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COMMUNITY KNOWLEDGE AND AWARENESS ON THE ECOLOGICAL SERVICES OF PEATLAND IN VICTORIA, ORIENTAL MINDORO, PHILIPPINES

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ABSTRACT – Freshwater peatlands are important terrestrial carbon pool that are at risk of degradation due to anthropogenic interventions. This study described the socio-demographic characteristics of the communities in Bambanin, Victoria, Oriental Mindoro, Philippines and assessed their knowledge and awareness on the ecological services of peatlands. The research surveyed 170 randomly selected households and conducted key informant interviews. Data collected were analyzed using descriptive statistics. Results revealed that households are fully aware of the concept and existence of peatlands. However, there is a low understanding on the importance of peatlands and the impacts of anthropogenic activities on its overall condition. The low understanding could highly be associated with the respondents' low educational attainment and very low proportion of the respondents' population who were able to participate in the IEC activities in the site. This presented new challenges to the DENR regulators. Low environmental awareness hinders the communities to protect and conserve the peatland ecosystem that leads to the degradation of ecological services. The findings of this study will help in the formulation of mitigation policies particularly on the land use management that will address issues on peatland hydrology, agricultural activities, GHG emissions, and human encroachment to the protected area. The study also highlighted the importance of community participation in the decision-making process and implementation of local policies for sustainable peatland management. Massive IEC activities, such as informational seminars and distribution of localized IEC materials are recommended for the communities to recognize the fragility of this sensitive ecosystem.

Keywords: community knowledge and awareness, ecological services, peatland

INTRODUCTION

Peatlands are freshwater wetlands characterized by the deep accumulation of partly decomposed organic materials called "peat" (Vitt, 2013; Posa, Wijedasa, & Corlett, 2011). They are important terrestrial carbon pool (Turetsky, Wieder, Halsey, & Vitt, 2002; Charman, 2009) and are utilized for agriculture; energy generation; provision of food, raw materials and medicines; source of drinking water; habitat of many species of plants and animals; regulation of global, regional and local climates; and provision of recreation and aesthetic functions (Joosten and Clarke, 2002).

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Peatlands significantly help in carbon storage, flood control, climate stabilization, and groundwater, and provide forest resources, fisheries and agricultural resources. Peatland ecosystem supports a wide range of biological diversity and serves as refuge for rare and threatened species that can only be found in this type of ecosystem (Page et al., 2006).

Based on the statistics for tropical peatlands, the Philippines has a mean peatland area of 10,700 ha (Page et al., 2006), 110 km2 or equivalent to ~11,000 ha (Joosten, 2009). There are two major sites in the Philippines where peatlands have been confirmed: the Caimpugan peatland at Agusan Marsh Wildlife Sanctuary in Agusan del Sur and the Leyte Sab-a Basin at Alang-alang, Leyte (PAWB-DENR, 2009). Recent assessments by the Biodiversity Management Bureau (BMB) and the Ecosystems Research and Development Bureau (ERDB) of the Department of Environment and Natural Resources (DENR) confirmed additional peatland sites found in Victoria, Oriental Mindoro, Lalaguna and Rizal in Lopez, Quezon, and La Paz and Talacogon in Agusan del Sur. This study focuses on the peatland ecosystem found in Victoria, particularly in a Barangay called Bambanin.

Despite the numerous ecosystem services peatlands offer, they are at great risk of degradation because of anthropogenic interventions. Human interventions such as land use changes and unsustainable land management have adversely affected peatland ecosystems. Damages to the peatland ecosystem were caused by various land management practices such as pollution, drainage, grazing, afforestation, establishment of wind farms, cutting or peat extraction, and burning (Marsden & Ebmeier, 2012). One negative impact of these activities is that peatlands become sources of CO_2 emissions. The total cumulative emission from all peatlands in Southeast Asia as of 2006 was estimated at 9,700 Mt (5,300 Mt– 13,700 Mt) while the total cumulative emissions by 2030 and 2070 are projected to be at 25,900 Mt (17,200 Mt–31,000 Mt) and 37,300 Mt (28,900 Mt–39900 Mt), respectively (Hooijer et al., 2010).

One of the known causes of peatland degradation is the lack of awareness of the stakeholders on the vital ecosystem services. Ecosystem services refer to "the benefits people obtain from ecosystems, either directly or indirectly" (Millennium Ecosystem Assessment (2005), and can be classified as supporting, provisioning, regulating, or cultural services (Li et al., 2010).

One of the most effective strategies for a successful peatland management is the determination of the level of awareness of various stakeholders. Determining their knowledge and understanding of environmental issues such as those faced by the peatland ecosystem will help in developing site-specific strategies that will increase their level of awareness to be able to solve these environmental problems. It will also create opportunities for the stakeholders to be more involved and committed as responsible stewards in the protection and conservation of the peatland ecosystem. Hence, this determined the socio-demographic and economic characteristics of the households in the community surrounding the peatland in Bambanin, Victoria, Occidental Mindoro, and their awareness on the ecological services peatlands provide.

MATERIALS AND METHODS

Site Description

Bambanin is a barangay in the municipality of Victoria in the province of Oriental Mindoro, Philippines with a land area of 546.7 ha (Barangay Profile, 2019). It is situated at approximately 13.1196 oN, 121.2922 oE, in the island of Mindoro. It is bounded on the North by the municipality of Naujan, on the East by Lake Naujan, on the West by the Sablayan Municipality, and on the South by Socorro

Municipality. It has a population of 1,545 that is composed of 303 households (Barangay Profile, 2019). This area is accessible by all kinds of land vehicles.

One of the unique features of Bambanin is the presence of peatland, locally known as “Bulaho”, which has an estimated area of 27.59 ha, covering approximately 5.05% of the total land area of Bambanin. Bambanin peatland is part of the Naujan Lake National Park that covers 21,655 ha. It was declared as a protected area on January 25, 1968 by virtue of Proclamation No. 335. Ten percent (10%) of this protected area was identified as swamp areas adjacent to the lake, which is known as the Bambanin peatland swamp approximately 1.3 kilometers east of Naujan Lake (DENR-MIMAROPA, 2019). It is appropriate to conduct the study in the area due to the disturbance attributed to rapid land cover changes particularly the conversion of the peatland to agricultural areas.

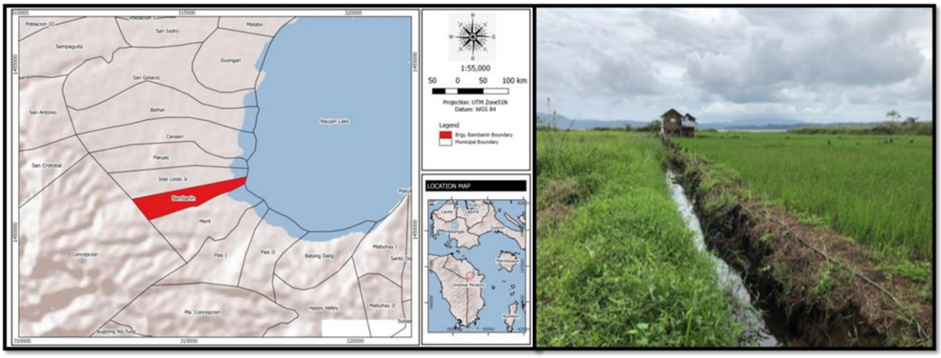

Figure 1. Left: Map showing the Administrative Boundaries of Brgy. Bambanin, Victoria, Oriental Mindoro; Right: The Bambanin peatland (Photo by GHRueda, November 2018).

Data Collection and Analysis

A survey was conducted among 170 households to assess their awareness on the ecological services of peatlands and the causes of its degradation. Slovin’s formula was used to determine the sample size from the population of 303 households with confidence level of 95% and 5% margin of error. Key informant interview (KII), particularly with the CENRO of Socorro, Park Superintendent of the Naujan Lake National Park and Technical Staff from the Protected Area Wildlife Coastal Zone and Management Services (PAWCZMS) in Mindoro, who are the main actors in peatland protection and conservation, was also conducted to supplement the quantitative data from the household survey. Some of the questions asked during the KII include the threats in peatland conservation, factors contributing to its degradation, as well as the level of awareness of communities surrounding the peatland, among others.

Pre-tested questionnaires were also distributed to thirty (30) respondents to determine their socio-demographic and economic characteristics and their knowledge and awareness on peatlands. Their awareness was measured through the total score obtained from the five questions included in the survey tool. The queries were dichotomous questions answerable by “Yes” or “No”. Since dichotomous questions are a sub-type of a nominal measurement scale, only frequencies and percentages of the Yes and No responses were presented and discussed. The summary of results and creation of tables from the household survey were done using the IBM SPSS Statistics 20.0 for Windows following the descriptive statistics. Baseline information on socio- demographic variables and frequencies using dichotomous queries were obtained and summarized. Coordinates of the households were also plotted to map the locations where interviews took place.

Figure 2 shows the household locations of the 170 respondents who were interviewed for the determination of level of awareness on various aspects concerning peatland ecosystem.

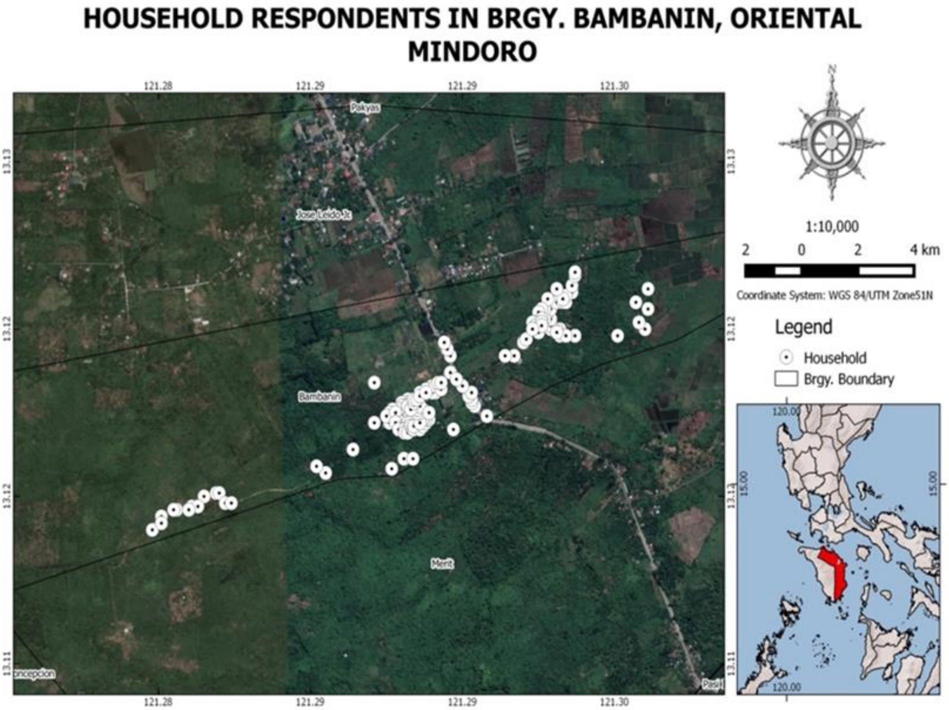

Figure 2. Household locations of 170 respondents in Brgy. Bambanin Oriental Mindoro.

RESULTS AND DISCUSSION

Table 1 shows that out of the 170 respondents interviewed in Bambanin, Victoria, Oriental Mindoro, majority are female (82.94%), are aged between 31 to 60 years old (61.18%), and are married (62.35%). In terms of educational attainment, 24.71% finished primary education, 22.35% are undergraduates, an equal number of respondents (4.71%) are college undergraduates and college graduates, and 5.88% did not receive formal education.

Table 1. Bambanin respondents' demographic characteristics.

Particulars	Frequency (n=170)	Percent
Sex	29	17.06
Male	141	82.94
Female	**170**	**100**
Total		
Age		
Below 30 years old	40	23.53
31 to 60 years old	104	61.18
More than 60 years old	26	15.29
Total	**170**	**100**
Civil Status		
Married	106	62.35
Single	15	8.82
Widow/ Widower	16	9.41
Separated	2	1.18
Live-in	31	18.24
Total	**170**	**100**
Educational Attainment		
Elementary Undergraduate	38	22.35
Elementary Graduate	42	24.71
High School Undergraduate	29	17.06
High School graduate	32	18.82
College Undergraduate	8	4.71
College Graduate	8	4.71
Vocational	3	1.76
No schooling	10	5.88
Total	**170**	**100**

Further findings presented in Table 2 revealed that 25.29% of the respondents are plain housewives, 24.12% are farmers, 21.76% are skilled workers, and 18.24% are into entrepreneurial businesses. The rest are engaged in other livelihoods such as working in companies and in Local Government Unit (LGU), work as babysitters or Overseas Filipino Workers (OFWs). Although the study area is situated adjacent to Naujan Lake, very few are engaged in fishing (3.53%).

More than half of the respondents (58.82%) earn less than P5,000.00 per month. Comparing this amount to the 512-peso minimum wage set by the National Wages Productivity Commission under the Department of Labor and Employment (DOLE), the respondents' earnings were way lower than the minimum wage. Moreover, 30.59% of the respondents earn between P5,000.00 to P10,000.00, and only 10.59% earn more than P10,000.00 per month. It can be noted that majority of the respondents live below the PSA's 2019 poverty threshold per family per month which is P10,481.00. This is the amount needed by a family of five to meet their basic food and non-food needs.

Knowledge and Awareness on Peatland Ecosystem

Knowledge is viewed as "a complex concept which consists of information and skills acquired through experience. It is also about truth and belief, perspective, judgements and expectations" (Hari et.al, 2016). Awareness, on the other hand, is "the state or ability to perceive, to feel, or to be conscious of events, objects, or sensory patterns" (Gafoor, 2012).

Table 2. Respondents' socio-economic attributes.

Particulars	Frequency (n=170)	Percent
Occupation		
Skilled worker	37	21.76
Farmer	41	24.12
Fisherman	6	3.53
Employee	12	7.06
Entrepreneur	31	18.24
None (Housewife)	43	25.29
Total	**170**	**100**
Monthly Income		
Less than P5000	100	58.82
P5,001 to P10,000	52	30.59
More than P10,000	18	10.59
Total	**170**	**100**

When the respondents were asked about their knowledge and awareness on what a peatland is or if they noticed the presence of peatland in Bambanin, 77.65% answered positively while 22.35% replied otherwise as shown in Table 3.

Table 3. Respondents' knowledge and awareness on peatland ecosystem.

Particulars	Frequency (n=170)	Percent
Awareness of presence of peatland		
Yes	132	77.65
No	38	22.35
Total	**170**	**100.00**
Knowledge on peatland ecosystem		
Muddy/water underneath	96	72.73
Not suitable for farming/yield not good	10	7.58
Has less trees compared to upland	9	6.81
Dominated by common reed	7	5.30
Water is rusty	8	6.06
Soil is black	1	0.76
Occurrence of fire	1	0.76
Total	**132**	**100**

The respondents' knowledge on peatland was based on their observation and the difference of the soil and vegetation from the uplands. Majority (72.73%) of those who said they know what peatland is described it as having very soft soil (muddy) which they attributed to the presence of more water underneath. During the survey, the respondents mentioned that the reason why less people are visiting the peatland is because of fear of being submerged in deep mud. A few respondents believed that the peat soil is not suitable for farming and although fruit trees, rice, corn, and other crops can grow in peatlands, the yield is not good and the crops do not reach maturity and eventually die. Some respondents also observed that there are more trees in the uplands compared to the peatland which they also refer to as lowland. Other observations on peatlands include domination by tambo (common reed) or Phragmites sp which were found growing all over the area, having rusty water, and that peat soil is black.

The knowledge of the respondents on peatland being muddy was supported by the statement given by one of the Key Informants from PAWCZMS who was involved in peatland profiling. Such characteristic was one of the identified problems in the delineation and mapping of peatland boundary as technical people could not go in areas with very deep mud, especially during wet season, for safety reasons.

Importance of Peatland Ecosystem

Globally, peatlands are found in boreal, tropical, and temperate regions where they essentially provide various ecosystem services (Schulte et al., 2019). Wösten, Rieley, and Page (2008) noted that tropical peatlands are a home for many endemic and endangered plant and animal species; provide water for drinking and irrigation; act as buffers between salt and freshwater hydrological systems; carbon storage; and provide food, shelter, and medicine.

Table 4. Respondents' perception on the importance of peatland.

Particulars	Frequency (n=170)	Percent
Are peatlands important?		
Yes	76	44.71
No	94	55.29
Total	**170**	**100**

Table 4 shows that more than half of the respondents (55.29%) believe that peatland has no use at all. On the other hand, 44.71% answered that peatland provides the following services: 1) It can be planted with rice, tuber plant (taro), banana trees, vegetables, other peatland-associated trees like bangkal (*Nauclea orientalis*), fruit trees and a variety of plants. Accordingly, it is the kind of soil that most farmers require as it is easy to till or dig out. However, this can only be done if drainage canals are dug to get rid of some water to make the soil more suitable for farming; 2) It acts as a sponge that absorbs water during heavy rainfall, thereby, prevents flooding in the area; 3) Tambo flowers can be used in making soft whisk brooms which they sell and became a source of income for some residents; 4) Source of clean water; and 5) Peat soils are sometimes used as fertilizers.

Factors Contributing to Peatland Degradation

Dohong et al., (2017) cited that logging, development of industrial plantations, drainage, and periodic fires are the primary causes of peatland degradation in South-East Asia. According to Wetlands International (2009), key drivers of peatland deterioration include drainage (grazing, agriculture, and industrial plantation), deforestation (legal and illegal logging), fire, weak governance (lack of awareness and coherent policies), and poverty (limited development options). Hooijer et al., (2010) indicated that threats to peatland stability include deforestation, drainage, and fire owing to human activities.

The CENR Officer of Socorro, Oriental Mindoro through a key informant interview shared that agriculture is the major issue in peatland degradation. Soil subsidence (gradual settling or sinking of peat surface) was observed as a result of drainage and is now considered as a critical problem in peatland management. He said that drainage makes the soil compacted due to the lowering of groundwater table. He added that there were reports that calamansi and rambutan planted in the peatland were seen leaning then eventually died as soils became compacted due to subsidence. This incidence was also observed by Nur Khakim et al., (2020) where they stated that drainage networks have significant impacts on peatland subsidence patterns. Subsidence normally occurs when peatlands are converted to other land uses such as agriculture (Hooijer et.al, 2012). Wösten et al., (1997), on the other hand, observed that peat subsidence starts as soon as the peatland swamps are drained and can only be stopped by rewetting or waterlogging the peatland again.

Another Key Informant, the Park Superintendent of the Naujan Lake National Park, stated that the rapid degradation of the peatland in the area was due to the lack of awareness of the community that peatland swamp is part of the Naujan Lake National Park which is pronounced as protected area as early as 1968. Inside a protected area, he reiterated that cultivation of vegetated land and over-extraction of resources are prohibited. However, the problem in strict implementation of laws in the area is the classification of the peatland as alienable and disposable (A & D) where some residents have already acquired land titles prior to the proclamation. This made the protection and conservation of the peatland more difficult especially to the regulators.

On the respondents' side, 30.58% of them did not have any idea on what degrades or destroys Bambanin peatland (Table 5). On the other hand, majority (69.42%) believed that the following contribute to the destruction of this ecosystem: a) the water's rust color (tea-like); b) the soil's waterlogged condition; c) the unusually deep mud; d) the presence of too much water underneath the soil especially during rainy season; e) non-biodegradable wastes that are dumped into the peatland area; f) land is being mismanaged; g) tillage; h) creation or establishments of a long/huge network of drainage canals; i) cutting of trees; j) the presence of reeds that dominate the area which as they say cover much of the peatland, thus, blocking the penetration of sunlight needed by the soil; k) flooding and l) building of houses inside the peatland.

Table 5. Respondents' perception on the factors contributing to peatland degradation.

Particulars	Frequency (n=170)	Percent
Do you have an idea on what destroys peatland?		
Yes	118	69.42
No	52	30.58
Total	**170**	**100**

Peatland Fires

Peatland fires are one of the key issues in peatland management especially during a prolonged dry season. Despite the peat soil's waterlogged characteristic, fire still occurred as informed by a respondent. Uncontrolled peatland forest fires are a usual occurrence in Indonesia specifically in Kalimantan and Sumatra which release vast amount of smoke detrimental to wildlife and human health, economy, and climate (Harrison et.al, 2009). Rueda and Pasicolan (2015) reported the incidence of recurring peatland forest fires particularly in Talacogon peatland which is part of the Agusan Marsh Wildlife Sanctuary. It was questioned whether these fires were natural or man-made as fisherfolks are known to burn peatland vegetation for fishing purposes.

Compared to peatlands found in other SEA countries such as Indonesia and Malaysia where peatland fires are usual scenarios, Bambanin peatland fire seldom happens as only eight (4.71%) respondents were able to experience or witness it (Table 6). Most of them said that the fire happened a long time ago, usually during summer or when the soil became very dry. A respondent also noted the last fire occurrence in the peatland that happened in 2013. They believed that the cause of fire can be attributed to the release of certain gases (they could not identify the kind of gas) due to the dryness of the soil and too much heat. Accordingly, agriculture that entails tillage, dry litters and heat underneath the soil likewise contributed to peatland fires.

Table 6. Respondents' answers on the occurrence of peatland fires.

Particulars	Frequency (n=170)	Percent
Witnessed peatland fires		
Yes	8	4.71
No	162	95.29
Total	**170**	**100**

Peatland Agriculture

During a previous IEC activity of the ERDB in the area, one of the socio-economic concerns mentioned by the participants was the suitability of the peat soil to their crops (rice and corn). A number of them recounted that the cash crops they harvested had poor quality and low survival, hence, the suitability of these crops to the kind of soil in their planting site was questioned. The participants were then informed that since peat soil has high pH but low in nutrients, good yield will not be guaranteed as same observations were told by the farmers in Talacogon peatland in Agusan del Sur (Pasicolan et al., 2016, unpublished). In addition, tilling the peatland triggers the emission of considerably high amount of greenhouse gases (GHG) to the atmosphere contributing to global warming. It is a known fact that peatlands have been exploited for intensive agriculture such as the ill-fated mega rice project in Indonesia (Page et al., 2009).

Table 7 shows that 30% of the respondents, including some housewives, are engaged in farming with farm lots that ranged from as small as 0.001 to 12 ha. Out of 51 farmer-respondents, only 22 apply fertilizers. For small farmers, most of the crops are used for daily sustenance but a small portion is also sold for extra income that ranged from as low as P24.00 to P2,000.00 per cropping season. Those who own relatively large farm lots can produce yield that can be sold from P3,000 to P45,000 per cropping season.

Table 7. Respondents who do farming in the peatland.

Particulars	Frequency (n=170)	Percent
Engaged in farming in the peatland		
Yes	51	30
No	119	70
Total	**170**	**100**
Fertilizer application		
Yes	22	43.14
No	29	56.86
Total	**51**	**100**
Frequency of Application		
Once a week	1	4.54
Once a month	2	9.10
Once a year	1	4.54
2-4 times every cropping season	18	81.82
Total	**22**	**100**

Probable Effects of Peatland Agriculture

Moreover, Table 8 shows that majority of the respondents are not aware on the probable effects of peatland agriculture (86.47%), have not observed drainage canals inside the peatland (61.76%) and do not believe that draining the peatland help produce high yield (69.41%).

Table 8. Respondents' answers on the probable effects of peatland agriculture, drainage and yields.

Particulars	Frequency (n=170)	Percent
Are you aware on probable effects of peatland agriculture?		
Yes	23	13.53
No	147	86.47
Total	**170**	**100**
Do you observe drainage canals inside the peatland?		
Yes	65	38.24
No	105	61.76
Total	**170**	**100**
Does draining the peatland help produce high yields?		
Yes	52	30.59
No	118	69.41
Total	**170**	**100**

The respondents were also asked if they are aware on the probable consequences when peat soil is tilled for agriculture, its effects on the soil, air and the atmosphere. Survey revealed that only 13.53% has knowledge about it and only few noted that soil becomes too dry when canals are drained for agriculture. When the soil is dry, large amount of dust is immediately released into the air when land is tilled. Some said that when peatland is destroyed, flooding is possible to occur.

Moreover, 38.24% of the respondents who noticed the canals inside the peatland were asked about the canals' purpose. All of them confirmed that they were built so that the water is drained from the peatland, making the soil harder and suitable for farming. Although they already know that canals destroy the peatland, they believed that it is the only way that the peatland can be utilized for agriculture.

On the other hand, 30.59% of the respondents observed that despite the creation of more and longer canals inside the peatland, the soil is still not suitable for agriculture therefore good yield and high quality crops are still not guaranteed. However, since most respondent-farmers rely on peatland for a living, they worked on whatever the peatland can offer.

A study in Bambanin peatland by Rueda et al. (2020) observed that huge amount of CO_2 is released to the atmosphere. Such emission is enhanced by anthropogenic activities such as farming, drainage and deforestation. As agriculture entails drainage of the peat soil, peat decomposition rapidly occurs that results to a higher risk of fire occurrences, emitting additional CO_2 which may lead to biodiversity loss or possible extinction (Miettinen, Shi, & Liew, 2012).

Conduct of Information, Education and Communication Campaign in the area

Among the respondents, 31.76% said that IEC activities were already conducted in their area (Table 9). These activities covered topics on awareness on peatland ecosystem and its importance, encouragement of participation and feedback, and advocacy on wise use and sustainable management of peatland.

Most of these activities were spearheaded by DENR-CENRO Oriental Mindoro. In terms of the learnings gained from these IEC initiatives, their answers were divided into the following: a) avoid dumping and burning of wastes inside the peatland; b) do not cut trees; c) observe safety measures when inside the peatland as the soil is indeed soft; d) that construction of houses (using hollow blocks) is discouraged; and d) plant as many trees as possible.

Table 9. Respondents' answers on the IEC activities conducted in Bambanin.

Particulars	Frequency (n=170)	Percent
IEC activities		
Yes	54	31.76
No	116	68.24
Total	**170**	**100**

Conservation and protection measures for the peatland

Majority of the respondents (73.53%) believe that something must be done for the purpose of conservation and protection of the peatland. Some of the activities they suggest include: a) avoid cutting of trees, instead plant trees such as bangkal which can survive in the peatland ecosystem (36.00%); b) canals should be created so that water will not be stored leading to its destruction (34.40%); and c) peatland must not be touched nor tilled and must be left it in its natural condition (17.60%).

Table 10. Ways to conserve the peatland ecosystem.

Particulars	Frequency (n=170)	Percent
Conservation of peatland		
Yes	125	73.53
No answer	45	26.47
Total	**170**	**100**
How to conserve peatland		
Protect the peatland	6	4.80
Do not touch or till the land	22	17.60
Do not create canals	43	34.40
Do not make the peatland idle	5	4.00
Do not let the grasses dominate the peatland	2	1.60
Do not burn wastes	2	1.60
Do not cut trees	45	36.00
Total	**125**	**100.00**

Awareness of Bambanin residents on the peatland ecosystem

According to Din et al., (2013), the creation of a society that is well-informed, well-aware, and can implement practices that will help sustain the environment is crucial. Determining the level of awareness of the respondents surrounding Bambanin peatland is necessary for the concerned agencies and law regulators to determine the direction they have to go and the kind of strategies to employ in conserving and rehabilitating this ecosystem.

Five questions lifted from the original survey questionnaire were used in determining the level of awareness of the respondents. There were dichotomous questions answerable by Yes or No. The frequencies and percentages of the respondents' answers to each question are plotted in Table 11.

Table 11. Awareness of Bambanin respondents.

Questions lifted from the survey tool	YES Response		NO Response	
	Frequency	%	Frequency	%
1. Do you have any idea on what a peatland is or how it was formed?	132	77.65	38	22.35
2. Are you aware of the existence of a peatland in Bambanin?	133	78.24	37	21.76
3. Do you know the importance of peatland?	76	44.71	94	55.29
4. Do you know what happens to the soil, air and atmosphere when peat soil is tilled to give way for agricultural activities?	23	13.53	147	86.47
5. Do you know the effects of peatland drainage?	61	35.88	109	64.12

Table 11 shows that the large proportion of the sampled population were fully aware of what a peatland is as well as its existence in Bambanin. This is in reference to the first two questions that almost had the same relative frequency of 78%. However, when asked about the importance of the peatland ecosystem, more than half (55.29%) had no idea. This suggests that their knowledge on peatland is limited only to its existence in the area but lack deeper understanding about it. Moreover, a large percentage (64.12%) of the respondents did not know the negative effects of creating a network of drainage within the peatland. Majority (86.47%) did not have any idea on what is happening in the peat soil properties or to the atmosphere when the land is used for agriculture.

CONCLUSION AND RECOMMENDATIONS

The respondents' low educational attainment affected their perception on the different aspects of peatland ecosystem including its ecology, importance, degradation, protection, and restoration. Though the proportion of the respondents that utilize peatland in farming was relatively small, the effects of agricultural activities including tillage, drainage and burning contribute in the rapid degradation of the peatland. Considering also that these agricultural practices have been existing for a relatively long time, further deterioration of the already disturbed peatland is inevitable.

The respondents are fully aware of the concept and existence of peatland in Bambanin. However, deeper understanding on the importance of peatland and the impacts of anthropogenic activities on the overall state of the Bambanin peatland is considered low. This low understanding, together with other issues that are likely to emerge in the future, presented new challenges to the DENR regulators. This problem could also highly be associated with the very low proportion of the respondents' population who were able to participate in the IEC activities. Low environmental awareness hinders the communities to protect and conserve the peatland ecosystem that leads to the degradation of ecological services.

It is recommended that the result of the study be used by the concerned government agencies as baseline information for the protection of the peatland since it helps reduce the GHG emissions brought about by anthropogenic activities and mitigate the probable effects of global warming to humans and the environment.

The local government of Bambanin should also formulate mitigation policies in the form of municipal ordinance particularly on land use management to address issues on peatland hydrology, agricultural activities, and human encroachment to the protected area. Further, a Municipal Resolution is suggested to be crafted to seek wide compliance among the constituents and to elicit active participation of the Local Government Unit and the people in the community in the protection and management of peatland. As low knowledge and awareness on this important environmental asset contributes to its degradation, massive IEC activities such as informational seminars and distribution of localized IEC materials must be conducted in the communities to recognize the fragility of this sensitive ecosystem.

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STATEMENT OF AUTHORSHIP

The author conducted the primary data collection, literature search, analysis of data, interpretation of results and the writing, including the revisions, of this research article independently. The author also ensures that what she has written in this paper is entirely her own original work.

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