiliency.

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