MJSIR
Mountain Journal of Science and Interdisciplinary Research
PRINT ISSN: 2619-7855
ONLINE ISSN: 2651-7744
January-June 2019 • 79 (1) : 53-61

Climate Change Experiences and the Role of Community Values in Climate Change Adaptation: Focus on Women Farmers of Sitio Legleg, Palina, Kibungan, Benguet

Ann Heather B. Kiwang

Department of Social Sciences, College of Arts ans Sciences, Benguet State University
**Corresponding author email address: hbkiwang@yahoo.com.sg*

Abstract

Women farmers, especially in developing countries, are often considered as the most vulnerable to the devastating effects of climate change. Using life history approach, this study explored the experiences of women subsistence farmers in Sitio Legleg on climate change within their cultural milieu to be able to identify indicators of climate change and analyzed how community values help the women farmers adapt to climate change. Many of the women farmers experienced hotter climate, less rainfall, and dwindling water supply. Cough, colds, chicken pox, sore eyes, and amoebiasis became common ailments. They likewise experienced a widespread wilting of their main crop, sweetpotato. Nonetheless, certain community values such as gender division of labor, reciprocity and 'alluyon' helped them adapt to the potentially devastating impacts of climate change by allowing women, men and community members to share the burden of providing for the family.

KEYWORDS

climate change
women farmers
adaptation
community values
culture

Introduction

Climate change is an international concern. The Secretary-General of the United Nations (UN) aptly said, "*It is the major, overriding environmental issue of our time, and the single greatest challenge facing environmental regulators. It is a growing crisis with economic, health and safety, food production, security, and other dimensions*" (United Nations Environment Program [UNEP], 2009).

While no one is impervious to the effects of climate change, women are especially vulnerable. Two major reasons account for this vulnerability. First, women play a central role in providing food for their families and for their community. Food and Agriculture Organization (FAO) 2015 estimates that more than 50% of the food grown worldwide is produced by women who remain active in both the cash and subsistence agricultural sectors. This economic function makes them dependent on natural resources that are threatened by climate change. Women farmers currently account for 45-80% of the responsibility for all food production in developing countries depending on the region, with about two-thirds of the female labor force coming from developing countries, and more than 90% in many African countries (UN Women Watch, 2009).

Secondly, certain cultural and socio-political factors perpetuate gender inequalities that reinforce women's vulnerability. In Africa, for instance, though the current social division of responsibilities and distribution of access to and control of resources will disproportionately affect women who are mostly (60-80%) responsible for securing food throughout the whole value chain, and equally responsible for managing the natural resource base (land, water, in particular), women by statutory and/or customary laws, have restricted property rights over these natural resources. They also have limited access to support services, such as credit and extension services that would otherwise capacitate them to adopt more climate-resilient technologies and practices (Gaye, 2009). Hence, when coupled with unequal access to resources and to decision-making processes, limited mobility places women in rural areas in a position where they are disproportionately affected by climate change (UN Women Watch, 2009).

Several studies were able to document specific functions of women farmers in communities engaged in agriculture. In Africa, FAO (2015) reported that women play a major part in sowing, weeding, application of fertilizers and pesticides, harvesting, threshing, food processing, transportation, and marketing. Women in some countries, such as Tanzania, participate fairly equally with men in site clearance and land preparation. The same FAO (2015) report said that in many countries, men are responsible for the large livestock while women for the smaller animals, such as poultry, sheep and goats. Women though are also often responsible for feeding and milking all livestock. Furthermore, they are often responsible for seedlings, gathering food, fodder and wood. FAO (2015) further adds that in Nepal, fodder collection for buffalo is exclusively a woman's job. She is the one who prepares for ploughing, tends to cattle and other livestock, transplants seedlings, participates in harvesting, threshing and plays a major role in horticulture. In Pakistan, women carry out 60 to 80% of the cleaning, feeding and milking of cattle and in both South and Southeast Asia, women supply a significant amount of the labor in plantations, producing tea, rubber, and fruit (FAO, 2015).

Another study revealed that in Southeast Asia, women play a major role in rice production, particularly in sowing, transplanting, harvesting and processing. Overall, women are responsible for the more time-consuming and labor-intensive tasks of crops and livestock production, sowing, application of fertilizer, weeding, harvesting, transporting, threshing, winnowing, cleaning, sorting, grading, and bagging (FAO, 2015).

These and other similar studies confirm the active role of women in agriculture. Consequently, a woman's quality of life is significantly affected by changes in climate. Numerous studies have already been conducted recognizing the vulnerabilities of women especially women farmers to climate change.

In Burkina Faso, Africa, a study showed that water shortage have forced women and their sons and daughters, who usually helped them with this task, to travel increasingly long distances and walk long kilometers to find water. It showed how women's plots are more vulnerable to climate change because they are usually the most affected. These plots are made up of poor-quality land and have restricted access to water and the women do not have the necessary tools and inputs (chemical fertilizers, compost, improved seeds) for farming. The study added that the construction of zai pits and stone walls, which require considerable physical strength, cannot be done in women's plots, resulting to heavy rains and run-off water sweeping away much of the plant coverage. In terms of human capital, the same study pointed out that the main impact of climate change on women is their increased workload (Sauliere, 2011).

In another study conducted in Odisha in Africa, most of the women reported that late monsoon rains cause delays of planting in paddies by 15 to 45 days almost every year as a consequence of the shift of the onset of rain by more than a month in Kharif season (July to September) and about a month in Rabi season (November to April). Also, rainfall is not sufficient, resulting in reduced yields and lower returns to the farmers (Bhatt et al., 2012).

A number of local studies likewise documented the indicators as well as impacts of climate change particularly to farming communities. A study conducted in selected farming communities in Paoay, Atok; Loo, Buguias; Bayabas, Sablan; and, Taloy Sur, Tuba in Benguet Province looked into the perceived effects of climate change among farmers. The farmers noted increasing pest and/or new pest and plant diseases, lesser crop yield, lesser water supply, increase of human diseases, increase forest

fire occurrences, and disruption of traditional agricultural calendar (Batani et al., 2013). In a related study conducted in Betag, La Trinidad and in Madaymen, Kibungan, respondents observed prolonged droughts, erratic typhoon episodes, warmer middays, colder afternoon, and irregular rainfall patterns. Further, Betag residents claimed to have experienced strikingly low production in 2011 due to erratic and early rains. On the other hand, some Madaymen residents experienced a nearly scarce stock of food as a result of erosions and landslides (Batani, 2012). Another local study documented the sensitivity to climate-related hazards of farmers in Poblacion, Tuba and in Puguis, La Trinidad, Benguet. Farmers experienced higher risks in production. They noted rotting of fruits and roots, slow recovery and destruction of flowers, and delayed flowering due to typhoons (Parao et al., 2014).

Community values have been shown to play a significant role in climate change adaptation particularly in indigenous communities. A local study noted that indigenous socio-cultural practices such as 'aluyon' or 'obbo' (mutual self-help systems) and 'binnulod' (borrowing in cash or in kind without interest) made communities and households resilient to the impacts of climate change. The study also noted some gender roles. Men are in charge with handling manually intensive tasks while women solicit for food and help and support those who have joined the relief and rehabilitation (Batani, 2012).

The vulnerabilities of women to climate change may vary depending on the context within which these women navigate their lives as food providers for their families and for their community. Qualitative research allows an in depth exploration of this context highlighting common, as well as, unique stories of how women, and the community as a whole, overcome adverse climate change impacts for the perpetuation of a better quality of life. This study supports the assemblage of researches that recognizes the significance of documenting and promoting community values that work to mitigate the impacts of climate change.

Sitio Legleg in Kibungan presents an interesting case in investigating the consequences of climate change to women farmers because it is largely a subsistence farming community, consisting of only a few residents. There are approximately 50 households in the sitio, with single or two families in one house. From Baguio City, the sitio can be reached through a rough, narrow, and winding road.

The study explored the experiences of women farmers to be able to identify indicators of climate change as well as community values that have helped them adapt to the impacts of climate change.

Methodology

The study employed a qualitative research design particularly life histories. Accordingly, life history approach in qualitative research emphasizes on the importance of presenting the individual's subjective evaluation of his/her experiences and of giving information about his/her social experiences (Abu Bakar & Abdullah, 2008). In this study, instead of covering the complete and entire experiences of the women farmers', their life stories were topical, covering only a phase of the women farmers' lives, particularly their farming experiences. Women farmers from Sitio Legleg, Palina, Kibungan, Benguet, a subsistence farming community comprised the population of the study (Figure 1). Two (2) focused group discussions (FGD) were participated in by women farmers of the sitio in 2016. Face-to-face interviews were also conducted with the farmers who have been farming for more than ten years, to clarify and substantiate the data gathered during the FGD. The inclusion criterion of ten years was decided in consideration of their length of farming experience which would allow them to provide a more in depth information on the changes in the climate as well as on persisting community values.

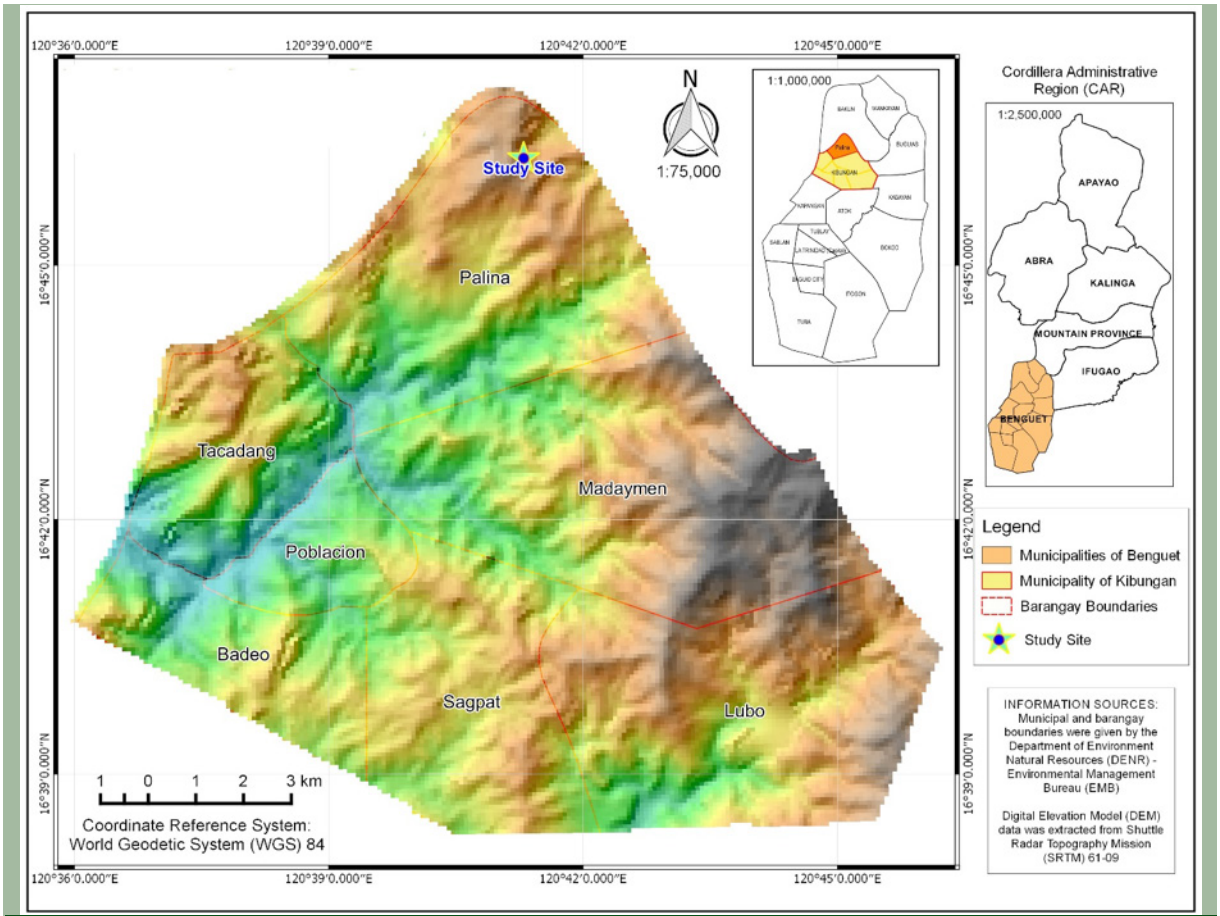

Figure 1. Map of Kibungan, Benguet showing Sitio Legleg, Palina, the study site

Results and Discussion

Sitio Legleg: A Predominantly Subsistent Farming Community

Legleg is a sitio of Barangay Palina in the municipality of Kibungan, Benguet, consisting of around 50 households. It is primarily a subsistence farming community. The sitio relies heavily on rain-fed agriculture. In the study, the women farmers revealed that they barter with their neighbors or sell some of their crops to nearby communities especially if their harvest is plentiful. Their crops include corn, peanut, beans, cucumber, 'gabi', 'kamoteng kahoy', potato, ginger as well as legumes like 'batong' and 'cardis'. However, their main crop is sweetpotato or 'togi'. Some plant the rice variety 'balatinnaw' but only if requested by a buyer. The women farmers claimed that there used to be more rice fields in their sitio, however, residents started shifting to gardening as communities around them turned to vegetable cash crops. Hence, it is becoming apparent that commercial farming is slowly exerting its influence over Sitio Legleg. The vulnerability of subsistence farmers to climate change comes both from being predominantly located in the tropics, and from various socioeconomic, demographic, and policy trends limiting their capacity to adapt to changes (Morton, 2007). Thorlakson and Neufeldt (2012) likewise pointed out that subsistence farmers do not have the capital to invest in new adaptive practices with which to protect their homes and families. This is especially true to households that rely almost entirely on rain-fed agriculture.

Experiencing Climate Change

Change in temperature. In terms of temperature, the women farmers have been observing that the weather has become hotter during the dry season and colder during the wet season. They said that the hotness of the weather is different now. One of them claimed, "*Sabsabali ti pudot tadta* (The temperature is different now)". Others said, "*Napupu-os tadta. Ha-an ma-anusan* (We can not tolerate it because it's very

hot now)". They likewise observed irregularity in weather patterns. The rainy season before started from June or July and lasted until December, albeit, only occasional rains during the months of November and December. In 2015, however, rain became seldom. The resulting hotter temperature caused a change in their work hours. They no longer able to go to their farms from 10 AM to 2 PM because it is very hot at that time. They say, "*Nabawasan ti oras ti panagtrabaho* (Working hours were lessen)". The eldest among them, an 82 years old woman, expressed her sentiments on the increasing difficulty of working in the farm. "*Nakay ak garuden* (I'm already old)", she exclaimed.

This increase in temperature and erratic weather were also reported by farmers in other communities in Paoay, Atok; Loo, Buguias; Bayabas, Sablan; and Taloy Sur, Tuba, Benguet (Batani et al., 2013).

Decreasing water supply. The community has three alternative water supply sources and means of storage. One is the water tank, a project of the National Irrigation Administration (NIA), which is used to store water. During daytime, water is used for household consumption; however, during night time, it is used for watering plants in their gardens. Some households have their own water pumps. Others use a hose, commercially bought or made of bamboo, to get water from the water spring 'ubbog' to their farms. Accordingly, a decline in the volume of water has been observed. They say, "*Agkurkurang ti danum* (There's a water shortage)". Hence, they have to constantly check if there is enough water in their farms. This can be a tedious task for many whose farms are located more than an hour's walk from their homes. They attributed this scarcity of water to the lack of rain since the beginning of the year 2016. An elder said, "*Binmassit ti todo* (low rainfall)". The United Nations (UN) has emphasized the significant impact of climate change on fresh water sources, affecting the availability of water used for domestic and productive tasks (UN Women Watch, 2009).

Prevalence of certain plant diseases. During the past few months preceding the conduct of the study, the women farmers experienced severe wilting of their crop, sweetpotato or 'togi'. They observed that the leaves of sweet potatoes turn yellow or 'mangmango'. They further described it as, "*Kaman bu-ot ay mansilaw* (It looks like a yellowish mold)". This disease is observed even in sweetpotatoes planted in newly prepared garden plots. This caused their harvest to decrease dramatically. An examination conducted by specialists from the Northern Philippine Rootcrops Research and Training Center (NPRCRTC) of Benguet State University (BSU) pointed to *Fusarium* wilt – a fungal disease that attacks potato, tomato, eggplant and pepper through the roots, interfering with the water conducting vessels of the plant. One also observed that some of her seedlings become rotten or "*ma-eges nga bonobon*". She attributed it to strong rains and extreme heat. She exclaimed, "*Anya ngay ti pagbiyag nu kasta*? (What could be our livelihood?)".

In one study conducted in Barangay Poblacion, Tuba, Benguet, leaf miner infestation which resulted to an estimated 60% of yield loss was associated by farmers to climate change (Parao et al., 2017). Another study in selected communities of Benguet likewise attributed lesser crop yield to pest and crop diseases (Batani et al., 2012). Clearly, local farmers often associate the occurrence and spread of plant diseases to climate change.

Rise of common human illnesses. The women in the community mostly experiences coughs, colds, chicken pox and sore eyes. They also noted the increased number of residents who had amoebiasis which they blame to the scarcity of their water supply. Though scarcity of water does not cause amoebiasis, per se, this disease is often associated with poor sanitation. The lack of water for frequent and thorough washing of food as well as of utensils being used for food preparation may have indeed caused the disease to spread. Note that the residents claimed to have experienced a decline in the volume of their water supply. The decline is attributed by the community to the observed increase in temperature and irregularity of rainfall.

A related study found that erratic weather as well as intensifying and irregular rainfall pattern led to an increase in the occurrence of upper respiratory diseases such as flu and cough in certain farming communities in Benguet (Batani et al., 2013).

UN (2009) likewise cited the abundance of evidence linking the evolution and distribution of infectious diseases to climate and weather which entails a greater incidence of infectious diseases such as cholera, malaria, and dengue fever, due to the extension of risk seasons and wider geographic distribution of disease vectors. In Sitio Legleg,

climate change seems to have increased the prevalence of diseases ordinarily experienced by the residents.

Community Values and Resiliency to Climate Change

UN (2009) identified four areas as critical building blocks in response to climate change: mitigation, adaptation, technology transfer, and financing. Adaptation has been defined as a range of activities to reduce vulnerability and build resilience in key sectors, such as water, agriculture, and human settlements (UN Women Watch, 2009). This study found that community values can play a significant role in climate change adaptation.

Gender Division of Labor. Several studies pointed to the vulnerability of women farmers to the effects of climate change. This vulnerability is due primarily to women's role as food providers. As stated in a United Nation's fact sheet (2009), "*Women are more vulnerable to the effects of climate change than men—primarily as they constitute the majority of the world's poor and are more dependent for their livelihood on natural resources that are threatened by climate change.*" In Sitio Legleg, however, this vulnerability, especially when compared to men, is not apparent. Admittedly, women play a significant role in providing food for the family; nonetheless, the concept of gender division of labor in the community allows men to help carry the burden.

Men are primarily responsible for preparing the 'uma' (farm) for planting. Perhaps this is due to the difference in biological strength between men and women. Preparing the 'uma' requires the use of 'gabyon' (grub hoe). Although women can perform this task as well, men are more able to do so because they are stronger. Men are likewise responsible for plowing the rice field. Women, on the other hand, help in removing the weeds. Weeding is done before planting and while waiting for the plants to grow. Planting and harvesting crops including 'palay' are assigned primarily to women. Nonetheless, men also do the task in situations where the women need to take care of the children.

With the observed decrease in water supply, maintaining their farms has become more burdensome. A woman said, "*Kumurkurang danum ti talon. Masapul apan kita-kita-en nu ada danum* (There's no enough water, one has to check regularly if there is water)". Watering the plants and spraying insecticide are often done by men. Hence, the hotter temperature due to climate change does not necessarily put more burden to the women as compared to the men. Furthermore, keeping the seedlings is a responsibility of both men and women. Interestingly, women were observed to be more knowledgeable than men when choosing better cuttings for sweetpotato. Men tend to choose cuttings with 'a-atidug' (long) stems whereas women choose those with short stems. They observed that shorter stemmed cuttings are more likely to grow and bear good crops. They say, "*Amu ti babae ti mayat nga semilya* (Women are better in choosing planting materials)".

The same UN (2009) fact sheet emphasized the devastating effect of dwindling water resources on women and girls who are chiefly responsible for fetching water for their families; hence, spending significant amount of time hauling water from distant sources on a daily basis. In Sitio Legleg, however, productive work and domestic chores such as cooking are shared responsibilities between husband and wife. The women would reiterate, "*Depende ti pagtutulagan* (It depends on the agreement)". In fact, the word 'tulagan' (agreement) would be mentioned from time to time whenever the women were asked about what men and women do in the farm and at home. This means spouses are able to talk and agree on. Consequently, unlike in other developing countries, water management in a household or in a farm, does not rest solely on women.

The residents revealed that their farms or 'uma' are far from their home which can take more or less an hour of walk from their household. Apparently, though many of the residents have gardens near their home, they still have and maintain wider farms in other areas of the sitio. If there are children in the family, the wife stays at home or 'ag-iyan' while the husband stays in the farm for two to three days or until all farm activities have been done. The woman pointed out, "*Agbantay ti ubing ti babae* (The women take cares of the children)". They maintain a 'kampo' (house) where the husband sleeps and eats while away from his family. Pounding of rice is also done in the 'kampo' after which the husband brings home an amount enough for their daily needs. The distance of the farm to their houses makes it difficult for them to transport the entire harvest to their house.

Hence, the 'kampo' also serves as a storage area for their crops. In some cases, the mother-in-law helps in taking care of the children so that the wife can help out in the farm.

In Sitio Legleg, the reproductive role of women is almost always considered in the division of task between husband and wife. Child rearing is the primary responsibility of women; hence, the husband is expected to perform other household chores and farm activities whenever the wife is preoccupied with taking care of the children. With this arrangement, the effect of multiple burden (reproductive, productive, and other domestic chores) on women farmers is somehow lessened. The welfare of the mother is further protected by their belief that she cannot work in the field or 'ha-an agtalon' at least three months after giving birth. "*Agtang-gad isuna* (The women who just give birth must stay at home)", they say.

The UN factsheet (2009) pointed to unequal access between men and women to resources and to decision-making processes. Accordingly, this limited mobility places women in rural areas in a position where they are disproportionately affected by climate change. In Sitio Legleg, the women farmers are able to communicate and negotiate with their husbands on matters of productive work and domestic chores. Who does what depends on the agreement or 'tulagan' of the couple. It would seem that the residents of Sitio Legleg are not bound by the kind of gender dichotomy prevailing or observed in other several societies.

The significance of gender roles in 'obbo' or mutual aid systems or reciprocal labor exchange in some communities of Benguet was pointed out in one study which observed that men are in charge with handling the manually intensive tasks such carrying heavy loads and digging while women are tasked to solicit for food and help and support those who have joined the relief and rehabilitation (Batani et al., 2012).

Reciprocity and 'Aluyon': Sense of Community. In addition to prevailing gender division of labor, the norm of reciprocity and the practice of 'aluyon' likewise play significant roles in mitigating the impacts of climate change to the community.

During harvest, women keep seedlings in preparation for the next planting season. This is done to prevent or mitigate expenses incurred in acquiring new seedlings. Women share seedlings with each other. Harvests like 'aba' (yam) and 'lukto' (sweetpotato) are primarily for the family's daily subsistence. Excess harvests may be shared with neighbors who have not been able to plant during that season. Reciprocity seems to be a common practice among the members of the community. 'Balatinnaw' rice variety, however, are planted primarily for sale to neighboring towns.

Their sense of community can be further observed in the residents' willingness to cooperate with BSU through the NPRCRTC in addressing the *Fusarium* wilt infestation of their sweetpotato crops. Residents with available farm lots during the time of the study agreed to plant the clean planting materials given to them with the understanding that should they be successful in propagating the plant, they will share clean planting materials to the other residents. An on-going extension project by Ruth Batani found that *Fusarium* wilt continues to attack sweetpotato in Sitio Legleg. Nonetheless, one of the women farmers was able to successfully propagate clean sweetpotato planting materials which she shared with some of her fellow farmers.

Reciprocity can also be observed in their concept of 'aluyon'. During planting and harvesting season, residents call on their neighbors to help them. They refer to this practice as "komboy". Reciprocity is very helpful especially in carrying heavy loads of crops.

The community's notion of reciprocity and 'aluyon' also play an important role in reducing the burden of accomplishing farm activities especially during the planting and harvesting seasons.

The open sharing of experiences and information on health-related concerns among the residents may likewise be considered a manifestation of their sense of community.

A study conducted in Madaymen, Kibungan, Benguet learned that indigenous sociocultural practices such as 'aluyon' and 'binnulod' made the communities and the household resilient in adapting to the impacts of climate change (Batani et al., 2012).

Conclusions

Many of the women farmers experienced warmer climate, fewer rains and dwindling water supply resulting from climate change. The residents likewise experienced extreme wilting of their crop, sweetpotato. Diseases such as coughs, colds, chicken pox, sore eyes, and amoebiasis have become more common. The women farmers associate the prevalence of these common diseases to warmer temperature, stronger rains and erratic weather.

Certain community values such as gender division of labor, reciprocity and 'aluyon' help women farmers adapt to, and thus mitigate, the impacts of climate change. Both husband and wife share most of the responsibility in the house as well as in the farm, lessening the effects of multiple burden to women farmers. Furthermore, the practice of reciprocity and 'aluyon' allow community members to share the bulk of the work done in the farm especially during planting and harvest season.

Recommendations

The local government unit should become more responsive to increasing health concerns by strengthening the local health center's capability to reach out to distant sitios like Sitio Legleg. The local government unit must look for ways and means to utilize the water tank project of NIA more efficiently to ensure water supply for all residents of the sitio during times when rain becomes seldom.

The community values on gender division of labor, reciprocity and aluyon may be documented and promoted to sustain community adaptability to climate change. These can be included in discussions within the context of gender and development. Sharing of work in the farm between husband and wife as well as among community members may be emphasized as a significant factor in safeguarding a better quality of life for families particularly in farming communities.

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