Household shocks and coping mechanisms in Camiguin Province, Philippines

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Abstract. Island’s vulnerability is anchored towards stewardship to accommodate environmental conservation and economic activity. Vulnerability poses risk and uncertainty of island households. Household as an important entity plays a role for island development. This study aimed to identify the profile of rural households, evaluate the shocks as well as coping mechanisms employed by the rural households. Stratified random sampling was undertaken to identify the 377 randomly selected samples from the municipalities of Catarman and Sagay in the province of Camiguin, Philippines. The survey was conducted from February to March 2019. Household’s data collected includes age of the respondent, sex of the respondent, household size, household income in range, educational attainment of respondent, farm size, and tenurial status. Respondents were asked to rank the shocks and risks encountered as well as the coping mechanisms. Data collected were analysed using descriptive statistics. Results revealed that post-harvest losses played a significant role in agricultural shocks while could not buy food due to food price increase as economic shocks. Selling of livestock, land and other assets got the highest rank for mechanisms to cope up with shocks. Improved storage facilities and efficient transport system can be taken into consideration to improve the quality of agricultural products to be marketed inside and outside the island to minimize post-harvest losses.

1. Introduction
Small islands are resource-rich ecosystems however disadvantageous because of its remote location, and proneness to natural disasters [1-2]. On the other hand, human-environment relationship can be evident in small island as it shares interest in terms of environmental conservation, livelihood, and indigeneity [3]. Natural resources serve an important contribution to food and livelihood needs in small islands [4-7].

In the past, few studies were carried out on impacts of various shocks such as weather shocks [8-10], agricultural shocks [11], and economic shocks [12] on households. Majority of these households reside in rural areas such as small island, they are more likely vulnerable to these shocks.

Various mechanisms were employed by rural households to cope up with these shocks. For instance, livestock portfolio has been significant for weather shocks [13]. Some diverse coping strategies to withstand shocks were also employed [9]. For some, they result to selling valuable assets to cope up with shocks [14].

Thus, this study was carried out to identify the profile of rural households in small islands, evaluate shocks as well as their coping mechanisms employed.
2. Materials and methods
This section presents the study area, sampling and collection, and variable selection and analysis.

2.1 Study area
The study was conducted in the municipalities of Sagay and Catarman, Camiguin Philippines and both are fifth class municipalities. Agriculture, fisheries, and tourism are the major livelihoods in the area. Farming is evident in upland barangays while fishing is evident in lowland areas. Major crops grown include coconut, lanzones and banana.

Sagay has an area of 44.13 square kilometres which comprises of nine barangays while Catarman has an area of 53.75 square kilometres which comprises of fourteen barangays. Figure 1 presents the location of the study area.

![Map of Camiguin Island, Philippines](image)

**Figure 1.** Map of Camiguin Island, Philippines.

2.2 Sampling and collection
Stratified random sampling method has been utilized. Samples of the population were identified using Slovin’s Formula \( n = N/1+Nc^2 \) [15]. A total population (households) of 6,796 were calculated which were from 4,060 households of Catarman and 2,736 households of Sagay [16]. Total samples of 377 were identified which comprise of 220 samples from Catarman and 157 samples from Sagay as presented in Table 1.

| Municipality | Population (households) | Sample |
|--------------|-------------------------|--------|
| Catarman     | 4,060                   | 220    |
| Sagay        | 2,736                   | 157    |
| Total        | 6,796                   | 377    |

The data collection was conducted last February to March 2019 in the said municipalities. Prior to the collection, a letter of consent was provided to the municipal mayors as courtesy to conduct the household survey. Printed questionnaires were provided to the participants (only to the household heads) and were asked to answer. The participants were asked to rank the shocks (agricultural and economic) and coping mechanisms sections of the questionnaire.
2.3 Variable selection and data analysis

Relevant socio-economic variables such as age, sex, civil status, educational attainment, household income, household size, land tenure and farm size were asked from the participants. Data collected were analysed using descriptive statistics.

3. Results and discussion

3.1. Household’s characteristics

A total of 377 households were asked to answer the printed questionnaire. Around 67.9% of the samples belongs to the age group 41-60. It is then followed by samples that age group above 60 years old which comprises of 21.2%. Samples 40 years old and below comprise of 10.9% of the samples.

| Household characteristics          | Frequency | Percentage |
|-----------------------------------|-----------|------------|
| Age group                         |           |            |
| 40 and below                      | 41        | 10.9       |
| 41 to 60                          | 256       | 67.9       |
| Above 60                          | 80        | 21.2       |
| Sex                               |           |            |
| Male                              | 243       | 64.5       |
| Female                            | 134       | 35.5       |
| Civil Status                      |           |            |
| Single                            | 11        | 2.9        |
| Married                           | 338       | 89.7       |
| Widow                             | 28        | 7.4        |
| Educational attainment            |           |            |
| High graduate and below           | 317       | 84.1       |
| College level and above           | 60        | 15.9       |
| Household income (Philippine Pesos$^a$) |     |          |
| 8,500 and below                   | 359       | 95.2       |
| 8,501 and above                   | 18        | 4.8        |
| Household size                    |           |            |
| 1 to 3 members                    | 169       | 44.8       |
| 4 to 5 members                    | 150       | 39.8       |
| 6 and above members               | 58        | 15.4       |
| Land tenure                       |           |            |
| Owner                             | 314       | 83.3       |
| Tenant                            | 63        | 16.7       |
| Farm size                         |           |            |
| Below 3 hectares                  | 338       | 89.7       |
| 3 hectares and above              | 39        | 10.3       |

$^a$ 1 US Dollar = Philippine Peso 52.69 (March 2019)

Majority of the household heads were male which comprise of 64.5% of the participants. Their female counterparts were only 35.5%. Married household heads dominate the survey which comprise of 89.7%, the remaining participants were either single or widow. About 84.1% of the participants were high school graduate and below while only 15.9% were college level or higher in terms of educational attainment. About 95.2% had household income of 8,500 Philippines pesos and below while only 4.8% had household income of 8,501 Philippine pesos and above. About 44.8% of the samples had household
size between 1 to 3 members and about 39.8% of the samples had household size between 4 to 5 members. Only 15.4% had household size 6 members and above. Majority of the households owns the land which comprise of 83.3% while only 16.7% answered that they were tenants of the land they use now. About 87.9% owns below 3 hectares while only 10.3% owns 3 hectares and above.

3.2 Household shocks

Farming is one of the livelihood opportunities in the island of Camiguin. As presented in Table 2, first in rank for agricultural shocks is post-harvest losses. Strong increase of price for inputs ranked the second while market (buyer of the product) ranked third. Natural calamities such as drought and typhoon ranked fourth. Lack of technical support and pest and diseases (crops and livestock) ranked fifth and sixth, respectively.

Post-harvest technology plays a significant role in small islands. Post-harvest losses are significant to rural households as socio-economic status [17]. It is also indicated that post-harvest losses affect private and public costs [18].

Participants from the survey were also asked to rank economic shocks. Interestingly, could not buy food due to food price increase ranked first while strong decreases of prices of outputs/product sales ranked second. Surprisingly, lack of available food in the market ranked third while job loss as an economic shock was rank lastly by the participants.

Purchasing power of peso in Camiguin is relatively high as compared to the neighbouring provinces [19] which determine food prices in the island.

| Table 3. Household shocks. |
|---------------------------|

| Shocks                                      | Mean   | Standard deviation | Rank |
|---------------------------------------------|--------|--------------------|------|
| Agricultural shocks                         |        |                    |      |
| Postharvest losses                          | 2.29   | 1.329              | 1    |
| Strong Increase of price for inputs         | 2.82   | 1.353              | 2    |
| Market (buyer of the product)               | 2.90   | 1.329              | 3    |
| Natural calamities such as drought and typhoon | 3.75  | 1.568              | 4    |
| Lack of technical support                   | 4.23   | 1.684              | 5    |
| Pest and diseases (crops and livestock)     | 4.96   | 1.227              | 6    |
| Economic shocks                             |        |                    |      |
| Could not buy food due to food price increase | 2.01   | 0.942              | 1    |
| Strong decrease of prices of outputs/product sales | 2.10   | 1.183              | 2    |
| Lack of available food in the market        | 2.91   | 0.920              | 3    |
| Job loss                                    | 2.98   | 1.026              | 4    |

3.3 Household coping mechanisms

Participants from the survey were also asked to rank the coping mechanisms they employed to cope up with shocks. Based on the result, sold livestock, land, and other assets ranked first. Diversify agricultural portfolio ranked second while substitute crops ranked third. Took up additional occupation or off-farm employment and reduced production inputs ranked fourth and fifth, respectively. Borrow money or used savings ranked sixth. Ask help from government/NGOs, relatives, and friends or neighbours as well as did nothing were the last two ranks by the participants.

Selling of assets to cope up with shocks is also observed in rural Cambodia [14]. It is also noticeable that physical assets of any form contribute to the coping mechanisms of households.
4. Conclusions

To sum it up, post-harvest losses prevail in Camiguin households as agricultural shock. On the other hand, increasing food prices as an economic shock hinder households to buy food. This increase in food prices can be associated with limited supply simply because majority of these foods need to be imported. This imposes higher prices when reach the consumer.

Selling of livestock, land and assets remains as a safety nets to cope with shocks. However, the government already employs interventions to help these households through conditional cash transfer. This conditional cash transfer is a cash subsidy provided to poor households. Aside from that, the government also helps by providing agricultural inputs such as seeds and fertilizers for them to produce their own food. Moreover, government agencies have been working together to provide seminars and training for additional knowledge of the households and improve their skill sets to make them prepare for incoming shocks.

Formation of organizations to foster technical knowledge sharing and skills development can be a doable undertaking to encourage production in the community level. Empowering women and youth in food production can facilitate linkages to various agencies where women and youth are of interest. Through these, possible projects intervention can be formulated to address shocks and uncertainty.

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Table 4. Households coping mechanisms.

| Coping Mechanisms                                      | Mean | Standard Deviation | Rank |
|-------------------------------------------------------|------|--------------------|------|
| Sold livestock, land, and other assets                 | 3.20 | 1.859              | 1    |
| Diversify agricultural portfolio                      | 3.33 | 1.807              | 2    |
| Substitute crops                                       | 3.48 | 1.820              | 3    |
| Took up additional occupation (off-farm employment)   | 3.71 | 2.153              | 4    |
| Reduced production inputs                              | 4.06 | 1.785              | 5    |
| Borrow money or used savings                           | 5.13 | 1.554              | 6    |
| Ask help from government/NGOs, relatives, and friends or neighbours | 5.95 | 1.641              | 7    |
| Did nothing                                           | 7.13 | 2.157              | 8    |
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