



Ecosystem Services Valuation of BIRILAROSA Protected Landscape and Seascapes (BLPLS) in Northern Samar, Philippines

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Abstract

Payment for Ecosystem Services (PES) is becoming increasingly popular as a way to manage ecosystems using economic incentives. The environmental economics approach to PES incorporates ecosystem services into the market model, with an emphasis on efficiency. The ecological economics approach, in contrast, seeks to adapt economic institutions to the physical characteristics of ecosystem services prioritizing ecological sustainability and just distribution and requiring a trans/multidisciplinary approach.

This project aimed to identify the potential ecosystem services in BiriLaRoSa Protected Landscape and Seascape (BLPLS) and to estimate the stakeholders (Buyers and Sellers) willingness to pay and accept the payment for ecosystem services provided by the Biri Rock Formation sites. A proposition scheme and negotiation agreement on the ecosystem payment schemes are likewise proposed for future management conservation efforts of the local community to sustain, and preserve the natural ecotourism sites in Biri Larosa Protected Landscape and Seascape.

Keywords: Payment for Ecosystem services, Birilarosa Protected Landscape and Seascape, Buyers, Sellers.

1. Introduction

Ecosystem services are defined as services provided by the natural environment that benefit people. Ecosystem services likewise deliver outputs or outcomes that directly and indirectly affect human wellbeing and these considerations can link well to taking an economic approach. The underlying case for the valuation of ecosystem services is that it will contribute towards better decision-making by ensuring that policy appraisals fully take into account the costs and benefits of the natural environment and by highlighting much more clearly the implications for human wellbeing while providing new insights for policy development. Some of these ecosystem services are well known, including food, fiber and fuel provision and the cultural services that provide benefit to people through recreation and appreciation of nature. Other services provided by ecosystems are not so well known. These include the regulation of the climate, purification of air and water, flood protection, soil formation and nutrient cycling. These are not generally considered within policy appraisal and represent an area where a greater and more systematic focus would be very useful.

The **Biri Larosa Protected Landscape and Seascape (BLPLS)** is a protected area located in Northern Samar, Philippines, 40 kilometers (25 mi) west of the provincial capital, Catarman. It is in the Balicuatro Islands, composed of the island municipality of Biri and associated smaller islands, off the northwestern coast of Samar in the San Bernardino Strait.

It also includes the coastal areas of the adjacent municipalities from which it derives the second half of its name – a combination of the first two letters of the names of the municipalities of Lavezares, Rosario and San Jose.

The protected area spans 33,492 hectares of land and sea when it was gazetted in 2000 through Presidential Proclamation No. 291. It is famous for its natural rock formations, as well as beaches, coral reefs, sea grass beds and mangrove forests. The San Bernardino Strait, noted for its strong waves and currents, is also a popular surfing location in Samar.

Based on the PAME-METT survey, the highest identified ecosystem services threats are: illegal fishing activities, urbanization, climate change, unregulated recreational and tourism activities, change in political leadership, gravel and sand extractions, improper waste management, land conversion, and lack of support fund for resource management program. Lack of awareness on the BLPLS protected area was also observed to contribute to these threats.

All these identified problems, issues and concerns which, directly and indirectly, contribute to the potential deterioration of these seascape/landscape ecosystem resources can no longer be ignored as the associated socio-economic setbacks brought about by these identified threats are now being felt by the people in the community and the protected area stakeholders as well.

It is on this context that environmental protection and biodiversity conservation of the BIRILAROSA protected seascape/landscape must be given foremost attention. Furthermore, the area is now the center of eco-tourism in the province and among the tourist attraction in the Philippines. Thus, the need to assess economic value of the BLPLS environmental services with its corresponding impacts/ importance to the people in the community and to all stakeholders.

As the first phase of this project, it was proposed that focus is given on the valuation of the Biri rock formations being considered as the major eco-tourism destination in the BLPLS. A study on ecosystem services valuation for this particular protected areas was conceptualized in order to determine its potential services and the willingness of the community and stakeholders to pay for it and its acceptability.

2. Objectives

To determine the potential services available in BLPLS.

To estimate the willingness to pay and to accept of the buyers/tourists/resource users for the improved ecotourism services provided specifically by the Biri Rock Formation.

To propose payment schemes for BLPLS ecosystem services provided.

Define/recommend negotiating agreements between and among the sellers and buyers of the ecosystem services identified.

3. Locale of the Study

The study was conducted in the seascapes and landscapes of the four (4) covered municipalities of BIRILAROSA, namely; Biri, Lavezares, Rosario, and San Jose. These municipalities are in the Balicutro area in the first congressional district of Northern Samar covering a total of 16 barangays as sampling sites. These sites were selected for their being regularly visited by national and local tourists.

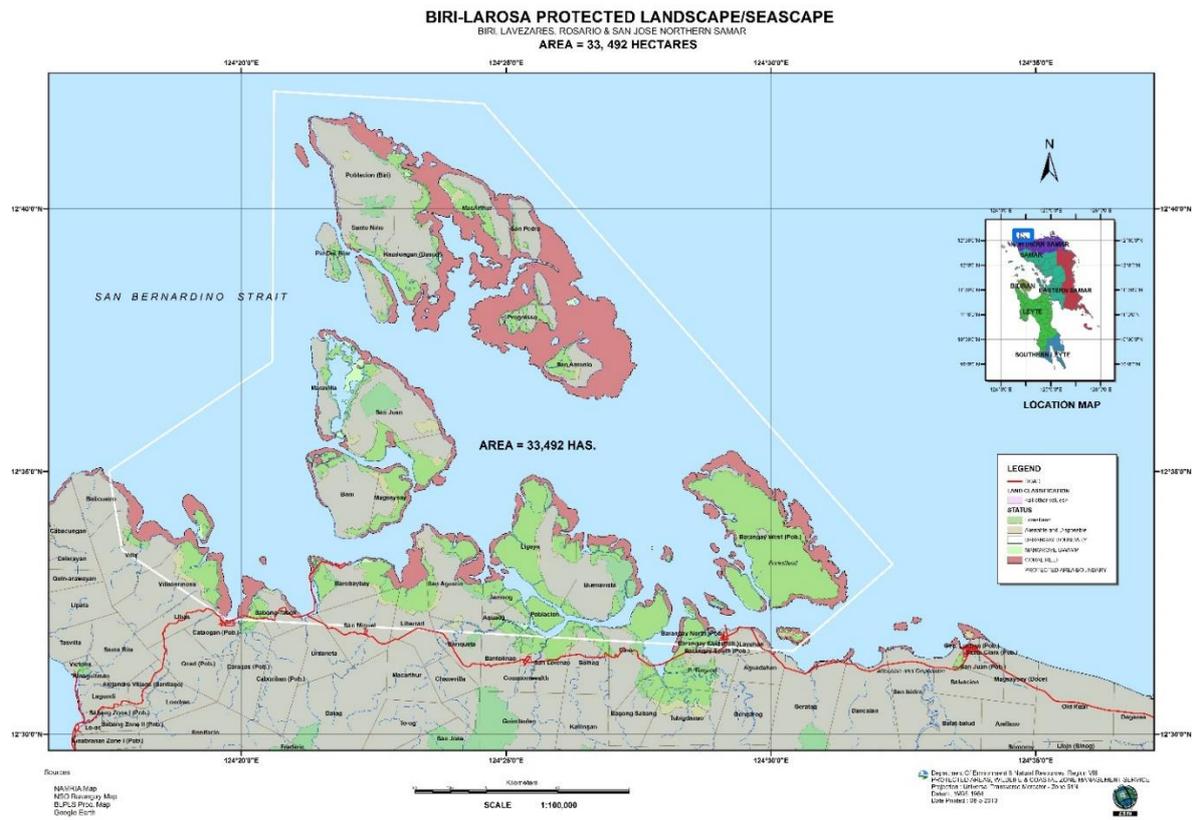


Figure 1

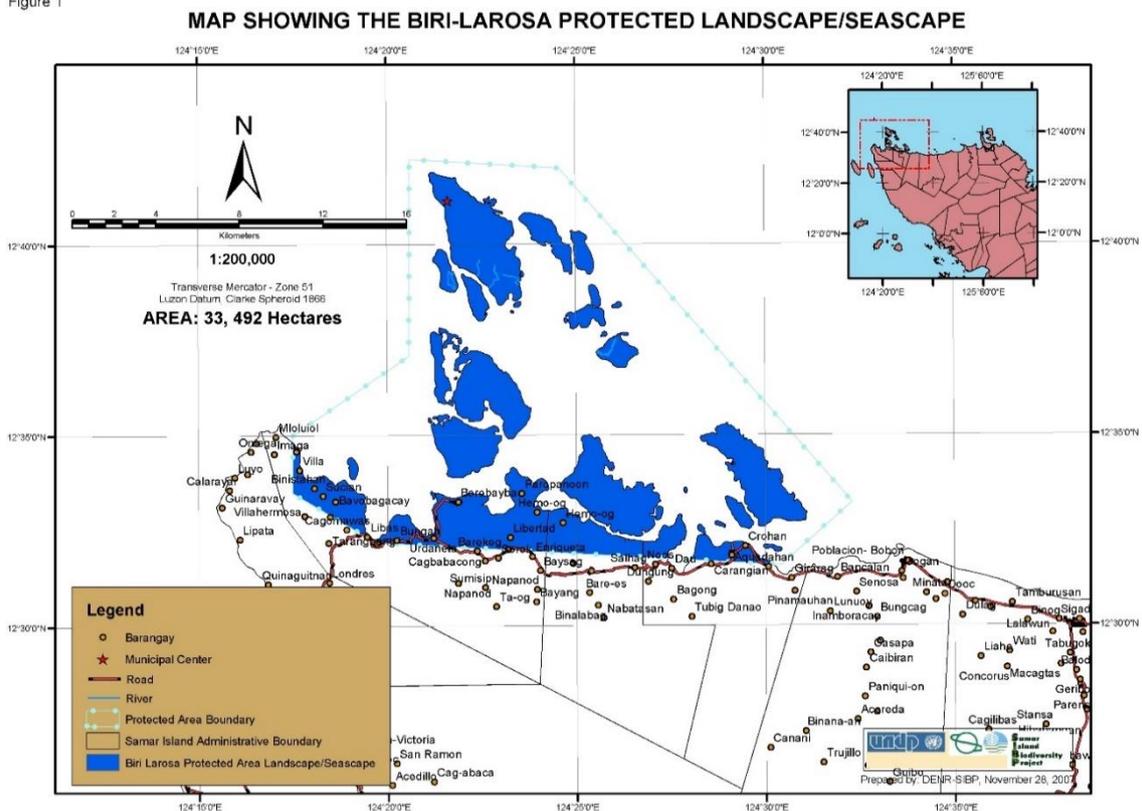
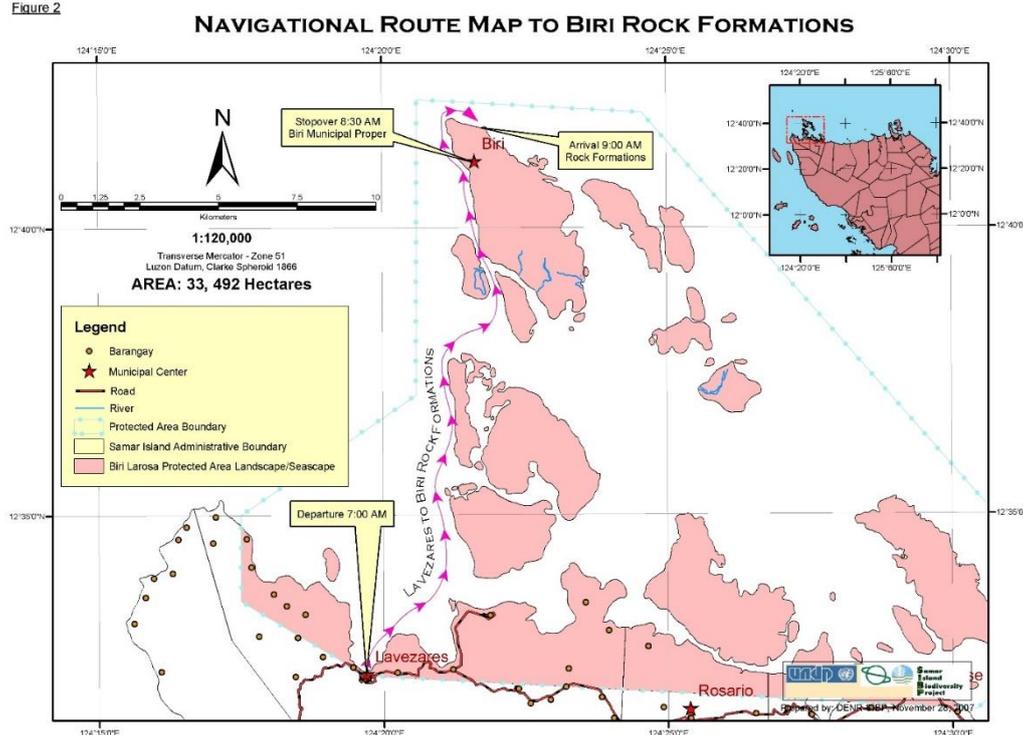
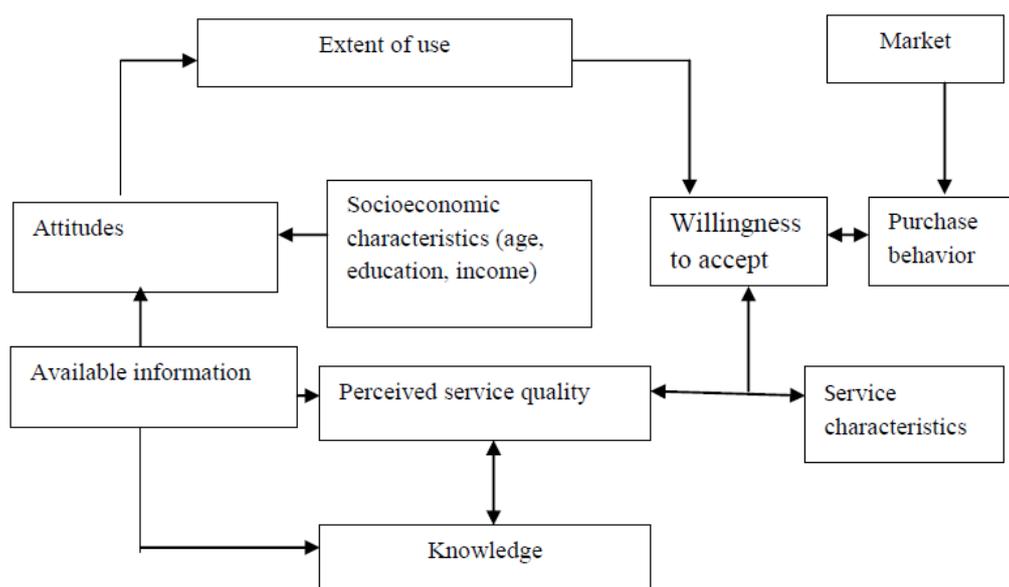


Figure 2



4. Conceptual Framework

The willingness to pay for ecosystem services is influenced by various characteristics of ecosystem users such as the assets owned by the household head. These assets are functions of various factors including socioeconomic policies and institutional frameworks set by governments and sociocultural backgrounds. Likewise, sociodemographic characteristics such as gender, age, income, marital status, and family size may influence WTP but the relative influence of these factors vary across communities/sectors who tend to attach different values to ecosystem services based on their norms, culture, and preferences (Stephen, 2015).



Conceptual Framework illustrating factors that influence WTP (Stephen, 2015)

Respondents

A total of **one thousand three hundred twenty five (1,425) respondents** were interviewed (Fig. 2). Effort was made so that the respondents cut across and are representative of the different sectors; namely: buyers, sellers, government organizations, women, fisherfolks, farmers, youth and students, transport (boat operators and motorcycle drivers), business owners, tourists (both local and foreign), and members of the PAMB. The more than one thousand survey respondents were from the 16 barangays; namely: San Antonio, Sto. Nino, Poblacion, and Proper of the municipality of Biri; Libas, Urdaneta, Barobaybay, and San Agustin of the municipality of Lavezares; Buenavista, Ligaya, Jamoog, and Aguada of the municipality of Rosario; Dao, North Geratag, and Aguadahan of the municipality of San Jose.

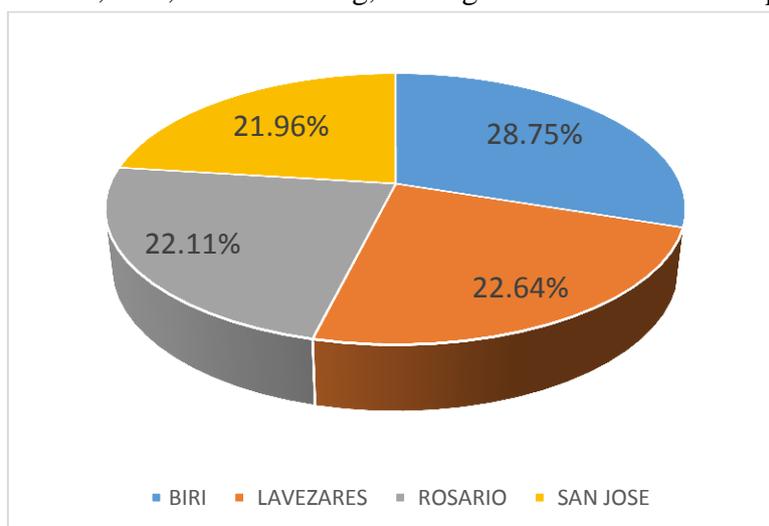


Fig. 2. Percentage Distribution of Respondents per Area

5. Methodology

Data collection in the BIRILAROSA protected seascapes and landscapes were conducted from September 20 to December 15, 2017. Quantitative and qualitative methods were employed to determine the willingness of the people in the community to pay for the ecosystem services provided by BLPLS.

A series of data gathering activities was facilitated by the research management team to the target respondents from the 16 barangays as the strategic areas of the BLPLS. A social survey questionnaire was used to gather primary data on economic valuation on existing ecosystem services in the protected areas, and the respondents' willingness to pay (WTP) PES. Collection of data and relevant information were administered by the three (3) field researchers assisted by the research project management team.

To further validate the data gathered, participatory resource appraisal processes were undertaken. Data and information validation were documented from the series of focus group discussion (FGD) activities, Key Informant Interview (KII) and informal one-on-one communication with the people in the community represented by a total of 110 FGD participants 47 key informant interviewees, and 43 one-on-one communication. Basic essential data and information on their willingness to pay environmental or ecosystem services provided by the protected seascape/landscape in BLPLS were solicited.

6. Results and Discussion

Respondents' Profile

The respondents were grouped according to their sectoral representation and whether they are buyers or sellers (Table 1). The members of the PAMB were separated as a group considering that this is the main proponent of the payment for ecosystem services. Local tourists refer to local inhabitants in the province not living in the identified 16 barangays but were at the site during the conduct of the survey.

Table 1. Profile and the Respondents per Sectoral Representation

SECTORS	Biri		Lavezares		Rosario		San Jose		TOTAL		Total Respondents	%
	Buyers	Seller	Buyers	Seller	Buyers	Seller	Buyers	Seller	BUYERS	SELLERS		
Fisherfolks	14	31	15	28	14	23	13	31	56	113	169	11.86
Farmer	14	33	14	27	13	22	12	30	53	112	165	11.58
Women	15	17	9	22	11	32	13	15	48	86	134	9.40
Youth/Students	16	32	11	25	12	30	8	27	47	114	161	11.30
Transport (Boat Operators and Drivers)	20	53	17	45	24	32	23	35	84	165	249	17.47
Business/Resort Owners	21	31	11	21	11	26	8	29	51	107	158	11.09
Government Employees	46	38	23	32	13	30	19	28	101	128	229	16.07
Local Tourists									132		132	9.26
Foreign Tourists									11		11	0.77
PAMB										17	17	1.19
Grand Total	146	235	100	200	98	195	96	195	583	842	1,425	100.00

Table 1 shows the distribution of sectoral representation of the respondents from the BIRILAROSA protected areas.

It is interesting to note that there were many PES sellers (842) compared to buyers (583) (Fig. 4). The number of available buyers are those who were interviewed in the local communities including the tourists (local and foreign) who were at the site during the conduct of the survey.

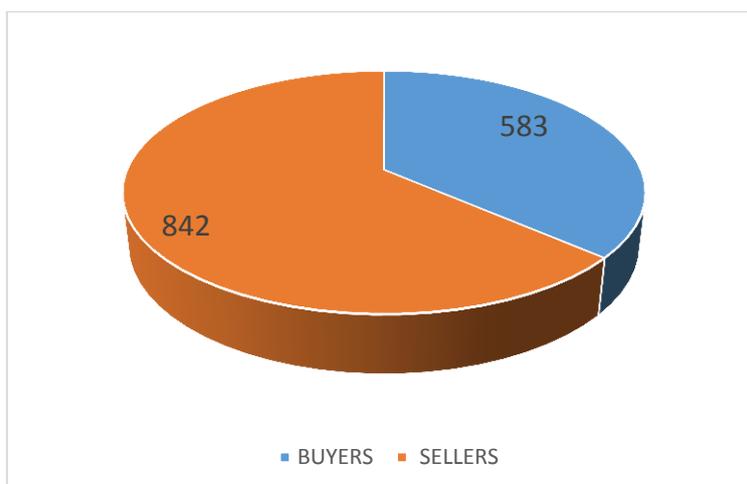


Figure 4. Distribution of Respondents whether Buyer or Seller

In this study, the “sellers” are those who provide services (e.g., transport, accommodation / resort / business) and / or make use of products of the natural resources in the area and derive income in the process (e.g., agri-fisheries products and by-products sold by farmers, fishers, women, small business, etc.) and/or provide ecosystem services such as the Biri Rock Formations (e.g., the LGU, PAMB, Tourism Office). On the other hand, the “buyers” are generally classified as consumers who avail of the above-mentioned services and pay a certain amount in return. However, the thin line between the dichotomy of these respondents can be eradicated when it comes to the overall ecosystem services because almost all of these respondents can be considered as “buyers” since they derive benefit from the ecosystem services provided within the BLPLS protected area.

Respondents’ Familiarity and Awareness of the Ecosystem Services Available in the BLPLS Protected Areas (PAs)

Table 2 presents the respondents’ familiarity and awareness of the potential services provided by the BLPLS protected areas. The ecosystems services were categorized into four (4) components; namely: provisioning (food, fuel/energy source, and others); regulating (biodiversity enhancement, environmental protection, and purification); supporting (nutrient, production, tourism, scientific, and political); and cultural (spiritual and recreational).

Table 2. Respondents’ Familiarity and Awareness of Potential Services Available in BLPLS Protected Areas (PAs)

PAs	Provisioning			Regulating			Supporting				Cultural		
	Food	Fuel/ Energy	Others	Biodiversity Enhancement	Environmental Protection	Purification	Nutrient Cycling	Production	Tourism	Scientific	Political	Spiritual	Recreational
Biri													
Buyers	50.5%	54.5%	44%	43.3%	61.6%	48.5%	48%	47%	48%	36%	43%	34%	48%
Sellers	81%	70.8%	60.6%	68.1%	61%	91.2%	64.3%	76.2%	76.2%	86.8%	66.8%	62.5%	76.2%
Lavezares													
Buyers	76.5%	89.6%	68%	69.5%	74.3%	68%	49%	57%	68%	64.3%	68%	73%	76.2%
Sellers	71.9%	95.2%	58%	58.5%	68.5%	70.4%	50%	50%	73%	51%	57%	56%	73%
Rosario													
Buyers	77%	62%	65%	74%	69%	80%	57%	62.5%	67%	56%	66%	64%	67%
Sellers	82%	78.3%	65%	78.5%	73.6%	73.6%	57%	67.5%	87%	63.5%	80%	64%	87%
San Jose													
Buyers	92.2%	80.2%	89.4%	89%	78%	94%	66%	66.5%	67%	80%	84%	76%	67%
Sellers	82.2%	78.3%	81%	73.5%	69.6%	94%	66%	66.5%	67%	84%	84%	75%	67%
Average %	76.69%	74.19%	66%	69.27%	68.76%	78.81%	66%	66.50%	67%	84%	84%	75%	67%
	72.29%			72.28%			73.5%				71%		

It is interesting to note that an average of 72.26% of the total population were very much aware of and familiar with the services provided by the natural ecosystems to their daily living. The four (4) components of the ecosystems services got the following rating: provisioning, 72.29%; regulating, 72.28%; supporting, 73.5%; and cultural services, 71%. The potential ecosystem services (PES) available in the BLPLS protected areas are enumerated in Table 3, which shows a high potential of diverse products and services benefitted by the local population. Biodiversity protection, conservation, and enhancement should be considered for local legislation.

Table 3. Potential Ecosystem Services (PES) Commodities and Services Provided by the BLPLS Protected Areas (Pas)

Potential Ecosystem Services	Commodities and Services Available in BLPLS PAs			
	BIRI	LAVEZARES	ROSARIO	SAN JOSE
Provisioning	Mangroves, sea foods, fiber, fuel, medicine, seaweeds, agri-fishery, livelihoods	Forest, agri-fishery crops, Mangroves, sea foods, fiber, fuel, medicine, seaweeds, Livelihoods, watershed protection	Water systems, forest, food, fibers, fuel, agri-fisher crops, livelihoods, watershed protection	Water systems, Mangroves, sea foods, fiber, fuel, medicine, agri-fishery crops, livelihoods, watershed protection
Protecting/Regulating	Rock formation, Mangroves, sea grasses, buffer zones, preserving scenic beauty	Rock formation, mangroves, sea grasses, buffer zones, maintenance of landscape beauty	Mangroves, sea grasses, buffer zones, carbon sequestration	Mangroves, sea grasses, rock formation, buffer zones
Supporting	Soil formation, nutrient cycling, Photosynthetic activities, biodiversity conservation	Soil formation, nutrient cycling Photosynthetic activities, watershed protection	Soil formation, nutrient cycling Photosynthetic activities,	Soil formation, nutrient cycling, Photosynthetic activities
Cultural	Eco-tourism, educational, recreation, aesthetics, spiritual values	Eco-tourism, educational, recreation, aesthetics, spiritual values	Eco-tourism, educational, recreation, aesthetics, spiritual values	Eco-tourism, educational, recreation, aesthetics, spiritual values

Awareness and Knowledge on Coral Reefs, Sea grass, Mangroves Ecosystem

Most of the respondents **strongly agree** that the Biri seascape/landscape protected areas provide environmental and economic benefits to the community. The healthy ecosystem attracts both national and local tourists. It also harbors marine biodiversity. The entire ecosystems offer sustainable livelihood opportunities to the local folks. Only two (2) respondents expressed strong disagreement especially on the statement about community protection from natural disasters and importance to fishermen, divers and snorkelers.

Table 4 shows the comparison of knowledge and awareness of buyers and sellers on the ecosystem services provided by the BLPLS PAs.

Table 4. Comparison of the Knowledge and Awareness of Buyers and Sellers on the PES of the BLPLS Pas

PES of the BLPLS PAs	AGREE				STRONGLY AGREE			
	BUYER		SELLER		BUYER		SELLER	
	f	%*	f	%**	f	%*	f	%**
Protection	71	12.18	95	11.28	184	31.56	340	40.38
Livelihood to local folks	84	14.41	120	14.25	180	30.87	340	40.38
Tourism	48	8.23	82	9.74	218	37.39	387	45.96
Habitat	70	12.01	137	16.27	196	33.62	323	38.36
Biodiversity	72	12.35	133	15.80	194	33.28	326	38.72

**percent of the total 583 buyer-respondents

***percent of the total 842 seller-respondents

The data shows that there were more respondents who **strongly agree** to the ecosystem services provided for by the BLPLS PAs. This implies that both local buyers and sellers manifest higher level of knowledge and awareness about the existing services provided by the marine and coastal ecosystems in the BLPLS PAs. Although there is no big difference in the percentage responses, there were more buyers than sellers who strongly agree to the identified PES. In both groups of respondents, tourism and protection ranked first and second, respectively, among the ecosystem services. These responses could mean that protection (of the existing ecosystems) should go with any tourism activity in the area. On the other hand, livelihood to local folks ranked second among the sellers while it ranked last among the buyers. To the sellers, tourism would also mean livelihood opportunity as it encourages economic activities such as value adding to the natural resources products (e.g., danggit production, production of souvenir items from seashells, etc.), aside from generating income through labor and related tourism services in the area.

Potential Threats to the Coral Reef, Seagrass and Mangrove Ecosystems

Table 5 presents the level of familiarity and awareness on the potential threats to the area's ecosystems. More respondents were **very familiar and aware** of the identified threats, with typhoon and natural disasters ranking first among the potential threats.

Table 5. Familiarity of Respondents on the Potential Threats to the BLPLS Pas

Potential Threats	Familiar				Very Familiar			
	Buyers		Sellers		Buyers		Sellers	
	f	%*	f	%**	f	%*	f	%**
Climate Change	74	12.69	120	14.25	176	30.19	297	35.27
Coral bleaching	67	11.49	117	13.90	171	29.33	251	29.81
Typhoon & Natural Disasters	76	13.04	160	19.00	184	31.56	317	37.65
Pollution	87	14.92	136	16.15	169	28.99	275	32.66
Urbanization	67	11.49	105	12.47	177	30.36	187	22.21
Invasive species	17	2.92	138	16.39	147	25.21	233	27.67
Over fishing	69	11.84	123	14.61	176	30.19	300	35.63
Damage from ships	75	12.86	132	15.68	176	30.19	240	28.50
Informal settlers	69	11.84	132	15.68	171	29.33	278	33.02
Massive Tourism	68	11.66	106	12.59	159	27.27	267	31.71
Sedimentation	75	12.86	134	15.91	140	24.01	222	26.37
Unregulated tourism activities	76	13.04	115	13.66	162	27.79	280	33.25

*percent of the total 583 buyer-respondents

**percent of the total 842 seller-respondents

Respondents' Attitude or Level of Support for Coral Reef, Seagrass and Mangrove Ecosystems Management Strategies

Most of the respondents expressed their strong support and commitment to the identified management strategies in the PAs. Only few respondents were not aware or have no idea about the proposed regulatory management strategies. No one from the respondents opposed these propositions.

Table 6. Respondents' Level of Support to the PAs Management Strategies

PAs Management Strategies	Support				Strongly Support			
	Buyers		Sellers		Buyers		Sellers	
	f	%*	f	%**	f	%*	f	%**
Increased enforcements	72	12.35	129	15.30	179	30.70	321	38.08
Setting up limits	77	13.21	110	13.05	170	29.16	280	33.21
Stricter pollution control measures	60	10.29	152	18.03	179	30.70	316	37.49
More restrictions on construction practices	85	14.58	142	16.84	179	30.70	308	36.54
Limits recreation use	84	14.41	147	17.44	181	31.05	318	37.72
Regulated tourism development	75	12.86	99	11.74	174	29.85	290	34.40
PAMB IEC campaign	82	14.07	158	18.74	169	28.99	292	34.64
LGUs compliance to PES capacity	69	11.84	120	14.23	195	33.45	332	39.38
Local legislations	72	12.35	129	15.30	168	28.82	279	33.10
Strict SWM Program	70	12.01	129	15.30	173	29.67	302	35.82
Users fee for PES	71	12.18	123	14.59	168	28.82	265	31.44

*percent of the total 583 buyer-respondents

**percent of the total 842 seller-respondents

More respondents expressed **strong support** to the PAs management strategies enumerated in Table 6. “LGUs compliance to PES capacity” got the highest percentage of responses from the two groups of respondents.

Given the potential threats, the BIRILAROSA protected areas has been subject to protection and conservation. The survey reveals that the attitude and the level of willingness of the buyers and sellers to support the PAs’ management strategies were very high with significant number of sellers and buyers who would strongly support the existing PAs management efforts. Limiting the recreation use to minimize environmental damage due to waste generation and pollution shall be taken into consideration. The respondents’, and the community’s, strong support to the LGU for it to comply with PES capacities and other local legislations should encourage the LGU to enforce ordinances related to environmental protection and conservation. Stricter implementation of the waste management program in the protected areas should also be considered at the local level.

Table 7. Ecotourism Infrastructure Facilities

A. Recreational site	B. Info about protected area-Rock formation	C. Traffic/ Transportation	D. Miscellaneous
<ul style="list-style-type: none"> Sight-Seeing Bird-watching Relaxation Diving/Swimming Area 	<ul style="list-style-type: none"> Tour Guide Brochures IEC Materials 	<ul style="list-style-type: none"> Road Condition Transport Vehicles 	<ul style="list-style-type: none"> Food and Beverage services Accommodation Security and Safety

The existing ecotourism facilities were categorized into four namely: recreational sites, info guide, transportation, and other amenities/miscellaneous. In order to attract both local and

foreign tourists and visitors, the stakeholders proposed to improve the basic ecotourism facilities especially the recreational sites where most of the tourists go and spend most of their time. The local road condition also needs to be improved to facilitate easy access and convenience for the tourists and visitors. The enhanced basic services delivery are likewise necessary to upgrade especially the quality food products and souvenir items. The accommodation facilities should also be improved to give more comfort to the customers who are willing to stay longer in these tourist destinations. The security and safety of the tourists should also be considered.

Willingness to Pay

The following tables present the summary statistics for WTP.

Of the 143 tourist-respondents, 107 (74.83%) were willing to pay while 36 (25.17) were not. The most popular response was P55.00 (22.38%) or P5.00 higher than the present P50.00 fee. The mean WTP is P86.12 while the median WTP is P60.00, which indicates that majority of the respondents are willing to pay less than the mean WTP and that the response distribution is skewed by a limited number of high bidders (notably foreign tourists).

Amount (P)	Frequency	Percent
0	12	8.39
50	15	10.49
55	32	22.38
60	27	18.88
65	28	19.58
70	6	4.20
75	1	0.70
80	9	6.29
100	4	2.80
150	1	0.70
200	1	0.70
400	1	0.70
500	4	2.80
1000	2	1.40
TOTAL	143	100.00

*Zero indicates that the respondent was not willing to pay

Mean	86.12
Median	60.00
Mode	55.00
Std. Deviation	136.46

Willingness to Pay (WTP) Determinants

Logit regression was performed to determine the factors affecting willingness to pay (WTP) by the respondents to the proposed increase. Respondents were considered as one group, i.e., samples were not split based on sector (e.g., local tourists v. foreign tourists, etc.).

The independent variables that were examined in the model were: age, gender, marital status, number of dependents, highest educational attainment, monthly income, and total number of potential threats to the coral, mangrove, and seagrass ecosystems.

Results of the computation revealed that only four of the aforementioned independent variables significantly determine WTP: age, gender, monthly income, and number of potential threats.

$$\widehat{WTP} = \beta_0 + \beta_1 \text{Age} + \beta_2 \text{Gender} + \beta_3 \text{MonthlyIncome} + \beta_4 \text{NumberofPotentialThreats}$$

Variable	Coefficient	Standard Error
Age	0.016	0.004
Gender (male)	-0.432	0.141
Monthly Income	-0.541	0.043
Number of Potential Threats	-0.055	0.012
(Constant)	0.929	0.325

The results imply that older people were more likely to be willing to pay the proposed increase. This could be because those who are of age have already settled in life, have realized the significance of protecting and managing ecosystems for future generation (Stephen, 2015) and thus may have the inclination to give away for the future or the satisfaction to contribute towards a better place to live in (Surendran and Sekar, 2010).

Females were found to be more willing to pay than males, which could be attributed to the stronger tendency of women to be more caring of natural resources and the environment more than men. The reluctance of men may also be attributed to their feeling of insecurity of parting with hard-earned money to unknown/personally distant entities, i.e., the LGU, whom they might think would not use the same for the right purpose (Surendran and Sekar, 2010).

However, the result also shows that those with larger incomes tend to be less likely to be willing to pay, which is inconsistent with common economic reasoning (budget constraints binding those with low incomes). This finding could imply that those who earn more would rather opt to visit other attractions that are of comparatively similar fee or that the respondents simply—but alarmingly—did not want to pay more for the cause of conservation of the site.

Also, those who perceived more potential threats to the ecosystem were less likely willing to pay than those who perceived fewer threats. This indicates that there is less concern towards environmental conservation among the respondents, i.e., those who believe that there is an alarming environmental scenario in the rock formation tend not to be convinced to visit the same and therefore less willing to pay.

Travel Cost Method (TCM) Valuation

Considering the transportation cost, time cost, and on-site expenses of the tourist-respondents, the average annual travel cost (AATC) was computed to be

$$\text{AATC} = (\text{P}714,968.00 + \text{P}98,375.00 + \text{P}154,267.00) / 274 = \text{P}3,531.42$$

The annual total travel cost (ATTC) was

$$\text{ATTC} = \text{P}3,531.42/\text{visit} \times 553 \text{ annual visits} = \text{P}1,952,875.26$$

while the consumer surplus was

$$\text{CS} = \text{ATTC} - \text{Site Maintenance Cost} = \text{P}1,952,875.26 - \text{P}30,953.07 = \text{P}1,921,922.19$$

The recreational value (RV) of the Biri Rock Formation was then determined by capitalizing CS in perpetuity at 10% discount rate. Thus,

$$\text{RV} = \text{P}19,219,221.90$$

7. Conclusions and Recommendations

During the conduct of the survey, there were more sellers than buyers in the BLPLS area, however, this dichotomy has thin demarcation line since almost all of the respondents avail of and benefit from the ecosystem services provided by the BLPLS protected area.

This study revealed that the respondents have a relatively high familiarity and awareness of the ecosystem services available in the BLPLS PAs, which include: provisioning (food, fuel/energy, etc.); regulating (biodiversity enhancement, purification, and environmental protection); supporting (nutrient cycling, production, tourism, scientific endeavors, political services); and cultural (spiritual and recreational).

The respondents strongly agree to the ecosystem services provided by the BLPLS PAs, which in turn provide environmental and economic benefits to the community.

The respondents are also very familiar and aware of the threats to the BLPLS PA ecosystems, foremost of which are typhoon and natural disasters, followed by over-fishing, climate change, unregulated tourism activities, and informal settlers among others.

With their current familiarity and awareness of the ecosystem services of the BLPLS PAs, the respondents expressed strong support to the PAs regulatory management strategies, foremost of which is the "LGUs compliance to PES capacity." To be taken into consideration is the limit to the recreation use in order to minimize ecosystem and environmental damage especially due to unregulated tourism activities which also generate solid waste and pollution in the area.

The respondents already have relatively high familiarity and awareness of the ecosystem services of the BLPLS PAs, so it would not be difficult on their part to determine the value of the ecosystem services that may be lost in the process of unregulated economic and/or tourism activities. In addition, while the respondents also have relatively high awareness of the threats to the BLPLS PAs, there still need for them to undergo risk assessment in order to determine the risk levels of particular areas and identify mitigation measures. This kind of risk assessment will facilitate determination of the carrying capacity of the Biri Rock Formations and its surrounding ecosystems.

This study provides evidence that the majority of respondents are willing to pay for environment conservation. If the program to collect fees can be improved and implemented, it could help finance conservation-oriented management, including the protection of biodiversity and ecosystem in the study site, thus maintaining the quality of the environment and preventing further degradation of natural resources.

Based on the foregoing, the following are recommended:

1. Increase PES Awareness of Stakeholders

Training, technical support and other services provision of offices where sellers and buyers can meet; provision of training and informational services to market actors, such as business and advisory services hub for new buyers or sellers of ecosystem services; the mapping of ecosystem values so that private actors (or lower government levels) can easily select sites. This includes identifying priority/critical areas and encouraging buyers to focus on areas where institutional conditions are already in place to enable transactions; partnering with private sector firms to help them design and initiate a private PES scheme.

- i. Capacity Building Activities- Build capacity of the service providers, buyers and the intermediaries. The role of PAMB is very critical in bringing the different LGUs in implementing the PES schemes.
- ii. Resource Economic Valuation
- iii. Resource Risk Assessment
- iv. IEC Materials Distribution- Conduct extensive information, education and communication campaign about PES
- v. Advocacy program

2. Protection and Conservation Policy

Policy and regulatory support provision of oversight and quality control over national registries of ecosystem services; development of standards around what constitutes an ecosystem service credit; and development of national certification systems.

- a. Regulations (Permits and Licensing).
 1. Payment schemes/mechanism
 - a. % increase in entrance/users fees
 - b. Conditionals on delivery of services
 - c. Period of payments/schemes
 - d. Subsidies and charges
 2. Taxes
 - a. Agreements with business owners and service providers
 3. Incentives (in kind or cash)
- b. Program/project development and complementation
 1. Organizing and associations formation
 2. Livelihood Diversification
- c. Institutionalize the PES thru local enactments by the Protected Area Management Board (PAMB)
 1. Ownership and use rights over:
 - Land Tenure (who, what, how long and under what conditions)
 - Natural resources conservation
 - Credits for ecosystem services
- d. Participatory Monitoring
 1. Citizens-led monitoring
 2. Constructive Engagement

3. Partnership agreements

The result of the research suggests that PES schemes could play a more prominent role in linking public and private efforts to protect biodiversity and ecosystem services, both in the local and national level of development arena. Local buyers are willing to invest for environmental protection, biodiversity conservation and scenic beauty, reflecting a greater interest in protecting their local ecosystem services with local benefits. Certain ecosystems must be managed at the landscape scale, rather than at the local or farm scale, to optimize the provision of ecosystem services, such as freshwater and habitats for a wide range of biodiversity.

A key element for the success of PES is participation by all stakeholders. New programs should incorporate local knowledge, in addition to expert views, to build trust and to encourage acceptance of the schemes. PES is more likely to succeed if stakeholders are included in the discussions and negotiations from the beginning. Schemes need to be evaluated. Evidence for the impact of the schemes should be decided in advance, appropriate monitoring schemes should be developed and information collected across all relevant scales of management. However, if the chosen indicators perform inadequately, they should be reconsidered. Compliance with the scheme will be increased if PAs managers agree with the way the indicators are selected and measured. Sufficient funding is needed for the collaborative programs and is as central to the success of the schemes as payments to the farmers. However, to ensure farmers join the scheme and are willing collaborators, payment levels to farmers need to be high enough to compete with other opportunities for land use and other sources of income available to farmers.

To address this, the researchers proposed an alternative definition, which states that 'PES is the transfer of resources between groups to create an incentive to align land use decisions with the wider social benefits of managing natural resources to provide an ecosystem service'. They argue that this definition describes more appropriately the existing variety of PES schemes. The first of these is the relative importance of the economic incentive in influencing land use decisions and thus ecosystem service provision. In this case, social and cultural motivations take precedence over economic concerns in establishing land use practices. Often there are intermediary organizations involved in PES transactions between several land owners and consumers. In some cases landowners do not receive individual payments, but instead receive an indirect payment, such as investment in public goods. Finally, the degree of commodification refers to the extent to which the service being provided can be assessed in measurable quantities. In many PES schemes, the commodity being traded is based on actual inputs and assumptions about the relationship between land use and provision of ecosystem services, rather than on measurable outputs directly.

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