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# Socio-Economic Impacts of Climate Change Support-Policies to Farming Systems in a Village in Tuguegarao City, Cagayan, Philippines

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**ABSTRACT**

*This study deals with the farming systems and socio-economic impacts of implemented climate change support-policies to 27 farmer respondents in Barangay Carig Norte, Tuguegarao City. Primary data were gathered through a systematic interview with the respondents using a questionnaire, cratfted based on the ultimate goals of the National Climate Change Action Plan. Existing records, assessment and project reports of the local government were also used as basis of the analysis. Based on interviews and secondary data, there was no clear indication that climate change support policies were implemented in accordance with the objectives set by the national government. In addtion, there were no concrete climate change support-policies yet implemented but there are initiatives and fragmented efforts, policies and projects that address the issues of droughts and flooding. Examples of the fragmented support projects implemented to address climate change are free use of water pump and provision of fuel allowance during drought. The crop insurance for calamities is yet to be implemented.*

**Key words**: *Climate change policies, farming system, socio-economic impact*

## INTRODUCTION

One of the greatest threats to the scarcity of the world's food supply and industries that depend on agriculture is climate change. This foreseable situation has been an issue to the burgeoning population and decrease in land area devoted to food production. Climate change significantly contributes to the scenario.

The mean temperature of the earth is projected to rise and the exact changes in local conditions are not clear. Topography, location, land use, and many other factors influence local weather. These also contribute to the manner in which global warming will affect a specific province or municipality, as pointed out by the Manila Observatory for the Congressional Commission on Science & Technology and Engineering (*COMSTE 2010)*.

With the uncertainty of the impacts of climate change on every country in the world, the leaders of each country came up with discussions and resolutions concerning strategies on adaptation and mitigation directly related to climate change based on the scientific observations and condition of each country. These discussions and resolutions resulted to the creation of the International Protocols (IP's) to create a general plan for the climate change scenario. Some of the outcomes of international collaboration were the United Nation Framework Convention on Climate Change (UNFCCC) at Rio de Janeiro in 1992, the awareness and strategies for the reduction of carbon and greenhouse gases emissions at Kyoto Protocol in 1998 and the Assessments of Impacts and Adaptations to Climate Change (AIACC) by the Global Environment Facility in 2005.

The International Protocols were decentralized to suit the needs of each country. Philippines has adapted and restructure IP's to fit in to the conditions the country has been facing on climate change. Although the possible effect of climate change has been laid, Philippines has done its own researches on climate change to simply understand the possible outcomes, in order to have its own strategy to localize its own policies and to figure out the uncertainties of the problem and lay solutions as well.

The Manila Observatory quantified climate change research using statistics to draw trends from historical records, and project such trends into the future. Since this approach uses past data, it forms the strongest basis for what scientists now know about the changing climate. The main drawback with this approach is the assessment of local climate change through downscaling that makes use of predictions generated by global climate models (GCMs), which are essentially computer programs used to forecast daily weather but engaged instead to foretell conditions decades into the future.

Research was also important for the creation of legislations in the Philippines. Legislators and scientists were in the most strategic position to focus and address the effects of climate change scenarios towards the safety of their fellowman, their resources and their territories.

The Philippines is not lagging behind in terms of creating its own policies with regards to climate change adaptation. Some of the policies created were adopted

from the ADB Climate Change Project in 1991 that focussed on rapid assessment of the country's vulnerable sectors and areas to climate change such as agriculture, water resources and coastal areas, GHG Abatement Awards in 1998 that intended to recognize companies that voluntarily reduce GHG emissions through activities such as energy efficiency, creation of Philippine Climate Change Commission in 2010 that is responsible for the planning and coordinating of programs and actions on climate change focusing on the vulnerable sectors of the country, and recently the implementation of Republic Act 10068 of 2010 that aims to encourage farmers to pursue organic agriculture as an adaptive measure on climate change.

At the moment, there are existing policies and there are those are still being crafted, aligned with the issues on climate change. However, there is no or lack of stakeholders consultation in the crafting of these polices and it eventually defeats the purpose of collective participation. After these agricultural support policies were created and ready for implementation, the Philippine government in all levels-national, municipal or barangay, lacked the capacity to sustain and monitor the programs that were sufficiently funded.

**The Study Site**

Tuguegarao City is located at the Cagayan Valley in the north-eastern part of the Luzon Island, Philippines. It is the city capital of Cagayan province and the regional capital of Region II. Tuguegarao is the economic center (commercial, education, health etc.) of the Cagayan Valley Region. It is located on a peninsula in the Cagayan Valley sheltered by the Sierra Madre Mountains, the Cordillera (at the east) and the Caraballo Mountains (at the south). Also, the city lies in the along the Cagayan River, the longest river in the Philippines.

Although Tuguegarao is a component city, one of the biggest source of revenue is agriculture, particularly on rice and corn production. The city is known to be the hottest city in the Philippines due to its averag temperature from 30$^{o}$C to 32$^{o}$C. The highest temperature recorded in the city was 42.2$^{o}$C on April 29, 1912.

From the analysis of the National Economic and Development Authority (NEDA) and National Disaster Coordinating Council (NDCC) in 2010, Cagayan is mentioned as one of the most vulnerable places in the Philippines in terms of economy and its ability to cope up with natural calamities due to climate change. Also, according to Philippine Atmospheric and Geophysical and Astonomical Services Administration (PAGASA) and Department of Public Works and Highways (DPWH) in 2010, Tuguegarao City is similarly a flood prone zone area like Iloilo City and Metro Manila due to its geographic location and the effect of sea level rise (*JICA 2010*).

Currently, Tuguegarao City does not have its localized policy on climate change. However, the city officials adapted national policies and programs on climate change. This study aims to determine the agricultural support-policies and assess their impact on the farming systems and socio-economic perspectives of farmers in Barangay Carig Norte, Tuguegarao City. The results and findings would be the basis of strategic recommendation of future agricultural support policies.

The study about policy-supports on climate change, brought about by the frameworks created by alliance of larger communities, are too vast to comprehend and to make singular generalization. The researcher created a framework to focus on the context of creating protocols, which is responsible to the creation of policy-support and projects that adapts and mitigates to the effects of climatic changes. The government policies, programs, and activities on natural resource and ecosystems management can positively or negatively impact a sector's vulnerability and adaptation to climate change, mainly depending on how they were implemented or put into action, and on how the respective manners of implementation were monitored and/or regulated, if at all (*Lasco et. al. 2007*). Sometimes in the end, it appears to become a case of policy "mal-implementation".

The National Climate Change Action Plan's (NCCAP) Ultimate Goals are the bases for the assessment tool- the questionnaire. The ultimate goals of the NCCAP are food security, water sufficiency, ecosystem and environmental stability, human security, climate-smart industries and services, sustainable energy and knowledge and capacity development. The association of protocols are any adoption that fits to the needs and cultural bounds of the smaller adapters (**Figure 1**). The disassociations are outside lying phases of ellipses from the larger protocols, which is brought about by the creation of new or additional protocols that are more customized to the objective conditions and capabilities of the local adapters. These associations and disassociations can be seen in the diagram from the larger global scale protocol to smaller city protocols. The study will determine the agricultural support policies implemented towards climate change adaptation and mitigation; describe the condition of the farming systems and socio-economic status of the farmers in Barangay Carig Norte due to the implemented support policies; and create a recommending resolution to support the farmers' condition towards adapting and mitigating the effects of climate change.

## METHODOLOGY

The study was conducted at Barangay Carig Norte,

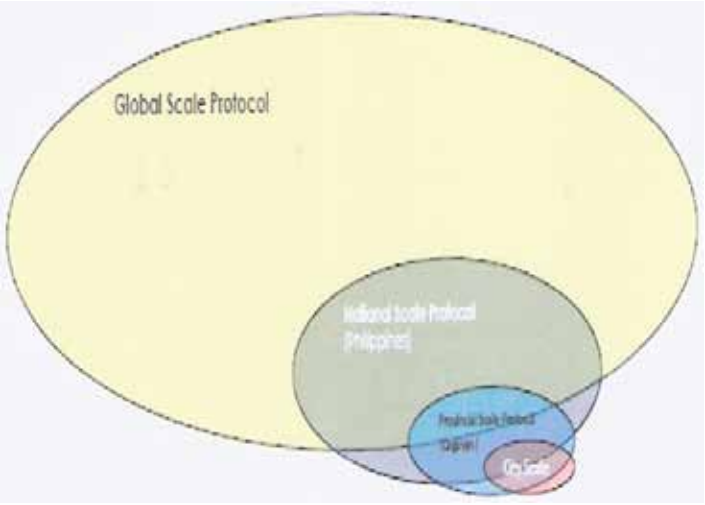


Figure 1. Theoretical framework.

Tuguegarao City from May 2011- July 2012. The barangay was selected primarily because the City Agriculture Office said there is an ongoing Farmers-Led Extension Project for Corn, which is composed of 27 farmers thus giving access to their availability and commitment for the this research. Also, other considerations were the accessibility of the site and the receptiveness of the respondents in the area.

The research focused on two variables, agricultural development policies/ projects implemented by the City Council (independent) and its effects to the social, economic and farming systems condition (dependent) of the farmers (**Figure 2**).

The design of the study also discussed the stages a policy or project undergoes: planning, legislation, implementation and evaluation; which is qualitatively being discussed the interrelationships of achieving the goals of the project from the involvement of the farmers in the listed stages.

Primary data collection was done through formal interview with the farmers. A systematic and strategic questionnaire was devised to gather the social demographics, economic status, farming systems, support-policies and suggestive resolution for the farmers. The question was prepared in Filipino but necessary translations to Ybanag and Ilokano during the actual interview was done to facilitate the collection of data. Participatory methodologies haven't been utilized due to the limitation of the farmers' exposure to such method and the availability of the farmers on the gathering of data.

Secondary data collection was done by asking the permission from the Mayor's Office to ask assistance and secure copies of city zoning and policy resolutions at the City Planning and Development Office, and brochures of the projects in agriculture from the City Agriculture Office. Also, additional information about climate change policies and climate change projects was derived from the Philippine

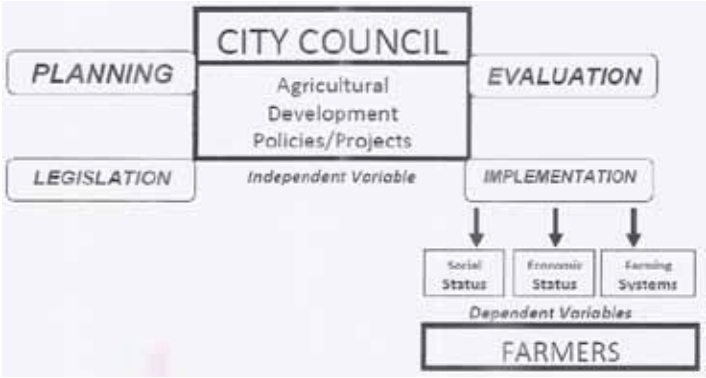


Figure 2. The variables considered in the study.

Information Agency and the Sanggunian Panlalawaigan ng Cagayan.

The questionnaire is categorically subdivided into the following:

**Social Demographics**. The questions at this part aim to gather basic information about the respondents. This part of the interview question created rapport between the respondent and the interviewer. Aside from the farmers' basic information, the respondents assessed the accessibility of the basic social services rendered in the locality. The respondents rated one (as the lowest) to five (as the highest) the social services which included education, housing, health services, basic goods, electricity, technology/ communication, safe water, calamity aids and food. This assessment gave an overview of their social security in the locality. Social relations, based on their affiliation, have also been asked. This determined how organizations help them in their daily lives and what particular aspect of their living.

**Economic Status**. This gave information about other sources of income aside from farming activities. It also gave the information about the planning and spending of the respondents. The trend from income and spending was extrapolated at this part of the interview. This also showed the frequency of lending money for capital by farmers; Agricultural Systems. The questions, at this part, were based on the components considered by *A. Frasier* (*1989*). The components considered at this part were physical features observable in farmer's farm, factors of production: labour, machinery, inputs, governmental supports, and farming systems: land ownership, farm activities, and farm outputs; and Support-policies and government projects. This created the listings of government support-policies and projects beneficial to the farmers. These qualitatively assesed the implementation of the projects and support-policies. At this point of the interview, the farmers assessed their knowledge about climate change. They were also given the chance to discuss what climate change is. The discussion gave them the chance to recall observations at their farms on the impacts and effects of climatic changes. The respondents were

given chance to formulate their own projects or support-policies that were tailored to their immediate needs.

The method of data collection was not thru a participatory method. This is due to the tendencies that the kind of method is not familiar to the farmers and may create the atmosphere of unevenness thus limiting the collection of required datato be analyzed. All members of the group were interviewed and considered as the respondents in assessing the socio-economic impacts of climate change support-policies to farming systems in Barangay Carig. The data were analyzed using descriptive statistics such as frequency counts, percentages, means and modes.

## RESULTS AND DISCUSSIONS

Carig Norte is one of the 49 barangays of Tuguegarao City. According to National Statistics Office, Carig had 3,647 residents by the end of the year 2007. Out of the total 5,891.47 ha of agricultural land in the city, less than 20% of the total land area in Plan of Carig Norte is devoted to residential area, 10% is marginal due to slope and the rest is devoted to agriculture (**Figure 3**).

Most of the farms are rainfed. Farms in the barangay are planted with corn, rice and vegetables. Also, pigs and native chickens are also raised in the area that is mostly backyard.

In the most recent Zoning Plan and Ordinance from the Tuguegarao City Planning Office as well as by the City Officials, the barangay is one of the 12 identified agricultural zones in the city. But due to observations of advantages from flooding and impacts of typhoon to the city, Carig Norte is eyed to be a residential area for the developers, since it has a higher elevation and has lesser vulnerability of damages brought about by typhoons compared to other barangays in the city.

The basic information gathered from the respondents (**Table 1)** are the demographics on age, gender distribution and number of children. The average age of respondents is 51 ± 9.51 years old and 59.26% of them are male and 40.74% are female.

The number of children is beneficial to the farmers since they are primary source of labour especially to those farmers who do not hire laborers. The farmers who employ their children to farm works comprised of 18.52% of the respondents.

Based on collected data for social components, the respondents are mostly educated or have been into formal education. Aside from being a farmer, they are also wage and salary earners ranging from blue collar jobs to white

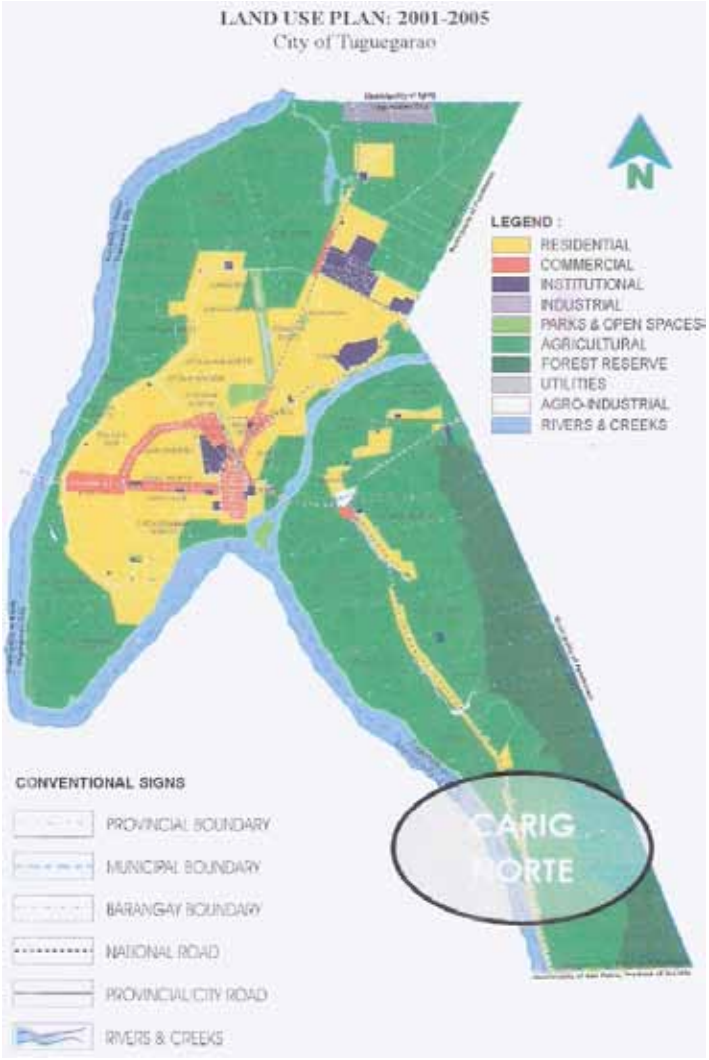

Figure 3. Land use of Tuguegarao City.

collar jobs such as carpentry, academe, public servant and multi-enterprise owner (**Table 2**).

The respondents were also asked to assess their current access to basic social services available in the city. The highly rated social service is Clean and Potable Water Services, which is rendered by Metro Tuguegarao Water District. Also, the listed total social services rate is weighted as quite accessible from the total assessment rate of 3.31. The inclusion of these rating is highly responsible to our interpolation of the kind of resources available to farmers' and farm needs.

More than 50% of the respondents are members of the organization. According to the City Agriculturist's Office, the association that was organized was through the extension services of the said office. It is officially labelled on their records as Barangay Agriculture and Fisheries Council (BAFC), which was implemented thru the City Agricultural and Fisheries Modernization Program. But in the process of cross-checking of the information about their affiliation to BAFC, the respondents still do not associate themselves as member of BAFC. There might have been an effect of the

presence of the representative of the CAO to the affiliation of the respondents to their respective organizations initiated by the office (**Table 3**).

Also, the respondents listed the incentives or advantages of being member of the organized associations.

Table 1. Social demographics of the respondents.

| **Basic information** | |
|---|---|
| *Age* | |
| Average | 50.8 -51 years old |
| Minimum | 33 years old |
| Maximum | 73 years old |
| *Gender Distribution* | |
| Male | 16 (59.36%) |
| Female | 11 (40.74%) |
| *only one is single (M, 50) | |
| *Children* | |
| Average | -4 children |
| Minimum | 0 |
| Maximum | 7 children |
| *most of their children have undergone formal education | |

Table 2. Educational background and social service assessment.

| **Social components** | |
|---|---|
| *Educational background* | |
| No formal education | 1 (3.70%) |
| Elementary level | 6 (22.22%) |
| Elementary graduate | 8 (29.63%) |
| High school level | 9 (33.33%) |
| College level | 1 (3.70%) |
| College graduate | 2 (7.41%) |
| *Assessment of basic social services* | |
| Education | 3.29 (QA) |
| Housing | 2.93 (QA) |
| Health care services | 3.19 (QA) |
| Price control on basic goods | 2.93 (QA) |
| Electricity | 3.56 (QA) |
| Technology/communication | 3.30 (QA) |
| Clean and potable wtaer | 3.93 (A) |
| Calamity safety/aid | 2.89 (QA) |
| Food | 3.81 (A) |
| *Total assessment* | 3.31 (QA) |

Legend: (1) incapable; (2) not accessible; (3) quite accessible (4) Accessible; (5) very accessible

Table 3. Social relations and organizational impacts.

| **Social Relations** | |
|---|---|
| *Organization member* | |
| Yes | 16 (59.26%) |
| No | 11 (40.74%) |
| *Organization*: farmer's group; barangay council and barangay agriculture and fisheries council | |
| Organization Incentives: tractor rental services, seminar and accessible government projects (seeds, fertilizers and other forms of dole-outs) | |

The incentives are highly focused on mechanization thru tractor rentals and subsidies thru the form of seed and fertilizer incentives.

The average monthly income of farmers is PhP 5,163.00. The farmer with lowest income is due to the source of income is only from the farm and no additional non-farm activities. The farmer with the highest income (PhP 26,000.00) is caused by non-farm activities and additional enterprise he owns. Such enterprises are apartment rental, carinderia and monthly allowance as barangay captain.

The respondents were also asked to list their monthly expenses. As an observation, the farm income and wage or salary is high. This is due to the farmers' attitude of not recording their farm expenditures and returns, as well as their personal or family expenditures. They can't keep track of the income generated from the farm or even the income from the non-farm activities thus not knowing the money used in spending (**Table 4**).

Most of spending, for farm production, were to purchase quality seeds, fertilizers and pesticides. Quality seeds are not being bought every planting season, usually they reuse them as planting materials, up to the 3rd generation, which resulted to low farm production.

The farmers are highly dependent on synthetic fertilizers and are not encourage finding alternatives. This is due to the effort of marketing strategies of fertilizer companies selling at farms. Pesticides are rampantly used in the barangay and use at cocktail formulas. The reason behind not finding alternative to pesticides and fertilizers is the quick solution or fix to the problems in the farm.

The farming system in Barangay Carig Norte generally has a farm-to-home-to-market scheme. This means that farm, home and family are tightly associated and directly influence the farm activities. The farms are generally for the purpose of partly commercial and partly subsistence. Their types of production are generally crop and crop and livestock/poultry, which produce rice, corn, vegetables, swine and chicken (**Table 5**).

Based from the diagram (**Figure 4**), rice is cultivated typically through land preparation, fertilization and pesticide management in the period, as indicated in the illustration, and harvested. The cropping pattern also indicates that the production of rice is highly dependent on rain. Corn is similar with rice in terms of maintenance and management.

Vegetable, wine and poultry production are available all year round. The maintenance of swine is primarily done by buying and/ or acquiring of piglets from stock or from other source; the piglets are now fattened and later be sold.

Table 4. The economic realms of the respondents.

| | |
|---|---|
| *Plans before spending* | |
| Yes | 8 (29.63%) |
| No | 10 (37.04%) |
| Sometimes | 9 (33.33%) |
| *Income* | |
| Average | PhP 5,163.00 |
| Minimum | PhP 2,000.00 |
| Maximum | PhP 26.000.00 |
| *Expenses* | |
| Average | PhP 3,935.00 |
| Minimum | PhP 1,800.00 |
| Maximum | PhP 10,500.00 |
| *Savings* | |
| Average | PhP 1,228.00 |
| Minimum | PhP 150.00 |
| Maximum | PhP 15,500.00 |

Table 5. The commodities produced by the farmers.

| **Products** | |
|---|---|
| *Rice* | |
| Average | PhP 1,333.33 |
| Total | PhP 36,000.00 assumption PhP 9.00 $kg^{-1}$ |
| *Corn* | |
| Average | PhP 7,122.22 |
| Total | PhP 192,300.00 assumption PhP 8.00 $kg^{-1}$ |
| *Vegetables* | |
| Average | PhP 851.85 |
| Total | PhP 23,000.00 |
| *Pig* | |
| Average | PhP 2,911.11 |
| Total | PhP 78,600.00 assumption PhP 4,800 $head^{-1}$ |
| *Chicken* | |
| Average | PhP 681.48 |
| Total | 18,400.00 assumption PhP 80.00 $head^{-1}$ |

While, the poultry production at backyard level, same as swine, is just fed with corn grits and freely grazing at farms or farmers' home. The eggs produced by these native chickens are not utilized to perpetuate its production (**Table 6**).

It was also found out that there are external interventions that influence farm productions like climate change. Barangay Carig Norte experiences Type II climate wherein there are longer pronounced dry season and light rainy season, based on DOST-PAGASA Climate Type Chart. In addition to the records, farmers observed the increase in temperature because of the faster rate of wilting in plants and the drying-up of some body of waters (like creeks and rivers) near their farms. The respondents also reported that based in the intensity of typhoon resulted to the prolonged and high quantity of precipitation. This was observed by the overflowing of rivers and creeks causing the drowning of their farms and houses.

Table 6. The farming systems of production.

| | |
|---|---|
| **Tenure** | |
| *Owned* | 2.68 ha |
| Average | 9.42 ha |
| Total | |
| *Tenant* | |
| Average | 1.09 ha |
| Total | 26.1 ha |
| *Farm inputs*: fertilizer, seeds, pesticides, labor | |
| *Machinery*: rented tractor, plow and carabao | |
| **Labor** | |
| *Paid labor* | |
| PhP 150.00 $day^{-1}$ | 14.81% |
| Php 120.00 $day^{-1}$ | 66.67% |
| *Family members* | |
| PhP 000.00 $day^{-1}$ | 18.52% |
| **External intervention** | |
| The local government thru the City Agricultural office is one of the direct intervening factors of the farners, which hel them in the acquisition of free farm inputs. | |
| **Production (Average)** | |
| Rice | 4,000 kg |
| Corn | 24,037.50 kg |
| Vegetable | no parameter |
| Pig | 16.38 heads |
| Chicken | 230 heads |

Carig Norte has two soil types namely 570-Carig Clay Loam and 571-Carig Loam. Carig Clay Loam has a scope of 46,405.52 ha in the two barangays of Carig (Carig Sur and Carig Norte) as well as near municipalities such as Baggao, Iguig, Lal-lo, Gattaran and Lasam, while Carig Loam has only as scope of 5, 527.72 ha and can also be found in some parts of Gattaran. Carig Soils are most excessively eroded soils in the province, with Faraon soils, where all of the surface and subsoil to part of the substratum were already removed (**Table 7** and **Table 8**).

It was found out that 63% of the farmers do not have an idea about climate change. Respondents who knew about climate change were informed thru local farmers' seminars and television. It is important to know if farmers are knowledgeable about climate change to clearly consider the real objectives of the farmers that are based on their actual needs and experience. (**Table 9**).

The opportunity to explain climate change was done to let them identify and list their observations of climate change on their farm. Also, they have propositions of probable policies for climate change, which are irrigation systems (1st in rank), training and seminar about climate change and adaptation measures (2nd in rank) and cheaper tractor rental services, which can directly influence farmers' productions (3rd in rank). The propositions are almost the same to different farmers. The propositions were tallied and ranked.

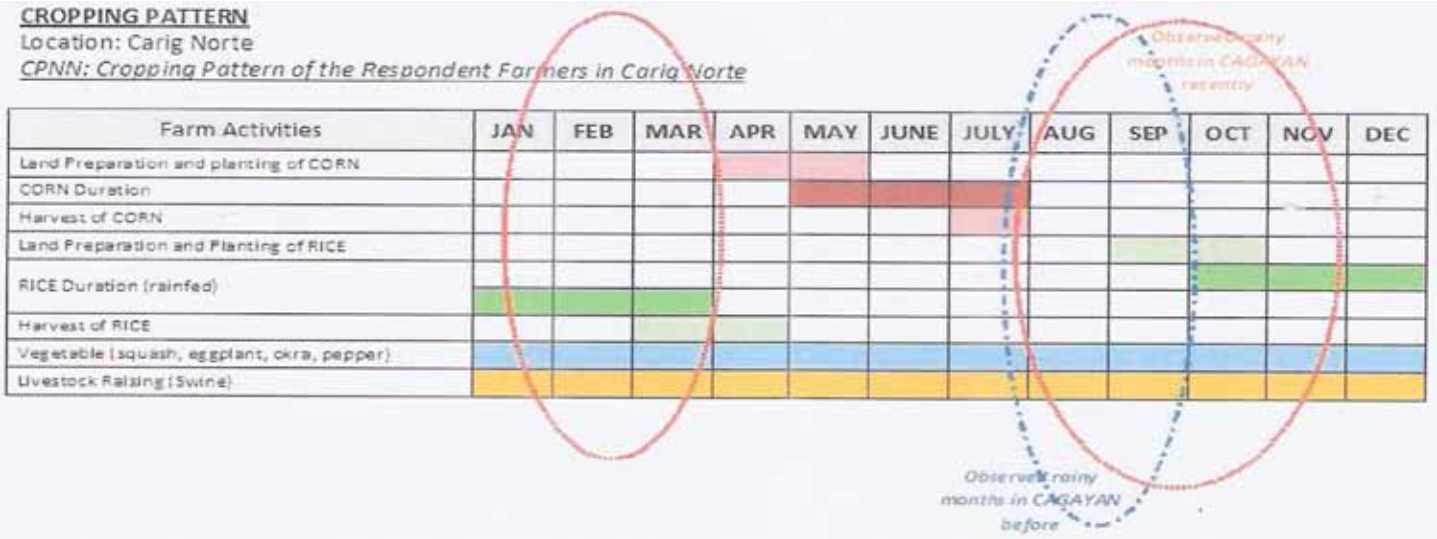


Figure 4. Cropping patterns of the farmers in Bagangay Carig Norte, Tuguegarao City.

Table 7. Soil characteristics of Barangay Carig Norte, Tuguegarao City.

| Soil type no. | Soil type | Parent material | General relief | Drainage | | Present use/ vegetation | other soil characteristics |
|---|---|---|---|---|---|---|---|
| | | | | External | Internal | | |
| 570 | Carig Clay Loam | shale and sandstone | undulating and rolling to hilly | fair to good | poor | upland rice | (0-25 cm) fine granular, slightly sticky when wet and hard when dry, rich in organic matter, plant roots penetrate at case; (26-75 cm) clay to heavy clay, columnar and compact; (75-150 cm) clay, heacy, light yellowish brown, fine granular. plastic when wet, fine iron concretions |
| 571 | Carig Loam | | | | | vegetables, fruit trees, grass, secondary forest | 15-20 cm deep, granular loose and friable and has a fair amount of organic matter |

Table 8. Soil chemical analysis of Brangay Carig Norte, Tuguegarao City.

| Soil type | pH value | Available constituents in parts per million (ppm) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | $NH_4$ | $NO_3$ | P | K | Ca | Mg | Mn | Fe |
| Carig Loam | 5.30 | 10 | trace | 7 | 118 | 3500 | 690 | 22 | 4 |
| Carig Clay Loam | 5.58 | 15 | trace | 12 | 140 | 5900 | 800 | 39 | 9 |

Table 9. Climate change policies and propositions.

| Climate change | |
|---|---|
| *Idea about climate change?* | |
| Yes | 10 (37.04%) |
| No | 17 (62.96%) |
| *Proposition to climate change* | |
| Irrigation systems | 19 (70.37%) |
| Training and seminar | 4 (14.81%) |
| Tractor Rental Services | 4 (14.81%) |

Irrigation has been a project of the local government in the area. The reason why the farmers brought out the need for this aid is because their irrigation systems have been dried up. The effect of low production is due to the loss of water supply, harshly experienced especially by the farms at the remote areas. The city resolutions on the free use of water pumps and fuel allowances to the farmers of the whole of Tuguegarao City were passed partly to mitigate the effects of drought brought about the change in climate conditions. However, when the respondents were asked if the resolutions were implemented, only the barangay captain claimed that he was the recipient of the said aid.

Training and seminar about climate change and adaptation measures were suggested resolutions by the farmers. Although, the CAO claims that there were initiatives of the government about seminars on climate change, the farmers see the seminars as too technical for them and they cannot create their own mechanisms for adaptation. One farmer also suggested that there should be an effort by the local government to help the farmers shift their conventional farming to organic farming but the efforts failed since the farmers said that they need immediate solutions on pest infestations

rather than pursuing organic farming first.

Cheaper tractor rental has been also raised as a resolution for their farm production. Farmers saw the need for tractor because their soils have the characteristic of being sticky when wet and too hard when dry.

The farmers complained on the pace and the beneficiaries of the delivery and implementation of some governmental projects and support-policies. It was observed that the respondents who are barangay officials were the primary beneficiary of the projects. Also, some of the farmers do associate themselves in some of the organizations established by CAO. The basis of their affiliation was their being beneficiary of certain dole-outs or support.

There are immediate cross checking done during the interview about the CAO's and local government's projects towards agricultural development. The researchers found out that the projects' thrust are towards the distribution of dole-out rather than empowerment and improvement of capacities. But still, the dole-outs of quality seeds, fertilizers and even feeds are not fairly distributed to the farmers. Agricultural projects in the site ends after the distribution of the dole-outs. According to respondents, seminars are attended because there are freebies or promised support at the end of the seminar.

## SUMMARY, CONCLUSION AND IMPLICATIONS

The research was created to determine the impacts of climate change support-policy, towards climate change adaptation and mitigation, to farmers in Barangay Carig Norte, Tuguegarao City. There are listing of the local government support-policies thru city resolutions and agricultural projects. The following were: City Resolution 029-2010, which permits the farmers the free use of irrigation pump set; City Resolution 030-2010, which is aimed to give fuel allowances to farmers who will be using the irrigation pump set; Climate Change and Disaster Risk Reduction Management Office establishment (CCDRRMO), which will not only respond to effects of calamities but also mitigate effects of climate change; Adoption of the Philippine Crop Insurance Corporation's (PCIC) weather index-based insurance; and, Adaption and implementation of the Republic Act 1012 or the People's Survival Fund Law that will guarantee sourcing out of funds to augment local governments units' (LGU) capabilities for disaster riskeduction and climate change mitigation and adaptation.

The support-policies created and implemented by local government are aimed towards supporting the farmers and the key players in the agricultural sectors. But those listed were fragmented solutions to the effects of climate change.

From the questionnaire, the respondents' basic information, assessment of the basic social services, economic condition, farming systems, and support-policies were gathered.

In general, due to the fragmentation of government support policies and its mal-implementation there were no fair effects of climate change support-policies on the socio-economic and farming systems conditions of the respondents. Selection of beneficiaries was based on the affinity or personal attachment to local powers and authorities, respectively.

Although it was found out that all of the respondents are beneficiaries of agricultural inputs from dole-outs, there is a gradation of its accessibility, such that others receive more and others receive less or worst, none. It was also observed from the respondents that the more they are economically empowered, the more they have access to support-policies from the government. This was not yet proven by any statistical analysis but was derived from the trends of data collected.

The fragmented support policies is caused by the not considering climate change as a priority issue of the national government, according to SEARCA's *Climate Change Policy Review* (*2007*). Not letting it as a priority issue affects lower government prioritization too. The creation of the Climate Change Commission (CCC) seems to be insignificant to its mandate since its activities are not rooted to the regions in the country and does not based its framework on localized studies. The division of work for the CCC by collaborating it with other key agencies in the country seems limited to the mandate of the head commission not giving the chance of creating a new perspectives in seeing solutions towards climate change. The effect of the fragmentation at the national level is also visible in the lower local government's actions. The weak intergovernmental linkages and relationships does not aid in the resolution of climate change in the country.

The improper implementation of the government support-policies and projects is due to the downscaled protocol adopted by the local governments. Due to adoption of protocols, the policies, projects and activities are not tailored to the needs of the area thus giving them a hard time in the implementation and the effects may seem insignificant to the beneficiaries. The implication of the adoption not adapted to the areas or beneficiaries are time and financially consuming.

## RECOMMENDATIONS

### For the Study

The research can be further studied by the use of participatory methods and tools in data collection. By this

way, aside from introducing the farmers a new way of laying information, the farmers can be vocal to their current condition thus important to the development of the policy and project creation.

The research can also focus only on the listings of the different government support policies and crosscheck them to farmers in the different barangays in Tuguegarao City.

Also, the utilization of statistic tools that can help quantify the relationships, significance and variation of the dependent and independent variables.

**For the Agricultural City Development**

If only there is the stakeholders' participation in the creation, legislation, implementation and evaluation of the support policies, the effect would be meaningful. This could be started by including the stakeholders or head of different farming groups in the identification of problems, planning and implementation, monitoring and evaluation of support services for the farmers for climate change adaptation and mitigation. As observed in the CAO projects, the projects being implemented by the CAO was pushed by the fad commodity and available funding that will support its implementation. Such projects are creation of cacao industry by encouraging farmers to grow cacao, the FLEs that are still handled by the agriculture office and vermi-composting that are fad in the shift of conventional to organic agriculture.

The City Agriculturist's Office as well as the City Planning and Development Office should learn how to empower their constituents by employing the principle of participation and collaboration, then effective and efficient projects can be created. By starting at the grassroots level of knowing what their true problems are, knowing what they have and knowing what they need to learn, project or policy created and implemented need not to be a dole-out. The city development agents should focus on genuine capacity building that result to self management.

Also, ordinances implemented should be based on national policies adapted to local conditions with proper accounting of resources with participation from the grassroots.

The local government should address the following since it has been a problem in the study at the same time basis for developmental projects:

A. Create a database of updated actual facts and figures in the agricultural sector;
B. Facilitate the creation of farmer's organization;
C. Create projects based on farmers' objective situation;
D. Involve the stakeholders on legislation; and
E. Prioritize climate change as an issue.

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