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Valuing Public Preferences for Ludong (*Cestraeus plicatilis* Valenciennes 1836) Conservation Program in Cagayan River Systems, Philippines

ABSTRACT

Ludong (Cestraeus plicatilis Valenciennes 1836) has been declared as an endangered species by the Bureau of Fisheries and Aquatic Resources (BFAR) in the Cagayan River Systems. Thus, BFAR is planning to ban ludong fishing for five years that will be complemented by changes in the current conservation program. This study determined and valued the program features preferred by 282 respondents from eight major ludong fishing and trading sites along the Cagayan River Systems in provinces of Cagayan and Isabela for the BFAR's 5-year proposed revised ludong conservation program using a choice experiment approach. The heterogeneity of the respondent's preferences for these program features was also determined. The respondents had the highest mean willingness to pay (PhP 534.07 per year) for a conservation program that has the lowest negative income impacts to them given their heavy reliance to fishing as income and food source. This program bans only ludong fishing gears from October to December 15, provides income benefits to them during the 2.5 months seasonal ban for ludong and provides information and education about ludong via a medium that is easily and widely accessible to them. The differences of their willingness to pay for these program features are low.

Key words: *ludong, Cagayan River, choice experiment, coastal resources management*

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INTRODUCTION

Ludong (*Cestraeus plicatilis* Valenciennes 1836) is an indigenous freshwater mullet fish that thrives in the headwaters of Cagayan River and Bantay-Abra of the Abra River System in the provinces of Ilocos Sur and Abra, in island of Luzon, northern Philippines (*Rosario 2004*). The fish is prized for its cultural and culinary value. It is considered as an annual gift of the river goddess to the Ibanags, the people by the banks of Bannag or Cagayan River (*Caldez 1998*) and a cultural icon to the Cagayanos (*BFAR R02 2011*). It is popular among gourmands due to its distinctive taste (*Gascon 2010*).

The fish is catadromous, which means that it thrives in fresh water but migrates annually to the sea to spawn (*BFAR R02 2010*). They migrate downstream to the estuary of the Cagayan River in Aparri, Cagayan from October to December in time with the flooding season and return upstream to their suspected habitats in the headwaters of Cagayan River after spawning (*BFAR R02 2011*). They traverse 200 to 300 km to reach their spawning ground (*BFAR R02 2010*).

A female ludong weighing 1.45 kg can lay around 1.8 million eggs per spawning season. Only a small percentage of these eggs develop into fingerlings due to the harsh conditions in the spawning grounds. Ludong fingerlings have a survival rate of only two (2) percent (*Gascon 2010*).

There is a high demand for the fish by local politicians, businessmen, executives and rich families, especially the Filipino-Chinese in Metro Manila. As a result, its price reached to as high as PhP 4, 000.00 to PhP 5,000.00 kg^{-1} or US $84 to US $105 kg^{-1} in 2009. This prompts local fishermen to catch young adults and mature ludong before they reach their spawning grounds in the Babuyan Channel during their downstream migration (*Gascon 2010*). According to Dr. Evelyn C. Ame, the research division head and ludong project leader of BFAR Region 2 in 2011, spawners with eggs are the most preferred catch by fishermen because of their bigger size which commands a higher price compared to young adults and mature ludong (*personal communication to Dr. Evelyn C. Ame, 23 December 2011*).

Owing to the ludong's overexploitation coupled with its low survival rate and the virtual obstacle course it must survive to lay its egg, the population of the fish suffered a sharp decline. The average size of fish caught has declined tremendously from 1.5 kg to 2.4 kg in 1997 to 0.25 kg in 2001, which is an indication that less ludong are reaching maturity (*Rosario 2004*). Likewise, the volume of ludong caught has severely declined from 1.32 MT in 2003 to 0.69 MT in 2011 (*BAS 2012*). For these reasons, the Bureau of Fisheries and Aquatic Resources (BFAR) have declared the fish as an endangered species in the Cagayan Valley.

This problem is further exacerbated by problems hounding the conservation efforts for ludong. The Fisheries Administrative Order (FAO) No. 31 of 1952, a law issued on May 1952 that prohibits the capture, purchase, sale, preparation and serving of ludong for private or public consumption, and the use of large meshed cast net, small drag seine, and cylindrical fish pot in Cagayan River and its tributaries and in Santa-Abra River System during ludong's seasonal migration from October to January, was suspended due to the opposition of fishermen and their families against the prohibition of use of fishnets during the seasonal migration of ludong (*Gascon 2010*). Furthermore, there is a dearth in information about the fish (*Lazaro 2011*) and low survival rate of caught breeders using gill net (*Rosario 2010*).

Hence, the BFAR is in the process of amending the suspended FAO to a joint administrative order (JAO) involving the issuance of local ordinances of the 37 municipalities comprising the fish corridor. The JAO being pursued has the main provision of imposing five-year closed season for ludong during the seasonal migration of the fish coupled by gear regulations, penalty for the violators of the law, and changes in the Oplan Sagip Ludong (OSL). Oplan Sagip Ludong is a ludong conservation movement launched by BFAR in October 2010 that is anchored on research and development, conservation and protection, and intensive information and education campaigns. According to a BFAR study, a ban of at least five years is necessary to ensure the regeneration of ludong population and enable the government to learn more about the fish and possibly breed them in captivity (*BFAR R02 2010*).

The success of any policy is partly dependent on community support. Hence, a better understanding of the preferences of the community for management process is vital in order to obtain the acceptance and support of the community for the policy (*Rogers 2012*). However, there was no attempt in the past and even at present to value the preferences of the stakeholders regarding BFAR's planned changes in the current conservation program for ludong in Cagayan River Systems.

In the field of fisheries, choice experiment (CE) is useful in evaluating fishery management alternatives and programs (*Aas et al. 2000; Wattage et al. 2005*). In developed countries, the method has been used to evaluate and determine (a) the public preferences for the features of marine protected areas (MPAs) (Wallmo and Edwards 2008; Wattage et al. 2011), (b) the anglers' preferences for angling regulations and catch or harvest (*Aas et al. 2000; Dorow et al. 2009*), (c) the support of Dutch fishers and citizens for management policy alternatives for flatfish (*Groeneveld 2011*), (d) the preferences of Western Australians for conservation management outcomes and processes in Ningaloo Marine Park (*Rogers 2012*), and (e) the importance of fishery management objectives to key stakeholders of English Channel fisheries (*Wattage et al. 2005*). In the Philippine setting, CE was used in evaluating the fishers' preferences for fishery management objectives in Danajon, Northern Bohol (*Bacalso 2007*) and in determining the factors that are valued by fishermen in MPA planning and management in Claveria, Cagayan (*Launio et al. 2009*).

The CE approach indirectly estimates the economic value that people put on non-market goods through hypothetical survey scenarios that elicit their stated preferences towards the good (*Kjaer 2005*). Each scenario has several alternatives or choices to choose from and only one alternative must be chosen by individuals in each scenario. Each alternative is characterized by features of the environmental good and the levels of these features. Based on the choice responses given by the individuals in each scenario, the value they placed on each feature is inferred (*Mangham et al. 2009*).

The CE has several advantages over the use of contingent valuation method (CVM). It has the ability to measure the implicit price of the features or attributes of the good (*Hanley et al. 1998b; Bateman et al. 2003*). As a result, it can evaluate a wide array of policy scenarios (*Wallmo and Lew 2011*) and reduce the expenses in valuation studies (*Hanley et al. 2001*). It can also value the change in the attributes or features of all at once (*Hanley et al. 1998b; Bateman et al. 2003*). These information are more important from a manager's or policy maker's point of view as most environmental management decisions are concerned with changing attribute levels, rather than losing or gaining the environmental good as a whole (*Boxall et al. 1996; Hanley et al. 1998a*).

The elicitation process of CE where respondents are required to choose their preferred options between two or more alternatives also decreases the occurrence of strategic bias in CVM as it becomes more difficult for the respondents to determine the effect of the each

alternative in a choice set on the outcome of the survey (*Olsen et al. 2005*). This set up also avoid the problem of yea saying bias in CVM because respondents are not required to answer a yes/no question (*Hanley et al. 1998a*).

The problem of giving equal value for different quantities of a good or attribute (i.e. insensitivity to scope) in CVM is also avoided in CE as respondents evaluate different levels of the attributes of the good in the choice sets in the selection of their preferred option (*Hanley et al. 1998a; Adamowicz et al. 1998; Foster and Mourato 2003*). Lastly, choice scenarios in CE correspond more closely to real life scenarios than CVM scenarios. Thus, respondents are more familiar to CE scenarios than CVM scenarios (*Olsen et al. 2005*).

This study valued the preferences of voter-respondents from selected local communities along the Cagayan River Systems in the provinces of Cagayan and Isabela in the Philippines for the BFAR's 5-year proposed revised conservation program for ludong using choice experiment approach. Specifically, the study aimed: to determine and value the program features preferred by the respondents; and to determine the heterogeneity or differences of preferences for the preferred program features among the respondents.

MATERIAL AND METHODS

Survey Approach and Data Collection

About three-hundred sixty-five (365) out of the targeted 375 respondents aged 21 to 65 years in eight riverside barangays in the provinces of Cagayan and Isabela have responded positively for a personal interview on July 23, 2013 to August 10, 2013, with the use of a pre-tested interview schedule.

The study sites and the respondents were selected using a four-stage sampling design. Study sites that will be greatly affected by the implementation of a revised ludong conservation program in Cagayan River Systems were selected. In the first stage, the provinces of Cagayan and Isabela were selected among the four provinces traversed by ludong in the Cagayan River Systems. The two (2) provinces are the most populated among the four (4) provinces and they have the most number of municipalities and cities situated along the migratory path of ludong. In the second stage, eight major ludong fishing and trading sites identified by BFAR Region 2 and the local government units (LGUs) in the provinces of Cagayan and Isabela were selected. These are six downstream barangays (Punta, Aparri; Agusi, Camalaniugan; Nassiping, Gattaran; Matalao, Sto. Niño; Tupang, Alcala; and Baccuit, Amulung) and two upstream barangays (Compania, Tumauini and Naguilian Norte, Ilagan City) in eight towns in the provinces of Cagayan and Isabela, respectively.

After the selection of study sites, the 375 respondents were proportionally allocated into each stratum (type of barangay, age, and gender). This was followed by proportional allocation of sample respondents in each stratum in each barangay. Lastly, the sample respondents per stratum for each barangay were randomly selected from the Commission on Elections' (COMELEC) list of voters of each barangay.

Choice Experiment Design

In this study, every 20 respondents randomly answered one of the 15 versions of six choice sets/scenarios generated from the 90 orthogonal fractional factorial combinations of the levels of the five features of the proposed program. Each combination contain Option A (the status quo), Option B, and Option C, with the two latter options being alternatives with different levels of the same program features found in Option A. These tasks were accomplished with the R software packages by *Aizaki* (*2012*) and *Grömping* (*2012*). (**Figure 1)**.

The five program features and their corresponding levels combined were established from focus group discussions (FGDs) conducted in six study barangays involving the participation of 15-25 voter-participants, the barangay officials, the representative(s) of the municipal agriculturists, and two representatives from BFAR Region 2. These are:

a) annual seasonal ban on specified fishing gears for ludong (Season) - October to November 15 only (Season1), October up to and including November only (Season2), and October to December 15 only (Season3);
b) ban on specified fishing gears during the seasonal ban for ludong (Gear) - ban gill net fishing only (Gear1), ban ludong fishing gears only (e.g. gill net, tabukol and pateng only), and ban all fishing gears in Cagayan River) (Gear2);
c) provision of sustainable alternative livelihoods (Altliv) - capacity building for non-fishing-based livelihoods only (Altliv1) and capacity building for non-fishing-based livelihoods with alternative livelihood establishment support (Altliv2);
d) provision of information and education (IEC) - status quo (pamphlets, brochures, posters, school and public forum, and radio program) (IEC1), social media (IEC2), and TV ad (IEC3); and
e) annual program cost to individual voters in terms of a fixed increase in the annual community certificate

Features of Ludong Conservation Program (for the next 5 years)	**Option A (No change in current conservation program)**	**Option B**	**Option C**
Annual seasonal ban on specified fishing gears for ludong	None	2.5 months (Oct-Dec 15 only)	1.5 months (Oct-Nov 15 only)
Ban on specified fishing gears during the seasonal ban for ludong	None	Ban all ludong fishing gears only	Ban all fishing gears
Provision of sustainable alternative livelihood	None	Capacity building on non-fishing-based livelihood + Livelihood establishment support	Capacity building on non-fishing-based livelihood only
Provision of information and education	Pamphlets, brochures, posters, school and public forum, and radio program	TV ad only	Pamphlets, brochures, posters, school and public forum, and radio program
Cost/year	PhP 0	PhP 100	PhP 130
I would prefer: (tick one)	□	□	□

Figure 1. A sample of a choice set for the 5-year proposed revised ludong conservation program.

payments (Cost) - PhP 30, PhP 70, PhP 100, PhP 130, and PhP 170.

Preference Analysis with the Use of Random Parameter Logit Model

Prior to the preference analysis, the following respondents with invalid choice responses were dropped from the analysis: (a) 12 respondents with inconsistent choices involving the same choice question, (b) 29 respondents who considered one program feature in their choices in the six choice sets, (c) six respondents who did not choose any value for annual program cost in their choices in the six choice sets, (d) 25 respondents with Very Uncertain, Uncertain and Do Not Know choices, (e) nine respondents with protest response (i.e. respondents who chose status quo option in all six choice sets whose reasons for their unwillingness to pay were not due to financial constraint) and (f) two respondents with protest responses and uncertain choices) were dropped from the analysis.

Respondents with inconsistent choices in the same choice question were excluded because the standard assumption on consistency of individual preferences was violated. Following *Olsen et al.* (*2005*), respondents who considered only one program feature in their choices in the six choice sets were dropped from the analysis because they violated the CE assumption that individuals make implicit trade-offs between the levels of the program features of the program features in the selection of their preferred choice in the six choice questions.

Respondents who did not choose any value for program cost in the selection of their preferred program options were excluded because marginal willingness to pay (MWTP) for the non-monetary features of the candidate programs cannot be estimated without the consideration of cost feature of the candidate programs. *Kosenius* (*2010*) mentioned respondents with Very Uncertain, Uncertain or Do Not Know choices were dropped from the analysis to reduce the hypothetical bias (i.e. the tendency of individuals to state a higher WTP in hypothetical situations than their actual payment in real life) and to derive more conservative WTP estimates. In addition, *Jorgensen et al.* (*1999*), noted protest respondents were also excluded because they do not reveal the true values

of the respondents. Their stated WTP were not really zero.

In this study, the valid choice responses elicited from the remaining 282 respondents were analyzed using random parameter logit (RPL) model. The basic linear form of the indirect utility function (Van) of respondent *n* for their chosen option in each choice set, say Option A, is shown in Equation 1:

$$Van = \beta1Season2 + \beta2Season3 + \beta3Gear2 + \beta4Gear3 + \beta5Altliv2 + \beta6IEC2 + \beta7IEC3 + \beta8Cost \quad (1)$$

where β1 to β7 are the coefficients of the non-monetary features of the proposed revised conservation program and β8 is the coefficient of the cost component of the said program.

The explanatory variables are the dummy variables of the non-monetary program features and the levels of the cost component of the proposed program. Season2 and Season3 are equal to 1 if the seasonal ban on specified fishing gears for ludong covers October up to and including November only and October to December 15 only, respectively. Gear2 and Gear3 are equal to 1 if all ludong fishing gears only and all fishing gears are banned during the seasonal ban, respectively. Altliv2 is equal to 1 if the capacity building on non-fishing-based livelihoods with livelihood establishment is provided. IEC2 and IEC3 are equal to 1 if the information and education campaign are social media only and TV ad only, respectively. Cost is equal to the level of fixed increases in annual community certificate payments reflected in the choice tasks.

In *Hensher and Greene* (*2003*), the β parameters for Season2, Gear2, Gear3, Altliv2 and IEC3 were specified as random and normally distributed while the rest of the β parameters were assumed to have fixed distribution. The β parameter for cost was assumed fixed for easy derivation of the marginal willingness to pay (MWTP) for program features with random β parameters (*Revelt and Train 1998*). The random β parameters in the model were specified to be uncorrelated and correlated among each other to find the best fit basic RPL model. The parameters of distribution (mean and standard deviation) of each random β in the model were estimated using 1,000 Halton draws (*Revelt and Train 1998*).

Marginal Willingness to Pay Estimation and Distribution

For direct interpretation of the β estimates for non-monetary program features of the best fit basic RPL model specification, the MWTP estimate for any of these program features was estimated (*Eggert and Olsson 2009*). Following *Hanemann* (*1984*), MWTP for any of the non-monetary program feature was obtained by dividing the β estimate for any of the other program feature (any of β1 to β7) with the β estimate for the annual cost of the annual program cost (β8).

The coefficient of variation (CV) of the MWTP estimate for any of the non-monetary program features with random effects was derived by dividing the standard deviation estimate for the β estimate of any of the random effect program features (Season2, Gear2, Gear3, Altliv2 and IEC3) with their respective β estimate. The CV values of the MWTPs of the random program features were interpreted using the interpretation of *Mitani* (*2007*).

RESULTS AND DISCUSSION

Socio-economic Characteristics of the Respondents

The respondents have a mean age of 41 years. The number of male (49.7%) and female respondents (50.3%) are almost the same. The respondents' educational attainment is widely diverse with some reaching elementary (27%), high school (37.6%) or college (31.5%) while only a few them finished diploma courses (2.1%) or postgraduate studies (1.8%). They have a mean number of children dependents of 2.24. Majority of them (56.4%) have personal monthly income of less than PhP 5,000.00 (**Table 1**).

Basic Random Parameter Logit Models

The basic RPL model with correlated random coefficients (RPL Model 2) has a better fit than the basic RPL model with uncorrelated random coefficients (RPL Model 1) (**Table 2**). This is exhibited by the lower log likelihood value and the higher pseudo-R2 of RPL Model 2. The pseudo-R2 (0.1252) of the RPL Model 2 also falls within the suggested range for good fit choice models of 0.10 to 0.20 (*Louviere et al. 2000*). Thus, the RPL Model 2 has a good fit. This implies that RPL Model 2 provides better estimates for the marginal utility parameters or mean coefficients of the program features. Furthermore, the specification of this model indicates that some of the marginal utility parameters or mean coefficients of the program features are not uniform across respondents and some of them are correlated with each other.

Parameter Estimates for the Features of Proposed Revised Ludong Conservation Program

The RPL Model 2 shows that the mean coefficients or the mean utility parameter estimates of the program features were positive and significant (**Table 3**). This implies that the respondents prefer any increase in the level of program features from their status quo level.

Table 1. Socio-economic characteristics of 282 voter respondents from eight barangays in the provinces of Cagayan and Isabela, Philippines (2013).

Characteristics	Number	Percent (%)
Age (years)		
21-35	112	39.7
36-50	88	31.2
51-65	82	29.1
Total Respondents	282	100.0
Mean Age	41.33	
Gender		
Male	140	49.7
Female	142	50.3
Number of children dependents		
None	114	40.4
1-2	111	39.4
3-4	51	18.1
5-6	6	2.1
Total Respondents	282	100.0
Mean number of children dependents	2.24	
Educational Attainment		
Elementary	76	27.0
High school	106	37.6
Diploma	6	2.1
College	89	31.5
Post-graduate	5	1.8
Total Respondents	282	100.0
Personal Monthly Income		
≤ 5,000	159	56.4
5,001-15,000	99	35.1
15,001-25,000	17	6.0
25,001-35,000	3	1.1
35,001-45,000	2	0.7
≥ 45,000	2	0.7
Total Respondents	282	100.0

The status quo conservation program has the following features: (a) no seasonal ban on specified fishing gears for ludong; (b) no ban on specified fishing gears during the seasonal ban; (c) no provisions on sustainable alternative livelihoods; (d) information and education campaign that employ the use of pamphlets, brochures, posters, school and public forum, and radio program; and (e) zero program cost to individual voters.

For each of the four non-monetary program features (Season, Gear, Altliv, and IEC), the mean coefficients for October to December 15 seasonal ban (Season3) on ludong fishing gears only (Gear2), capacity building for non-fishing-based livelihoods with livelihood establishment support (Altliv2), and TV ad campaign (IEC3) were the highest. Subsequently, the respondents also had higher mean marginal willingness to pay (MWTP) per year for Season3, Gear2, Altliv2, and IEC3 (**Table 3**). This shows that these program features are the preferred changes of therespondents to the current ludong conservation program.

Table 2. Comparison of goodness of fit of the basic random parameter logit models.

Measures of Goodness of Fit of Models	Basis Random Parameter Logit Model (RPL Model 1)	Basis Random Parameter Logit Model (RPL Model 2)
Log likelihood	-1474.1103	-1431.7491
Pseudo R^2	0.0993	0.1252

a. RPL Model 1 has fixed coefficients for October to December 15 seasonal ban on specified fishing gears for ludong (Season3), social media (IEC2) and annual program cost (Cost) while the rest of the program features have uncorrelated random coefficients that are normally distributed.
b. RPL Model 2 is RPL Model 1 with correlated random coefficients.

Notably, the respondents' preference for October to December 15 ban on ludong fishing gears only is more stringent than the observed ludong fishing during the spawning run from October to November using gill net by *Rosario* (*2010*). This implies that the respondents are willing to be subjected to stricter fishing regulations as long as their source of income and livelihood are not disrupted. Hence, they prefer the fishing regulations to be complemented by capacity building for alternative livelihood with livelihood establishment support.

All in all, the respondents' preference for a conservation program that bans only ludong fishing gears from October to December 15, provides capacity building for non-fishing-based livelihoods with livelihood establishment support, and promotes information and education about ludong through TV ads is due to economic reasons. With these program features, they can still catch other fish for subsistence food and additional income using other unregulated fishing gears during the 2.5 months seasonal ban for ludong fishing gears only, they can still earn income even during the period of the fishing regulation with the provision of capacity building for non-fishing-based livelihoods with livelihood establishment support, and they have wider and easier access to local TV channels.

Hence, the differences of respondents' mean MWTP per year for Gear2, Altliv2, and IEC3 were low (CV < 4.5) and most respondents (at least 60%) have positive marginal willingness to pay for these program features. In addition, all respondents have the same positive marginal willingness to pay for Season 3 (**Table 3**). This implies that consensus building for these program features will be easier to establish in the community than the program features that are not preferred by the respondents.

Willingness to Pay for the Proposed Revised Ludong Conservation Program

Each respondent is willing to pay an average of PhP 534.07 yr^{-1} for a change in the status quo program to their most preferred proposed program scenario (**Table 4**). Aggregating this estimate to the total number of respondents (282 respondents) would result to PhP 150,607.74 willingness to pay of all voter respondents per year for their most preferred proposed program scenario.

However, it cannot be established whether this willingness to pay estimate is high or low because of the absence of economic valuation studies that are directly comparable with this study.Thus, future studies using choice experiment (CE) method should have a separate contingent valuation question valuing the same program in order to validate the WTP estimates of the CE study, as applied by *Rudd* (*2007*) and *Christie et al.* (*2006*).

CONCLUSION AND RECOMMENDATIONS

Overall, the findings of this study conclude that most of the respondents have positive value for changes in the feature levels of the current conservation program forludong in the Cagayan River Systems and the respondents have the highest value for a proposed conservation program that has the least income or monetary effects to them. Thus, the negative income impacts of any changes in the features of the current conservation program to the local community

Table 3. Parameters estimates and mean marginal willingness to pay (MWTP) estimates for the features of the proposed revised ludong conservation program scenarios in Cagayan River Systems from basic random parameter logit model with correlated random coefficients (RPL Model 2).

Program Features	Parameter Estimates	Mean Marginal Willingness to Pay (MWTP) (PhP/year)	Coefficient of Variation (CV)	Fraction of Respondents With Negative Marginal Willingness to Pay (MWTP) (%)
Season2	0.3995874** 1.983399***	92.93*	4.96	42.02
Season3	0.477014***	110.93**		
Gear2	0.5830853** 2.019831***	135.60**	3.46	38.64
Gear3	0.4937196** 2.417603***	114.82**	4.90	41.91
Altliv2	0.5539192*** 1.84428***	128.82***	3.32	38.20
IEC2	0.5510277***	128.14***		
IEC3	0.6825063*** 1.395115***	158.72***	2.04	31.23
Cost	0.0043001***			

a. ***, ** and * indicate 1%, 5%, and 10% significance level, respectively.
b. Parameter estimates in non-italics are the mean coefficient estimates for the program features.
c. Parameter estimates in italics are the standard deviation estimates for the mean coefficients of random effect features of the program.
d. MWTP for the fixed effect program features (i.e. Oct. to Dec. 15 seasonal ban on specified fishing gears for ludong (Season3) and social media campaign (IEC2)) is the same for all respondents.
e. Coefficient of variation (CV) is the relative differences among the MWTP for the random effect program features.

Table 4. Average annual WTP of each respondent for the most preferred proposed ludong conservation program.

Proposed Program Scenario	Program Features of the Program Scenario	Average Annual WTP Per Respondent
Most preferred program scenario	October to December 15 seasonal ban on specifiedfishing gears for ludong (Season3) + Ban on all ludong fishing gears during the seasonal ban (Gear2) + Capacity building on non-fishing-based liveli hoods with livelihood establishment support (Altliv2) + TV ad campaign (IEC3)	PhP 534.07 per year (US $12.60 per year*)

*2013 Exchange Rate: US 1$ = PhP 42.4 (Philippine Statistics Authority)

and the heterogeneity of voter preferences for the program features must be taken into account in the revisions of the current ludong conservation program in the Cagayan River Systems. The consideration of these factors in the design of the revised ludong conservation program for implementation will increase the acceptance and support of the local communities for the said conservation program. A consensus must also be reached among BFAR, the provincial and municipal LGUs, and the local communities regarding the revisions in the features of the current conservation program to facilitate the effective and easy implementation of program changes to be made.

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