RESEARCH PAPER

Impact Assessment of the Flood Victims of Super Typhoon Ulysses in the Municipalities of Alcala and Gattaran, Cagayan, Philippines

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Abstract

The study was conducted at the Municipality of Alcala and Gattaran, Cagayan, Philippines, from January 2021 to December 2021 to assess the impact of megafloods caused by Typhoon Ulysses. The study employed a quantitative descriptive research approach with four hundred fifty (450) respondents drawn at random from each town. It sought to determine the sociodemographic and socioeconomic statuses of flood victims. The data were analyzed using statistical tools that were readily available. Results show that the damage assessment of typhoon Ulysses in agricultural crops, high-value commercial crops, poultry and livestock, infrastructure and fisheries in the Municipality of Alcala has a total amount of P56,298,000.00 and a total amount of P349,003,500.00 in the Municipality of Gattaran, Cagayan. A total of 6,565 families were affected in Alcala and 3,228 families in Gattaran, Cagayan, with six people drowned and electrocuted. The majority of respondents are male, aged 40-50, married, Ilokano, with elementary and higher education, and belong to a nuclear family. The result of the study shows that most families affected by typhoon Ulysses were caused by the 3 meters and above level of water and this also caused severe trauma in the community which was affected their source of income. Thus, the Municipality of Alcala and Gattaran is vulnerable to flooding and drought that bring the farmers earned low and acquired a low production in the agricultural sector. Furthermore, the results served as the baseline information for the agricultural extension workers to introduce appropriate actions and technology to be disseminated.

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Introduction

Typhoons are disasters with broad impacts worldwide. The worldwide frequency of severe meteorological disasters and the extent of loss caused by these disasters have increased significantly. Apart from flood disasters, typhoon disasters cause the largest economic losses and casualties in the world. (https://reliefweb.int/files/resources/2020%20Global%20Natural%20Disaster%20Assessment%20Report-EN%282%29).

On the other hand, CSU at Lallo known as one of the agricultural campuses in the university mandated to perform its thrusts, namely Instruction, Research, Extension and Production to implement the Extension Services in the community, the collaborative efforts with the Department of Science and Technology - Region II (DOST-RO II) to support the national initiatives to combat the effects of climate change such as strong typhoons. The social, economic and environmental impacts of climate change by enhancing the resiliency and adaptive capacities of the social and natural ecosystem through the use of technologies to promote environmental conservation and rehabilitation. It provides S & T-based interventions to prevent or prepare for climate and environment-related emergencies and hazards. Thus, extension programs/ projects serve as the transmission of the national directives to rural areas towards community development. Furthermore, the study aims to conduct a damage assessment and profile families affected by typhoon Ulysses; and determine their problems encountered and suggest coping mechanisms to survive during the typhoon.

Materials and methods

Research design

The study was conducted at the Municipality of Alcala and Gattaran, Cagayan. The barangay involved were: Naddungan, Barbarit, Ganzano, Nagatuan, Sidem, Tubungan Este, Dummun, Mabuno, and Sta. Ana, Gattaran and Pagbangkeruan, Alcala, Cagayan, which were severely affected by the megaflood caused by typhoon Ulysses. Data were collected with a structured questionnaire largely comprising of close-ended questions. The collected data were computed and analyzed to get the mean, standard deviation, and percentage.

Research Instruments

One (1) research instrument was used to gather the needed data. The Questionnaire consisted of three parts. Part I contain the damage assessment of flood victims/beneficiaries. Part II elicited the sociodemographic profile of the respondents, including age, sex, civil status, ethnicity, religion, and highest educational attainment; part III elicited the socioeconomic profile of the respondents such as occupation, family type, homeownership and condition, tenurial status, area cultivated, estimated net sales, highest income commodity, number of the cropping season. Part IV contains the problems encountered by the beneficiaries and its suggested solution during the said typhoon, also included were the sources of information and means of communication for rescue. Assessment of typhoon effects, depth of floodwater, damaged crops and area, estimated amount of crop, animals, houses, vehicles and machinery damaged and others.

Data gathering procedures

The profiling was conducted with the assistance of Municipal Agriculture Office and Municipal Social Welfare and Development Office and Municipal Disarter Risk and Reduction Management Council of the Local Government Unit of Gattaran and Alcala, Cagayan and barangay officials of Naddungan, Barbarit, Ganzano, Nagatuan, Sidem, Tubungan Este, Dummun, Mabuno, and Sta. Ana, Gattaran, Cagayan and Pagbangkeruan, Alcala, Cagayan.

The gathering of data was done by the campus project team of Cagayan State University Lal-lo, Cagayan, particularly faculty researchers and extensionists. Face-to-face interviews among the project team were done following the minimum Inter-Agency Task Force protocols such as maintaining social distancing, wearing a face mask and face shield, conducting in a wide area as well as alcohol, hand sanitizer, soap and washing area were always available in the area.

During the gathering phase, Four hundred fifty (450) flood victims (200 from Alcala and 250 from Gattaran, Cagayan) were selected and identified as respondents and interviewed. These respondents were severely affected by the megaflood caused by typhoon Ulysses. The campus project in charge took responsibility for monitoring the project team, ensuring that the data collected were valid and reliable. The venue of the profiling/interview took place in their barangay gymnasium.

Data analysis
Data were encoded in the EXCEL file to have ease in data encoding, cleaning, and manipulation. After data cleaning, the file was imported into the Statistical Package for Social Sciences software. To categorize and describe the group, frequency count, mean, standard deviation and percentage were computed.

Results and discussion
Damage assessment report of the municipality of Gattaran
Table 1 shows the damage assessment report of the Municipality of Gattaran and Alcala, Cagayan. Agricultural crops were reported to be heavily damaged with 4,012 hectares affected planted with

rice (inbred and hybrid) and corn, followed by the infrastructure with 38,000,000.00 costs of damage along its roads, bridges, school buildings and others. Unfortunately, there were two (2) casualties caused by drowning due to the typhoon Ulysses. And a total of 3,228 families with 10,106 individuals residing in the low-lying areas of the Cagayan River basin; thus, these are the recorded evacuees. No disease and other flood-related risks were reported since the MDRRMO of the locality were at heightened alert during typhoon Ulysses and the immediate needs of the evacuees were responded to by the Local Government Unit.

Sociodemographic profile of flood victims
Table 3 shows the personal information of the flood victims respondents of the Municipality of Gattaran and Alcala, Cagayan. From the four hundred fifty respondents, 250 or 55.60% of the beneficiaries are from Pagbangkeruan, Alcala, Cagayan and the others is from Baranagay Naddunan, Barbarit, Ganzano, Nagatuan, Sidem, Tubungan Este, Dummun, Mabuno, and Sta. Ana, Gattaran, Cagayan. As seen in the table below, the respondents' age mostly from 41-50 (22.00%) and 51-60 (20.00%) with an average age of 47.47 %.

Table 1. Damage assessment report in the municipality of Gattaran and Alcala Cagayan.

Indicator	Area Damaged (in ha) Municipality of Gattaran	Assessed Damage (in Peso Value) Municipality of Alcala
Agricultural Crops (Rice, & Corn)	309,868,000.00	42,658,000.00
Poultry & Livestock	1,135,500.00	1,007.486.00
High value crops (fruits and vegetables)	-	7,800,000.00
Infrastructure	38,000,000.00	4,950,000.00
Fisheries	-	890,000.00
Total	349,003,500.00	56,298,000.00

The aged results of the Ulysses typhoon beneficiaries are similarly the same as the vegetable farmers' results of M. Fernandez, 2021 in her study at San Mariano, Lal-lo, Cagayan, wherein their years of farming experience are essential in agricultural market participation (Ramoroka, 2012). In terms of their gender, the respondents are male-dominated with a total of 323 or 71. 80.00% while female are 127

or 28.20 %. Moreover, the respondents are mostly Roman Catholic, with a total of 399 or 88.90%, while the others are believers of Pentecost, Seventh Day Adventist, Iglesia ni Cristo (INC), Mormons, and etc. The results show that majority of them are Ilocano with a total of 444 or 98.90%, followed by Tagalog with a total of 4 or 0.9% and Capampangan with a total of 2 04 0.4%.

Table 2. Number of casualties, injured and affected families and individual caused by typhoon ulysses.

Indicator	Gattaran	Cause	Alcala	Cause
Number of deaths	2	Drowning	4	Drowning & Electrocution
Number of injuries	0		2	Electrocution
Number of Families Affected	3,228		6,565	
Number of Individuals Affected	10,106		19,011	
Disease and other flood related risks		None of significance		None of significance

The results imply that Ilocano was the most prominent ethnic group in Cagayan (PSA 2000). As to the type of family, most of them belong to the nuclear type of family with total respondents of 364 or 80.8% and 86 or 19.20% are under extended family. As to the size of family and civil status, most of the beneficiaries have 4 members with a total of 117 beneficiaries or 26% and married.

Table 3. Distribution of the respondents in terms of personal information of Reponsdents in municipalities covered.

Variable	Frequency (n=450)	Percentage
Municipality		
Alcala	250	55.6
Gattaran	200	44.4
Age		
20 and Below	3	0.7
21 to 30	77	17.1
31 to 40	85	18.9
41 to 50	99	22.0
51 to 60	90	20.0
61 to 70	55	12.2
71 to 80	33	7.3
81 and Above	8	1.8
Mean=47.47		
Gender		
Male	323	71.8
Female	127	28.2
Religion		
Roman Catholic	399	88.9
Penticos	29	6.5
Seventh Day Adventist	8	1.8
INC	3	0.7
Others (e.g. Mormons, MCGI, etc)	11	2.4
Ethnicity		
Ilocano	444	98.9
Tagalog	4	0.9
Capangpangan	2	0.4
Type of Family		
Nuclear	358	79.7
Extended	86	19.2
No Response	6	1.3
Married	341	75.8
Widow	57	12.7
Single	44	9.8
Separated	8	1.8
Highest Educational Attainment		
Collage Graduate	47	10.4
Collage Undergraduate	32	7.1
ALS Graduate	2	0.4
Vocational Graduate	3	0.7
High School Graduate	30	6.7
High School Undergraduate	115	25.6
Elementary Graduate	147	32.7
Elementary Undergraduate	73	16.2
No Response	1	0.2

The results show that household size plays an important role today, same as through with the results of Baba *et al.* of 2010 and Fernandez *et al.* of 2021, that households are vital in farming as it affects the number of farmers in earning a daily income for family and level of living and married farmers participated mostly in the agriculture sector in order to support their families.

Table 4. Distribution of the respondents in terms of socioeconomic profile.

Variable	Frequency (n=450)	Percentage
Occupation		
Farming	354	78.7
Laborer	72	16.0
Animal Raiser	10	2.2
Vendor	4	0.9
Fisherman	2	0.4
Others (e.g. Carpenter, Construction Worker, etc.)	8	1.8
Organization		
RSBSA	323	71.80
RIC	110	24.40
Agkaykaysa	7	1.6
AWRIC	5	1.1
Others (e.g. IA, SC, TASIKA, etc.)	5	1.1
Position in the Organization		
Member	449	99.8
Treasurer	1	0.2
Year Joined		
Before 2000	3	0.7
2000 to 2004	5	1.1
2005 to 2009	5	1.1
2010 to 2014	11	2.4
2015 to 2019	399	88.7
2020 to Present	15	3.3
No Response	12	2.7
Level		
National	357	79.3
Regional	48	10.7
Local	45	10.0
Home Ownership		
Owned	368	81.8
Staying with Parents/ Relatives	74	16.4
Occupying for Free	8	1.8
Home Condition		
Combination of concrete and wood	176	39.1
Concrete	144	32
Combination of wood and light materials	39	8.7
Combination of concrete and light materials	49	10.9
Light Materials	42	9.3
Source of Income		
Crop Production	355	78.9
Laborer	71	15.8
Animal Production	10	2.2
Vendor	4	0.9
Others (e.g. carpenter, construction worker, etc.)	5	1.1
No Response	5	1.1
Area Cultivated (in ha)		
0.5 and Below	141	31.2
0.6 to 1	63	14.0
1.1 to 1.5	18	4.0
1.6 to 2	15	3.3
2.1 to 2.5	7	1.6
2.6 to 3	5	1.1
3.1 and Above	18	4.0
No Response	183	40.8
Volume of Production		
1000 and Below	65	14.4

1001 to 2000	58	12.9
2001 to 3000	39	8.7
3001 to 4000	23	5.1
4001 to 5000	22	4.9
Above 5000	57	12.7
No Response	186	41.3
Amount of Income per Harvest		
5,000 and Below	41	9.1
5,001 to 10,000	86	19.1
10,001 to 15,000	36	8.0
15,001 to 20,000	29	6.4
20,001 to 25,000	12	2.7
25,001 to 30,000	12	2.7
More than 30,000	49	10.9
No Response	185	41.1
Frequency of Harvest/ Year		
1	7	1.6
2	253	56.2
3	1	0.2
No Response	189	42
Tenurial Status		
Tenant	175	38.9
Owner	73	16.2
Owner and Tenant	8	1.8
Leaseholder	6	1.3
Laborer	2	0.4
No Response	186	41.3

Furthermore, of the 450 respondents, a total of 147 or 32.70% were elementary graduate, followed by High school undergraduate with a total of 115 or 25.6%, elementary undergraduate with a total of 73 or 16.2%, college graduates with a total of 47 or 10.4%, college undergraduate with a total of 32 or 7.1%, high school graduate with a total of 30 or 6.7%, and the least were vocational graduate and ALS graduate with a total of 3 or 0.7% respectively.

Socioeconomic profile of affected beneficiaries
Table 4 shows the socioeconomic profile of the beneficiaries as victims caused by typhoon Ulysses. Under occupation, farming has dominated a portion of the respondents with a total of 354 or 78.7 %, followed by laborer with a total of 72 or 16.0%, animal raiser with a total of 10 or 2.2%, a carpenter with a total of 8 or 1.80%, construction workers and others, with a total of 8 or 0.90%, vendors with a total of 4 or 0.9% and the least are fisherman with a total of 2 or 0.4% respectively.

As to the involvement in the organization of the community, out of 450 farmer-beneficiaries 323 (71.80%) of them are registered in the Registry System for Basic Sectors in Agriculture (RSBSA), 110 or 24.40% joined in Rural Improvement Club, 7(1.6%) involved in Agkaykaysa Organization, 5 (1.1%) Alcala Women -Rural Improvement Club (AWRIC), and 5 (1.1%) are other groups of organization of the locality. And the majority of the beneficiaries are a member of the organization and joined the national organization in the year 2015-2019 with a total of 88.70% (399 farmers). As to the homeowners of the beneficiaries, 368 or 81.80% are owners of the house, some stay on the side of their parents with a total of 74 or 16.40%, and also occupy the house for free with a total of 8 or 1.80%. Their houses were mostly made in a combination of concrete and wood materials with a total of 176 or 39.10%, while 42 or 9.30% of them used light materials. As to their source of income, beneficiaries were engaged in crop production with a total of 355 or 78.90 %.

The results imply that the Municipality of Alcala and Gattaran are mostly engaged in the agricultural sector, especially in cultivating vegetables and other high-value crops. This was proved with the data reported by the Department of Agriculture Regional Field Office 02 dated June 2021, and they had a cultivated area averaging 0.5 ha with a total of 141 or 31. 20%.

Table 5. Distribution of the respondents in terms of information, effects and damages of typhoon Ulysses mega flooding.

Variable	Frequency (n=450)	Percentage
Sources of Typhoon Information		
Radio	263	58.6
Television	256	57.0
Municipal/ barangay announcement	96	21.4
Social media	87	19.4
Text messages	53	11.8
Early warning device	18	4.0
Means of Communication for Rescue Operations		
Cellphone	380	84.4
Barangay Officials	53	11.8
Relatives	2	0.4
No response	15	3.3
Assessment of Typhoon Effects		
Severe	412	91.6
Manageable	34	7.5
No Response	4	0.9
Depth of Flood Water (in feet)		
Less than 1	2	0.4
1	123	27.3
2	110	24.4
3	126	28
4	3	0.7
5 and Above	5	1.1
No Response	81	18
Damaged Crops		
Rice	100	22.2
Corn	27	6.0
Rice and corn	5	1.1
Banana	1	0.2
Rice and vegetables	1	0.2
Fruit trees	1	0.2
Not Applicable	305	67.8
No Response	10	2.2
Crop Area Damaged		
Less than 0.5	33	7.3
0.5 to 1	71	15.9
1.1 to 1.5	6	1.3
1.6 to 2	9	2.0
2.1 to 2.5	6	1.3
2.6 to 3	4	0.9
3.1 and Above	5	1.1
Not Applicable	305	67.8

No response	11	2.4
Estimated Amount of Crop Damaged (in peso)		
Less than 10,000	22	4.9
10,000 to 19,999	38	8.4
20,000 to 29,999	13	2.9
30,000 to 39,999	13	2.9
40,000 to 49,999	15	3.3
50,000 and Above	28	6.2
Not Applicable	309	68.7
No Response	12	2.7
Animals (Number of Deaths)		
1 to 5	15	3.3
6 to 10	3	0.8
11 to 15	2	0.4
16 to 20	1	0.2
More than 20	1	0.2
Not Applicable	382	84.9
No Response	46	10.2
Animals (Died)		
Chicken	81	18.0
Duck	16	3.6
Goat	12	2.7
Carabao	5	1.1
Cow	4	0.9
Turkey	4	0.9
Sheep	2	0.4
Pig	2	0.4
Horse	1	0.2
Animals (Estimated Amount Damaged in Peso)		
Less than 1000	6	1.3
1,000 to 4,999	13	2.9
5,000 to 9,999	5	1.1
10,000 to 14,999	1	0.2
15,000 to 19,999	2	0.4
20,000 and Above	3	0.7
No Response	420	93.4
House (Estimated Amount of Damaged/ Loss in Peso)		
1,000 and Below	7	1.6
1,001 to 1,500	19	4.2
1,501 to 2,000	12	2.7
2,001 to 2,500	13	2.8
2,501 to 3,000	7	1.6
3,001 to 3,500	7	1.6
3,501 and Above	4	0.9
No Response	381	84.6

Housing Unit (Damaged)		
Utensils	9	2.0
Appliances	12	2.7
Clothing	18	4.0
No Response	411	91.3
Vehicles and Machineries (Estimated Damage/ Loss in Peso)		
Less than 1,000	1	0.2
1,000 to 1,499	3	0.7
1,500 to 1,999	5	1.1
2,000 to 2,499	1	0.2
2,500 and Above	3	0.7
No Response	437	97.1
Vehicles and Machineries (Damaged)		
Motorcycle	7	1.6
Tractor	5	1.1
Tricycle	1	0.2
No Response	437	97.1
Health Related Effect		
Trauma	399	88.6
Illness	12	2.7
No Response	39	8.7
Sufficiency of Foods and Other Basic Needs		
Sufficient	419	93.3
Insufficient	17	3.6
No Response	14	3.1

In terms of volume of their production, unluckily, the respondents didn't respond with their volume of production and amount of income per harvest due to the reason that they were not able to record it because of the typhoon Ulysses hit the Province.

Thus, most of them only experienced 2 cropping seasons with a total of 253 or 56.20% and tenants with a total of 175 or 38.9%, respectively.

Problems encountered and suggested solution
Table 5 shows the problems encountered and suggested solutions by the respondents. As the typhoon Ulysses landfall in the Province, the respondents were able to generate the information through the aid of radio with a total of 263 or 58.60%, followed by the use of television with a total of 256 or 57% and the majority of them used their cellphones with a total of 380 or 84.40%. As to the degree of the effects of typhoon caused by Typhoon Ulysses, it shows that 412 or 91.60% of them experienced severe effects which were prevailed in the report last November 2020 that was caused by flash floods in most parts of Cagayan Valley wherein the depth of water was measured 3 meters and above.

Hence, the typhoon has severely affected the crops of the beneficiaries, mostly rice with a total of 100 or 22.20%, followed by corn with a total of 27 or 6% and other crops, and luckily, only a few were recorded having casualty animals. As to the losses due to flash floods, data showed that their clothes and other basic

necessities were run away with the water along the Cagayan River. Most of them saved some of their kitchen utensils, but they did not respond to the vehicles and machinery because most of them had no vehicles and machinery. Moreover, the typhoon caused trauma to the respondents with a total of 88.60% and illness with a total of 2.70% and some did not respond because they believed that they were still lucky because they had managed themselves. Furthermore, results showed that the majority of the victims/respondents were able to receive relief goods and other basic needs from other agencies, even in non-government and private sectors, with a total of 93.30% and still had also responded to insufficient needs with a total of 3.60% and there are still abstain with a total of 3.1 % respectively.

Conclusion

The result of the study shows that most families in the Municipality of Alcala and Gattaran were affected by typhoon Ulysses which was caused by the 3 meters and above level of water and this also caused severe trauma in the community which was affected their source of income for their daily needs in the family. The typhoon Ulysses was recorded as one of the deadliest typhoon in the Philippines in the year 2020. Thus, the Municipality of Alcala and Gattaran is vulnerable with flooding and drought that bring the farmers earned low and acquired a low production in the agricultural sector which may affect the status of living of the farmers. The results revealed the advantages and disadvantages of the country's typhoon coping capacity. Hence, there must need to have intervention toward victims of typhoon such as the Typhoon Ulysses in order to adapt and mitigate such natural scenarios or calamities to withstand their own capability. Therefore, the results served as the baseline information for the agricultural extension workers to introduce appropriate actions and technology to be disseminated.

Recommendation

Based on the study conducted, there must an immediate action must be taken toward fast recovery with the effect of typhoon ulysses, such as the provision of start inputs for farmers to their farming activities, capacity building on technical know-how to address the productivity and increase income towards sustainable agriculture, mitigation strategies in climate change, and as well as to nourish their psychological aspects in order to be resilient individuals.

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