



Flood Disaster Risk, Sense of Place, and Preparedness of Entrepreneurs in Communities along a River

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Abstract

This paper investigated the flood experiences of entrepreneurs in communities along the Ocoy River in Negros Oriental. It further examined the relationships among flood disaster risk perception, sense of place, and flood disaster preparedness of the respondents composed of 36 non-probable samples of owners and managers of enterprises near the river. The face-to-face survey revealed that most had accumulated damage and losses during floods, reinforcing their high flood disaster risk perceptions. But the latter was positively and significantly related to their sense of place score, which suggests a high value they assigned to their communities despite a high flood risk. However, they had a low disaster preparedness score which is not significantly related to flood disaster risk perception and a sense of place. Only place dependence had a positive and significant relationship to flood disaster preparedness which explains their reluctance to relocate their operations. Therefore, as part of enterprises' formal operational requirements for a business permit, the entrepreneurs must undergo flood disaster preparedness orientation to adapt to climate change.

Keywords: Flood disaster risk perception, sense of place, flood disaster preparedness, entrepreneurs, Ocoy River, Negros Oriental

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Introduction

According to Metcalfe (2014), the “small businesses are the lifeblood of the economy” because of their vast number that not only provides the needed commodities and services to local consumers but also employment opportunities and incomes to many (Asgary, Anjum & Azimi, 2012); therefore, contributing to the economic growth and well-being of developing countries (Adikaram & Nawarathna, 2018; Phillipson, Tiwasing, Gorton, Maioli, Newbery and Turner, 2019). This context suggests that small and medium enterprises situated in rural communities, in particular, can significantly contribute to improving the quality of life of residents. Although some owners of these enterprises do not reside in areas where their businesses operated (Greenberg, Farja, & Gimmon, 2018), they are still equally concerned about the supply and demand of what they produced or marketed and how their operations would impact local communities. Perhaps those driven more by economic gains would leave when business is no longer profitable. Yet, entrepreneurs are inspired by their social responsibility to share the opportunities afforded to them by law and the consuming public.

But the small and medium enterprises may be considered highly vulnerable from the lens of the sustainable livelihoods approach for development, both externally and internally (Serrat, 2017). Confronted with problems related to fluctuations in demand, like in the service business, affected their sales and profit given their limited capital and assets compared to large corporations. The problem, however, is not only due to the disrupted market. The lack of plans for unexpected events such as disasters makes these enterprises more vulnerable, whose viability to operate still and survive during a time of crisis is at stake (Tibay, Miller, Chang-Richards, Egbelakin, Seville, & Wilkinson, 2018). The situation may result from natural disasters due to geophysical, hydrological, climatological, meteorological, or biological hazards and technological disasters. The latter results in environmental degradation, pollution, and accidents or conflict over control of these resources resulting in devastating wars (Misha, Mazudar, & Suar, 2010; Adikaram & Nawarathna 2018). But the exposure to hazards of communities and enterprises to these general forms of disaster are relative to their location. For example, residents in Laguna, Philippines are always vulnerable to floods and earthquakes due to their proximity to the lake and the fault that passes through the area, respectively (Juanzon & Oreta, 2018; see also Abagat, Roxas, Talubo, & Abucay, 2017; Domingo & Manejar, 2018). But they remained in the area despite practically living in the danger zones and being aware of the associated hazards.

Different origins of hazards result in various degrees of disaster. This condition requires a more appropriate way of assessing how the enterprises are drastically affected by these hazards, given their adaptive capacity

gauged by their financial and technical abilities (Mishra et al., 2010; Abagat et al., 2017). This requirement has implications for assisting different types of enterprises in disaster preparedness and risk reduction management initiatives. Rose and Krausman (2013) reminded that adaptive or mitigation measures against disasters always have the associated cost.

For example, Samantha (2018) reported that limited resources constrained small and medium enterprises in Sri Lanka to respond to disasters and became highly vulnerable to flooding. They experienced an abrupt fall in revenues given the high costs of their operations. This situation left them with limited funds to repair damaged equipment and products. They also lost some workers displaced by floods. But stopping typhoons or heavy rains that result in flooding is difficult or perhaps beyond human capacities to do. Reducing the extent of impacts is the best thing that could be done by the affected communities, according to Adikaram & Nawarathna (2018).

Literature reveals that the primary focus of enterprise owners in disaster preparation in the past was more toward human survival, which was expected because of its central importance. Least important was protecting businesses because of the embedded idea that one could do nothing about the impending threats— a sense of fatalism (Josephson, Schrank, & Marshall, 2017). But things have changed with the advancement of disaster science and information, which made possible the projection of calamities such as incoming typhoons and hurricanes. The preparation could quickly be initiated at the household and community levels, reducing damage and losses.

Currently, learning from past experiences and other communities in disaster preparedness (e.g., Adikaram & Nawarathna, 2018) further enriched the adaptive capacity of owners of enterprises to safeguard their properties and businesses against perceived risk. Disaster response may include evacuation before the flood comes or building structures like dikes that could withstand overflowing waters from the river (Hop et al., 2017). But aside from behavioral and structural or mechanical mitigations, the preparations most common among enterprises at present involve risk transfer through insurance (Josephson et al., 2017). Such practices among people with considerable business investments intend to secure them from untoward incidents during calamities such as typhoons, floods, earthquakes, and other disastrous events.

Meanwhile, Mishra et al. (2010) found out that the emotional connections between people and where they reside for quite some time affect their preparedness to respond to natural disasters. They added that the residents who tend to be more prepared are genealogically and economically attached. Ujang & Zakariya (2015) also considered this the social and functional values assigned by people to a place. But

the strength of their attachments is a product of the frequency and length of their engagement. The same reasoning may explain why some owners of enterprises, and residents, do not relocate into safer areas for their business operation despite the perceived risk of floods and overflowing. This behavior implies place-dependent livelihoods that may also explain higher economic place attachment—a component of the sense of place. Place attachment may subsequently influence disaster risk perception and preparedness to secure their financial and food resources (see Mishra et al., 2010).

Given this as a backdrop, this paper first examined the flood disaster experiences of entrepreneurs situated along the different sections of the Ocoy River in Negros Oriental, Philippines. The investigation looked into how floods had affected their business operations, particularly starting in 2011, when Typhoons Sendong (Washi) and Pablo (Bopha) heavily hit the province. It measured the relationship between their flood disaster risk perception and sense of place; and how the two had influenced their flood disaster preparedness and decisions to relocate their business operation. The discussion revolved around the adaptation and resilience of these entrepreneurs, given their vulnerability to flooding as the climate-related hazard has become more intense at present compared to several decades ago. Also explored was how the local government units should appreciate the data to proactively respond to the impacts of flooding by increasing the adaptive capacity and resiliency of said enterprises.

Methods

The study covered selected enterprises situated in communities along the Ocoy River, stretching 19.8 km to the coast, excluding the headwaters with a west to east direction. Its geographic range was estimated to be from 9°17'49"N to 9°22'02"N latitude and from 123°09'38"E to 123°16'27"E longitude. The river occupies portions of Valencia, Sibulan and Dumaguete City—the latter being the capital of Negros Oriental, Philippines. The respondents included the owners and managers of these enterprises who resided in barangays where these were situated. The survey intended to cover a quota of 40 entrepreneurs, but only 36 had finally agreed to participate in the survey who included 26 females (72.22%) and ten males (27.78%). The females outnumbered the males because they were usually those available during the survey, particularly for household-based enterprises such as sari-sari (variety) stores. They were almost of the same average age (males= 50 years, females= 49 years), but the females have the youngest respondents with a range of 24 to 68 years old while the age range for the males is 42 to 64 years old.

Hired interviewers used a structured interview questionnaire written in English with Cebuano

translation under the supervision of a research assistant. The interviews went through April 2018. The disaster preparedness, risk perception, and sense of place rating scales were patterned after the published works of Mishra et al. (2010); Xu, Peng, Liu, & Wang, (2018); and Anacio, Hilvano, Burias, Pine, Nelson, & Ancog (2016), respectively. Before fieldwork, several coordination meetings were held with local government officials, particularly with the mayors and the disaster risk reduction officers, to inform them about the research project and secure the survey's endorsement from the barangay captains.

An ethics clearance was secured from the Silliman University Research Ethics Committee (UREC) as a policy before the fieldwork. Interviewers solicited informed consent from every sampled respondent and immediately replaced those who refused from the nearby areas along the Ocoy River. Refusal to answer specific interview questions was allowed when they already felt uncomfortable, particularly for some sensitive issues. Every respondent was also assured of full confidentiality and anonymity throughout the gathering and processing of data. Aside from descriptive statistics used in the presentation of the data, Spearman's rho was also employed to measure the significant relationships among the significant variables such as disaster risk perception, sense of place, and disaster preparedness.

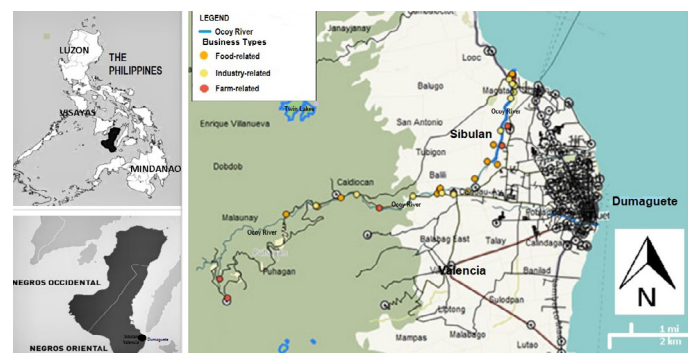


Figure 1. Study sites and distribution of sample enterprises along the Ocoy River in Negros Oriental, Philippines
(Source: <https://ocoyproject.org/bsmapping.php>)

Results

Business profile

Except for the Energy Development Corporation (EDC), a producer of geothermal energy which operated high up the source of the Ocoy River, there are no other industrial establishments in the area of the same scale. The study site covers those below the EDC, where a construction business firm based in Dumaguete City operated its concrete batching and its steel and metal sheet processing plant. This firm is the only big enterprise in

the area, while the majority were small according to the extent of their operation and the products they produced (see Table 1). As reflected in these figures, the study site had limited business opportunities: 33 were household-based enterprises (91.67%), two were in the form of partnership (5.55%), and one was a corporation (2.78%). The majority (83.33%) had capitalization from family savings, assistance from children, and borrowed money from relatives. Only six of these enterprises (16.67%) admitted to having incurred loans from banks and other formal lending institutions, which showed a skewed distribution according to their capital sources and assets.

For purposes of analysis, the classification of businesses included those related to food (41.67%) dominated by sari-sari (variety) stores; industry (33.33%) which included the processing plants of a construction firm, small scale quarry, gasoline station, motor repair shops and so on; and farm (25.00%) which included particular cash crops such as *sayote* (*Sechium edule*) and *kangkong* (*Ipomoea aquatica*) as well as the commercial raising of flowers and herbal plants, pigs and goats, and the trading of copra. On average, in terms of the number of years they had been operating along the river, farm-related enterprises were the oldest (17 years) followed by food-related (8 years) while the industry-related were the youngest (6 years).

The variation in years suggests that the study site was utilized for agriculture until new types of businesses or industries came along with residential area expansion, human population growth, new economic potentials, and road improvements toward the interior with the

development of the geothermal energy source. Of the 33 respondents who gave their average monthly business income, the following data further suggest that these were small businesses: up to Php 15,000 (72.73%), Php 15,001- 30,000 (6.06%), and Php 30,001 up (21.21%). They have limited assets and options for responding to catastrophic events that may bring significant economic disruption to vulnerable enterprises situated along or within the river. The financial situation of the enterprises and the nature of goods they produced likewise hinted that potential loss may allow them yet to recover and start again, which the data will show in the succeeding sections.

Moreover, the types of enterprises covered by the study conformed to their location relative to the Ocoy River. On average, the surveyed enterprises were 73 meters away from the riverbanks with a minimum distance of zero meters and a maximum of 250 meters. The cultivation of *kangkong* for sale was directly done within the river's shallow portion, explaining why some reported enterprises were now within the river. The minimum elevation of the said enterprises was two meters above sea level located in the downstream section, and the maximum elevation was 1,070 meters and located in the upstream section. Enterprises located in the lowest elevation were the industry-related enterprises. Their locations range from eight to 322 meters and mainly in the downstream section. The farm-related enterprises were, on average, located in the highest elevation (275.89), ranging from nine to 1,070 meters. Meanwhile, the food-related enterprises were, on average, 110 meters above sea level, which vary from two to 446 meters.

Table 1. Business Types and Specific Enterprises

Business Types	Number of Specific Enterprises	Mean Years in Operation	Total (%)
Food-related	<i>Sari-sari</i> store (11), eatery (2), dressed chicken store (1), bakery (1)	8.13	15 (41.67)
Industry-related	Quarry (3), gasoline station (2), motor repair shops (2), concrete batching plant (1), steel and metal sheet processing plant (1), highland resort (1), furniture shop (1), tire service center (1)	6.18	12 (33.33)
Farm-related	<i>Sayote</i> farm (2), <i>kangkong</i> farm (2), flower garden(1), herbal plant business (1), piggery (1), goat farming (1), copra trading (1)	16.80	9 (25.00)
Total		10.37	36 (100.00)

Flood disasters and business impact

From the heavy monsoon rains to the typhoons that hit the province from 2011 up to 2017, the respondents considered Typhoons Sendong (n= 10) and Pablo (n= 9) in 2011 and 2012, respectively, to be the most destructive. They based this in terms of the damage and losses they had experienced. This number represents 53 percent of those interviewed who said that they were seriously affected by the said typhoons that came immediately after the other as they were yet recovering from the previous flood. On average, the affected enterprises had stopped operation for about 84 days or 2.8 months, after which they resumed operation.

Table 2. Enterprises Seriously Affected by Floods

Flood Effects	Number	Percent
Yes	19	52.78
No	17	47.22
Total	36	100.00
Business Types Affected		
Food-related	8	42.10
Industry-related	6	31.58
Farm-related	5	26.32
Total	19	100.00

From their recollections, the respondents estimated the value of what they lost or the damage they suffered from the floods that they considered most destructive from 2011. The briefer prepared by the Oscar M. Lopez (OML) Center provided the definitions of damage and losses for this study. Damage refers to the “value of the affected assets, such as structures, equipment, and other related physical products,” while losses refer to the “value of unavoidable revenue that was affected after the disaster,” which are “measured in the amount in pre-disaster prices of foregone income opportunities, higher operating or production costs; and unexpected expenses” (Office of the Civil Defense cited in OML, 2017, p. 1). Damage includes repairable values of physical assets to restore their utility values while losses are foregone values and lost forever.

Admittedly, most of the respondents who were seriously affected by the typhoons had incurred significant damage and losses during the most devastating floods they experienced, which, if computed per household, would be Php 81,789 based on the accumulated estimated amount of Php 1,544,00 from all those affected. From the total amount, 56 percent (Php 874,500) of the cost of floods reported was damage on properties. In comparison,

44 percent (Php 679,500) were the losses primarily from destroyed and unsold farm products, which had affected their sales (Table 3). The cost of materials for repairing their destroyed structures likewise went up, which could have been part of their income losses aside from the sale reduction because they stopped business operation for some time. Meanwhile, destroyed equipment and vehicles used in business, which they could still restore to become functional again, were up on the list of the respondents. Other reported properties that were damaged included fences, buildings, and farmlands.

Table 3. Damage and Losses Due to River Floods

Damage	Php	Percent
Destroyed equipment	313,000	35.79
Destroyed business vehicles	230,000	26.30
Destroyed fences	127,000	14.52
Destroyed buildings	100,500	11.49
Eroded farmlands	100,000	11.44
Others	4,000	0.46
Total	874,500	100.00
Losses		
Destroyed farm products	463,000	68.14
Unsold farm products	158,500	23.32
High cost of materials	30,000	4.41
Reduction in sale	22,000	3.24
Death of animals	1,000	0.15
Others	5,000	0.74
Total	679,500	100.00
Over-all Total	1,554,000	

Sixteen of the 19 respondents of affected enterprises explained that they temporarily stopped their operation while the rest just transferred to the nearby elevated areas. These were away from the initial location. Half of the enterprises that temporarily stopped were food-related, primarily the sari-sari stores built with light materials. The same is true with the eatery, bakery, and store for dressed chicken. The *sayote* and *kangkong* farms were also damaged, that compelled the owners to stop planting for some time, particularly with the latter directly within the river. The operation of affected enterprises only resumed after the river had normalized and they had completed the repair of the damage caused by the flood.

Table 4. Effects and Decisions Relative to Flood Events

Variables	Number
Effects of river floods to business	
Temporarily stopped operation	16
Transferred to a nearby elevated area	3
Decision after river flood had normalized	
Returned and repaired structures	15
Did not return to original place	4

Whether the business had stopped or moved elsewhere that was safer, the respondents were further asked how they have recovered from the impacts of the worst flood they had experienced. The top source of financial resources was the cooperatives through loans (27.78%) followed by savings or investments (22.22%) they had that were immediately available for use in recovering their businesses or for their other household needs. The local government units were likewise good sources, which often came late, particularly for financial support in the repair and start-up of the grossly damaged business by the flood. Or else they went to lending institutions despite the excessive interest rates, particularly those non-members of cooperatives. As mentioned earlier, some resorted to repairing what is left of their properties to rebuild the business. Family and kinship assistance may have been enjoyed by a few from sources outside of the community. This assistance was reportedly uncommon in surveyed communities when their relatives were also residents who similarly suffered from the river's wrath (e.g., Oracion, 2015).

Table 5. Recovery Measures after Flood Events

Recovery Measures	Number	Percent
Loans from cooperatives	10	27.78
Savings and other investments	8	22.22
Government assistance	6	16.66
Lending institutions	4	11.11
Repair of damaged properties	3	8.33
Family and kinship assistance	2	5.56
Nothing	3	8.33
Total	36	100.00

Flood disaster risk perception and sense of place

Most of the surveyed enterprises are within the Ocoy River Basin and a flood hazard map shows that the midstream and downstream sections have high level hazard ratings. The projected flood water would go up to 1.5 meters (LIPAD, 2017). Given this situation, the amount of damage and losses incurred by enterprises due to river floods may influence how those affected see the associated risks. Thus, the respondents were requested to rate from one to four the degree of their agreement or disagreement to some statements that flood disaster could be controlled, predicted, probable, and destructive at certain times and the level of fear floods brought them. This measures the flood disaster risk perception of the respondents, which refers to the average of the scores they gave to every statement under a particular parameter asked during the survey. Table 5 shows that the respondents "strongly agree" with the descriptions regarding the uncontrollability of the disaster caused by floods. It also indicates the perceived unpredictability and the probability of its occurrence, particularly during times when they were not expecting it.

Despite the firm stance of the respondents about the uncontrollability of river floods, they still believed in reducing the negative impact, which explains why the probability of disaster is third in the order of their responses. This response also explains why they only "agree" to the statements referring to the level of fear they experienced during floods, which had similarly influenced their perception of the degree and probability of the anticipated disaster. Nonetheless, the overall results still indicate that they have strong flood disaster risk perception score as they continue to reside in communities closer to the Ocoy River, influencing how they value these communities (Table 6). On average, the industry- (3.43) and farm-related (3.41) business types tend to have higher risk perception scores than the food-related business (3.29), but they do not significantly differ (ANOVA= 0.361, p-value= 0.700, critical level=0.05). Nonetheless, the data shows that those with more significant investments and closest to the river perceived higher risk. However, perhaps the limited sample size was not able to prove it.

Meanwhile, the sense of place of the respondents, measured by the average scores of the degree they agreed or disagreed with the statements that described how they viewed their communities, reflect what meanings these places have to their well-being. Since the respondents were associated with the enterprises and other business activities along the Ocoy River as owners or managers, the expected response would be "strongly agree" to statements that denote dependence and attachment to their communities. Under a sense of dependence, they "strongly agreed" that their communities are "best places" with many "important things" they needed, while "only agreed" was the response that they have "social networks" and have enjoyed the "livelihood

opportunities” available. They also “strongly agreed” to be “happy” in their communities which they considered as “favorite places.” In contrast, they “only agreed” that they were “relaxed” and had “beautiful stories” about these communities.

These descriptions imply their very high sense of attachment and dependence with their communities but not much with their sense of identity, which is the lowest among the three components of sense of place (Table 6). Although the sense of place scores across business types do not significantly differ (ANOVA=0.475, p-value= 0.626, critical level= 0.05), the average scores showing the farm-related (3.42) business type to be highest than the industry- (3.20) and food-related (3.02) business suggest that length of operation may have influenced the scores. So despite that, they have a solid flood disaster risk perception while also having a definite sense of place, which are significantly related (Spearman rho= 1.000, p-value= 0.000, critical level= 0.01). This strong link between the two variables explains they did not transfer but operated again after temporarily stopping and repairing the damage caused by the flood. The flood threat did not discourage them from going on with their enterprise, perhaps because it would not happen every year and of the same magnitude.

Flood disaster preparedness and preventive measures

The flood disaster preparedness of the respondents to secure their enterprises was measured using the average scores of the perceived effectiveness of the various resources available to them during the period covered by the study. These included materials or implements for mitigating potential disastrous events and the activities they participated in using an instrument adapted from the work of Misha et al. (2010). They further identified which of the said specific resources and activities presented to them that they found applicable and if these had worked in preventing the impacts of flood disaster.

The process of measuring flood disaster preparedness of an enterprise considered it as a function of a combination of various resources and activities the owners or managers utilized and pursued, respectively. The exercise identified the enterprises’ preventive measures before and during times that the Ocoy River overflowed and destroyed houses, structures, and other business facilities. These measures, classified into biological, mechanical, and behavioral safety nets, were either indigenously developed or accessed by the enterprises from the government and other private organizations. The absence or non-application of any or all of these measures was assumed to have reduced flood disaster preparedness.

The biological measures include planting trees and bamboo along the river banks. In contrast, the structural or mechanical measures include installing flood-resistant business and farm structures and the filing of sandbags along the river banks often destroyed during floods. These prevented the overflow of water into nearby farms, residential areas, and business structures. Having emergency bags that contained basic survival needs and essential documents and boats and rubber tubes for use during an evacuation are also examples of mechanical safety measures. The behavioral measures include community discussion, mock evacuation drills, and seminars related to flood disaster preparation and mitigation conducted by local government units, non-government organizations, and schools. Monitoring weather disturbances in broadcast media, intensifying business operations, and harvesting farm crops before the flood season were also behavioral measures.

The data showed that the sampled enterprises had a low overall flood disaster preparedness score (0.89), which do not significantly differ across business types (ANOVA= 2.220, p-value= 0.125, critical level= 0.05). But an ocular examination of the data suggests that the industry-related business type (1.17) has the highest flood disaster preparedness score than the food- (0.79) and farm-related (0.67) business types. Thus, the results suggest that more significant investment requires more efforts to secure business operations from disastrous events as this type also perceived higher disaster risk. Incidentally, the sample size does not warrant reaching

Table 6. Disaster Risk Perception and Sense of Place Scores

Disaster Risk Perception	Average
Uncontrollability of the disaster	3.74
Unpredictability of experiencing a disaster	3.47
Probability of disaster	3.33
Level of fear of experiencing a disaster	3.18
Anticipated degree and probability of a disaster	3.11
Over-all	3.11
Sense of Place	
Place dependence	3.31
Place attachment	3.25
Place identity	2.99
Over-all	3.18

Rating Scale: Up to 1.74 = Strongly disagree
 1.75-2.49 = Disagree
 2.50-3.24 = Agree
 3.25-4.00 = Strongly agree

that level of analysis, which may be pursued in future studies. Current data show that only in behavioral measures where 50 percent and above of the respondents had reportedly availed of or participated. These measures included seeking information about the weather in various broadcast media (97.22%), seminars on disaster conducted by the local government units (58.33%), and discussion sessions on how to respond to catastrophe organized by the barangay governments (50.00%).

As shown in Table 7, among the three prominent behavioral mechanisms was monitoring the extent of weather disturbances that the respondents assessed per their experience as “very effective.” At the same time, the biological measures of planting trees and bamboo were “very ineffective” and far below the mean scores of the mechanical measures. However, the number of respondents who had not practiced or availed of particular actions affected the measure of effectiveness. This number was used as a divisor to get the mean score. This procedure suggests that the fewer the practitioners, the least effective the measures are; therefore, the least prepared the respondents are to flood disaster as a community.

It was unexpected that the positively linked flood disaster risk perception and sense of place of the respondents

would not be significantly related to their flood disaster preparedness. They registered a strong flood disaster risk perception score, but this did not make a difference or improve their flood disaster preparedness score. Likewise, their strong sense of place was absent in their being more prepared to protect their enterprises, families, and communities from floods. The sense of place of the respondents did not also matter with their personal plans and decisions to relocate elsewhere, particularly if the barangays or local government units had failed to initiate activities or projects to prevent or reduce the impact of flooding.

Of the three components of sense of place, only place dependence significantly relates to flood disaster preparedness. The respondents were more concerned about their enterprises as a source of livelihoods; thus, it shows that those with a higher place dependence score tend to have a higher flood disaster risk preparedness score (Spearman rho= 0.354, p-value= 0.03, critical level=0.05). The significant relationship between the two variables implies that economic security was of prime importance to entrepreneurs staying in their respective communities despite the hazards due to climate change.

Meanwhile, a test of significance was impossible to statistically compare the flood disaster preparedness

Table 7. Flood Disaster Preparedness According to Exiting Activities and Materials

Activities and Materials	Availability (%)	Participation (%)	Application (%)	Effectiveness Mean Scores*
Behavioral Measures				
Monitoring broadcast media about weather disturbances for information	35 (97.22)	34 (97.14)	34 (100.00)	3.72
Discussion session on disaster conducted by <i>purok</i> or <i>barangay</i>	18 (50.00)	13 (72.22)	12 (92.31)	1.19
Seminars conducted on disaster by local government units	21 (58.33)	10 (47.62)	10 (100.00)	1.11
Conducting mock drills for evacuation in case of disaster	12 (33.33)	11 (91.67)	10 (90.91)	0.81
Seminars conducted by non-government organizations on disaster awareness	14 (38.89)	6 (42.86)	6 (100.00)	0.50
Seminars conducted by schools on disaster awareness	13 (36.11)	7 (53.85)	5 (71.43)	0.47
Intensifying business operation before flood season to avoid damage and losses	6 (16.67)	3 (50.00)	3 (100.00)	0.28
Harvesting crops before flood season to avoid damage and losses	2 (5.56)	2 (100.00)	2 (100.00)	0.17

Activities and Materials	Availability (%)	Participation (%)	Application (%)	Effectiveness Mean Scores*
Mechanical Measures				
Keeping emergency bags to prevent losses and for protection	10 (27.78)	10 (100.00)	9 (90.00)	1.42
Installing flood resistant farm and business structures	14 (38.89)	12 (85.71)	12 (100.00)	1.33
Sand bags along river banks as flood control and protection	3 (8.33)	3 (100.00)	3 (100.00)	0.31
Having boats or rubber tubes for rescue or evacuation	3 (8.33)	1 (33.33)	1 (100.00)	0.11
Biological Measures				
Tree planting activities along river banks for flood control and protection	16 (44.44)	12 (75.00)	11 (91.67)	0.86
Bamboo planting activities along river banks for flood control	7 (19.44)	5 (71.43)	4 (80.00)	0.22

*Rating Scale: Up to 1.74 = Very ineffective 2.50-3.24 = Effective
 1.75-2.49 = Ineffective 3.25-4.00 = Very Effective

scores between entrepreneurs according to religious affiliations due to insufficient samples. Nonetheless, the mean score of non-Catholics (1.66) is higher than the Catholics (0.74) assumed as due to the religiosity of the latter during a disaster, and often viewed as fatalism (Leyva, Allen, Tom, Ospino, Torres, & Abraido-Lanza, 2014) or a search of “miraculous intervention” (Bautista, 2020, p. 40). This cultural response is a common observation in the rural Philippines (Borchgrevink, 2014) expressed in *bahala na*. Menguito and Teng-Calleja (2010, p. 3) consider *bahala na* as a “passive acceptance of the twists and turns in life,” which may be due to their limited access to physical, economic, financial, and social assets (Serrat, 2017). When in distress, they tend to exert less effort due to their belief that destiny will happen, which humans cannot control. An optimistic view is that religious person whose faith in the powers of divine intercession is well-rooted would resort to prayers to reinforce some adaptive measures they have already taken (Menguito & Teng-Calleja, 2010). The first expression of religiosity supports the findings of Mishra et al. (2010) that people with higher religious place attachment do not prepare much for impending disasters. But this issue requires further investigation.

Discussion

This paper assessed the damage and losses due to floods, flood disaster risk perception, sense of place, and disaster

preparedness of the owners and managers of enterprises. Preparedness to flood disaster was examined according to the availability, applicability, and effectiveness of biological, mechanical, and behavioral measures to reduce damage and losses on lives and properties as already proven elsewhere (e.g., Mishra et al., 2010). The majority reported to be affected by river floods and had incurred damage and losses in their operations. However, they seemed not alarmed by the more severe consequences of floods not until Typhoon Sendong hit the province and destroyed several structures closest to the river banks. And this current study has shown a behavioral pattern that seemingly deviates from what the literature would usually say about human responses when exposed to potential danger like the impending floods.

All other things being equal, the expected response of humans to danger is to avoid it or to prepare in many ways they could afford to reduce its negative impact (e.g., Alam, Alam, & Mushtaq, 2017). This behavior is called risk aversion with the primary intention of preserving or securing lives and properties. For example, a study shows that risk-averse workers keep themselves away from uncertainties. But they are less likely to transfer to new jobs in a workplace they were not very familiar with, even if they already felt the toxicity of their current work environment (van Huizen & Alessie, 2019). This behavior seems true among the surveyed owners and managers of enterprises along the Ocoy River. It appears that a known flooding every heavy rain or typhoon is

more easily handled and less feared than the danger of moving somewhere or engaging in other enterprises that they considered new and unimaginable given their skills and assets. They might not also be able to manage in a new environment.

Generally, most owners and managers of small enterprises did not score high enough in their flood disaster preparedness. However, they were admittedly aware of what to do given the list of possible actions open to them. Only a few assessed regarding the availability of mechanical and biological measures, perhaps due to their limited resources, but those who applied them considered these measures as very ineffective to prevent the destruction caused by flash flooding. Since these measures were already found effective and recommended in some other places, households or community disaster measures are among the concerns that the local government units have to examine if appropriately practiced along the Ocoy River.

The majority of entrepreneurs in the study had a small income and without enough land where they could transfer compared to those industry-related businesses. This condition explains why the threats of flood disaster did not drive them to operate far away from the river and did just what they could afford to recover from a perennial problem. They stopped temporarily, repaired the damaged structures and facilities, then went back to business after the river normalized. The small entrepreneurs could quickly recover given their limited capital needs and the number of people involved who are only household members. But they need to be assisted to speedily recover by implementing community-wide disaster preventive measures and preparedness to reduce the intensity of threats of perennial flooding. This need is one area in disaster risk reduction and management programs that local government units must consider.

Meanwhile, monitoring the incoming typhoon and other natural calamities through national and local broadcast media or traditional local knowledge (Hop, Ninh, & Hien, 2017) and local river flood warning system is not enough. Flood disaster preparedness is achieved after providing the knowledge and skills to survive in a stressful situation and the needed structural or mechanical, and biological measures to prevent the most destructive impacts of natural calamities. Evacuation or resettlement is always an option but often resisted by disaster victims who ironically preferred to die in places where they were raised and made a living than to relocate in a place that disrupted the kind of life they already considered normal.

The flood disaster risk perception of the respondents is significantly related to their sense of place, which means that despite the danger of flooding, they still highly valued their communities and refused to relocate their business operations (see Oracion, 2019 for household behavior). They had already learned to live with flooding

wherein the frequency and intensity are tolerable not to cripple their operations. And the abilities of small enterprises to recover, either far below from or at the same level as their original state, show how resilient they were, evident in how they avoided the hazards of flooding. The same optimism prevailed across business types—they all shared higher disaster risk perceptions with a stronger sense of place despite the flood hazards and lower disaster preparedness. Although unexpected and ironic, as mentioned earlier, studies in Pakistan (Asgary et al., 2012) and Indonesia (Neise & Revilla-Diez, 2019) noted to be generally familiar—the absence of disaster risk mitigation and preparedness measures among small enterprises.

What is also relevant to highlight is the implication of the severely affected entrepreneurs' responses despite being aware of the perennial river flooding. These responses include being used to flooding, evacuating to safer areas only when the threat became imminent and going back to where they originally had economic activities. All these imply making sense of climate change to their lives, shaping "how risk is conceived, prioritized, and managed" (see Granderson, 2014, p. 54). As hinted earlier, they must have already adapted to a life that is resilient to flooding as some of them also tried to be more prepared to reduce the threats but without resettling, particularly among those with greater economic place dependence. The many years they have been observing the behavior of the river allowed them to know very well that they could not control and predict flood disasters. But they could reduce the negative impacts, particularly those on farm-related enterprises. Besides, this type of small entrepreneur has lesser harm to worry about because of a lower investment than other entrepreneurs. They could always start over and live an everyday life until the next flood but perhaps better adapted to the situation.

Conclusion

This paper concludes that given the damage and losses incurred from the impacts of floods, in general, the flood disaster preparedness of the owners and managers of the surveyed enterprises does not significantly relate with their flood disaster risk perceptions and sense of place. Instead, they have high-risk perceptions and a high sense of place but with low flood disaster preparedness scores, particularly in the availability of mechanical measures and the observance of practices or activities to prevent more harm due to the floods. And although no significant differences exist across business types in these three variables, the results hinted that industry-related type tends to perceive higher flood disaster risk and correspondingly expressed more disaster preparedness than the other business types. Thus, limited economic, physical, social, and financial resources are factors that explain the reluctance of small entrepreneurs to relocate their operations. A larger and stratified sample, according

to business types, is required in future studies to prove these preliminary observations.

Meanwhile, the entrepreneurs' inadequate flood disaster preparedness needs intervention to reduce more damage and losses due to future floods. But finding a better place to relocate their enterprises farther from the riverbanks may be an option that unfortunately would not be available to many because of the nature of their activities and given their limited assets and income. The alternative is to try a more practical measure of requiring the owners or managers of small enterprises to attend a flood disaster preparedness orientation before giving them the business permits to operate. They should also submit their plans on responding to floods, which may get more destructive as climate change impacts become more intense in the years ahead. This measure is particularly appropriate to enterprises related to food and industry and open to those with farm-related activities exempted from business permits. The orientation aims to make them more aware of climate-related hazards and learn how to adapt to climatic uncertainties as to the new normal.

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