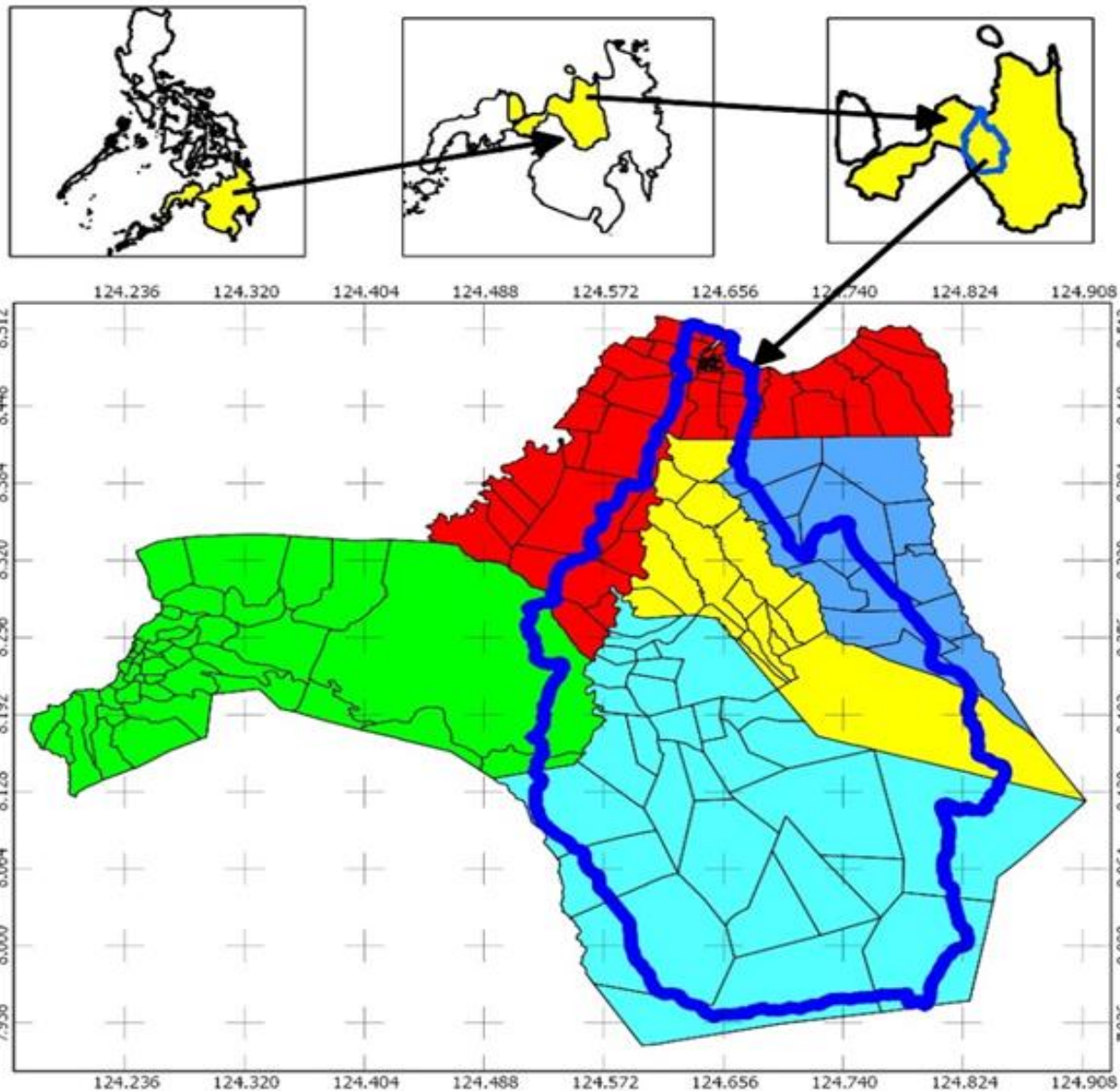


ESTIMATING HOUSEHOLD BENEFITS FROM THE CAGAYAN DE ORO RIVER BASIN: A CONTINGENT VALUATION SURVEY

Rosalina Palanca-Tan, PhD (Ateneo de Manila University)

Marichu Obedencio (Xavier University)

Caroline Laarni Serenas (Xavier University)



LOCATION MAP



1:450,000
Datum: WGS 1984
Projection system:
Long/Lat

0 2 4 6 8 kilometer



Legend:

CDO Riverbasin



Iligan



Cagayan de Oro City



Baungon



Libona



Talakag



Barangays



Sources : Political biundaries from
NAMRIA and River Basin
boundary from DENR



CENTER FOR
ENVIRONMENTAL
STUDIES AND
MANAGEMENT

CDO River Basin benefits to downstream households in CDO City

stable supply of good quality water

flood control

food (fish) supply

recreational activities

biodiversity

Contingent valuation method (CVM)

- survey-based: respondents are asked to state their willingness to pay (WTP) for a good, service or public program
- stated WTP is the monetary estimate of the total benefits (tangible and intangible, use and non-use values) that is derived from the good, service or public program
- WTP question: dichotomous choice framed within the context of a referendum
- six bid/price levels: 1%, 5%, 10%, 20%, 30% and 50% of the water bill

Contingent valuation method (CVM)

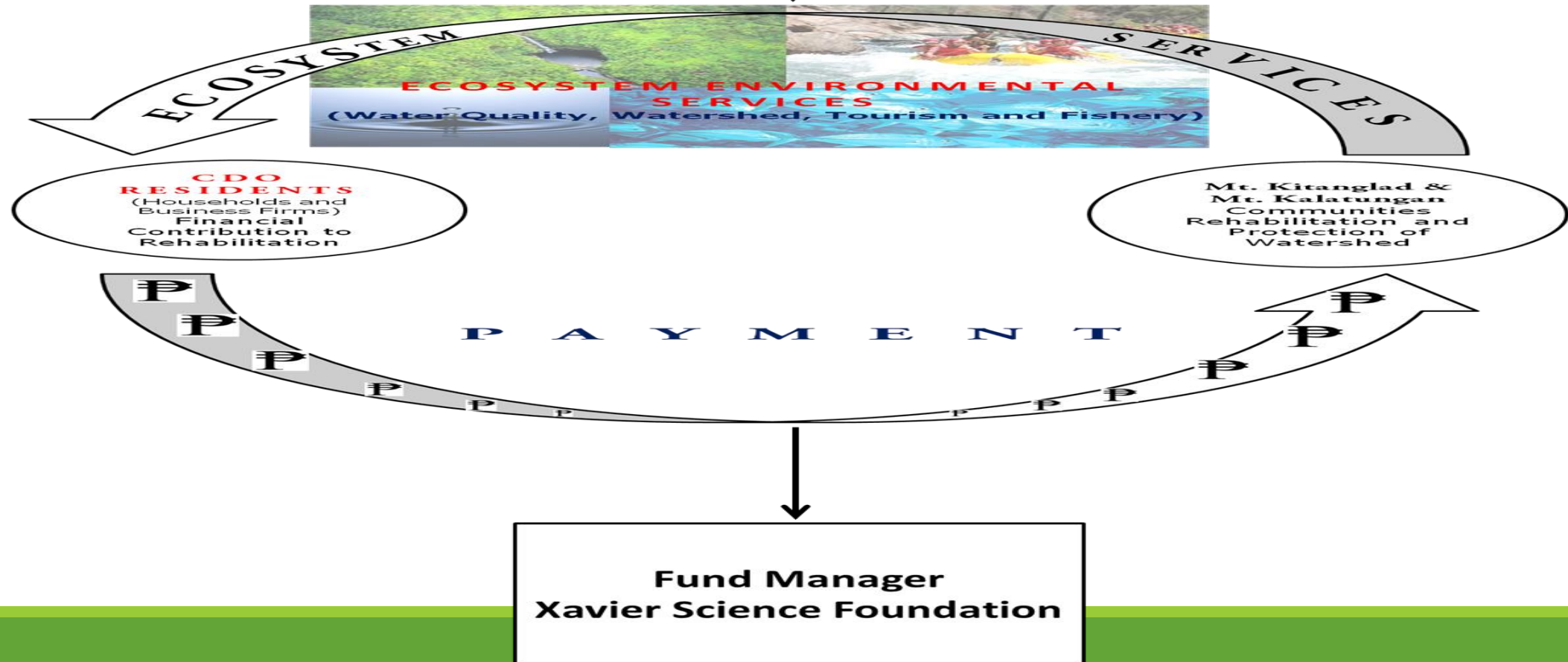
- Other questions included in the survey: socio-economic, social capital, awareness and attitude on watershed and watershed protection, water supply, sanitation and sewerage, water pollution, flood experience, fishing and tourism were included.
- Visual aids such as pictures of the CDORB, forest cover before and after proposed rehabilitation and preservation program were shown to the respondents as the CVM scenario was explained

CVM Scenario

set-up of the on-going payment for environmental services (PES) scheme of Xavier University-McKeough Marine Center (XU-MMC) and Cagayan de Oro River Basin Management Council (CDORBMC)

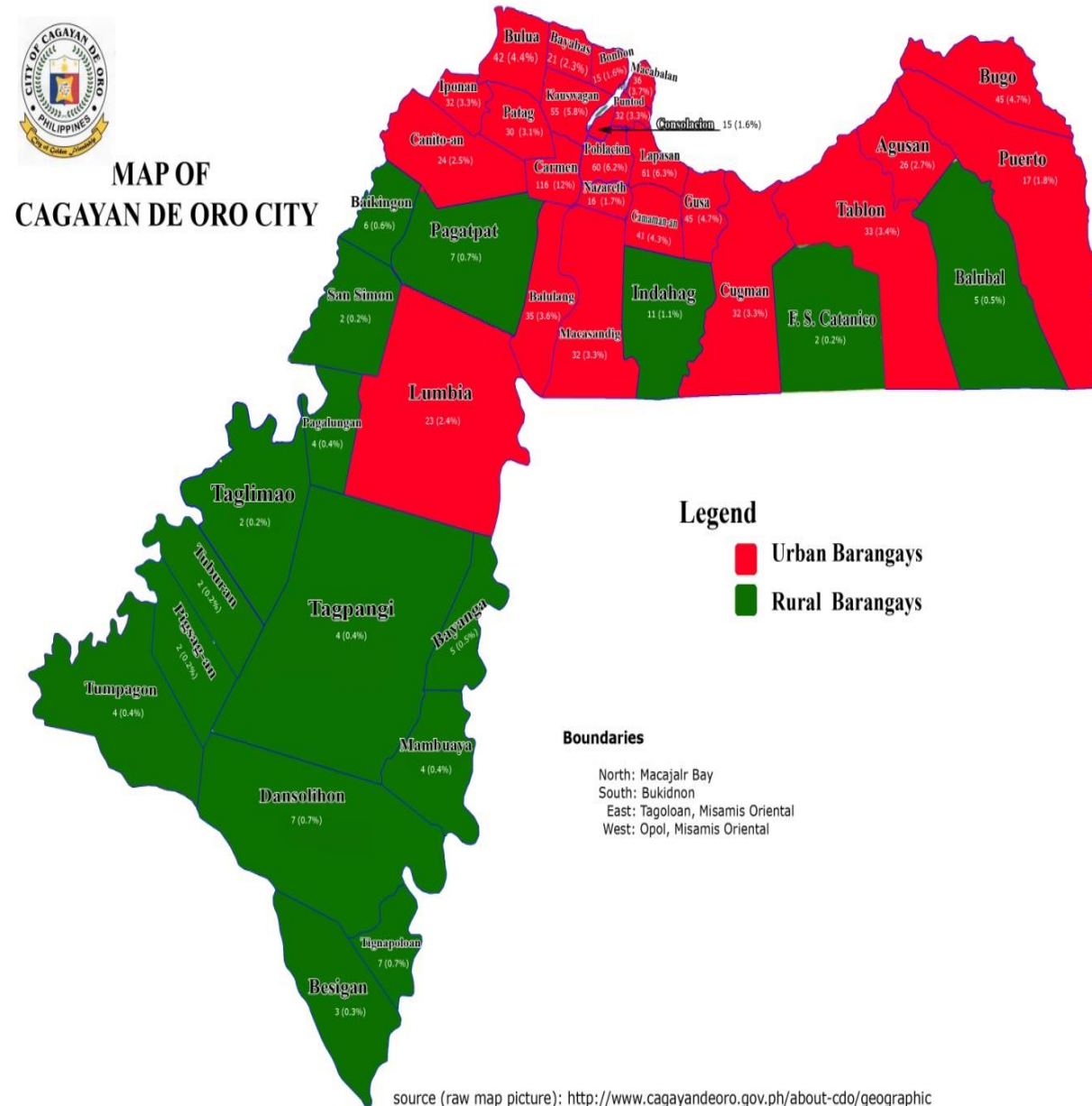
**CAGAYAN DE ORO RIVER BASIN MANAGEMENT COUNCIL
(CDORBM)
PAYMENT FOR ENVIRONMENTAL SERVICES (PES)**

**Monitoring Arm of CDORB
(XU-MMC)**



Survey Implementation

- sample size = 963 respondents
- face-to-face interview with the household head or the member making expenditure decisions in the family
- Sampling frame = all barangays (40 Poblacion barangays and 41 other barangays; or a total of 81 barangays, only 17 of which are rural) of CDO City, the downstream portion of the CDORB
- Systematic sampling procedure for selecting the respondents in each barangay, proportional sampling



Data Analysis

- yes-no response to the dichotomous choice CVM question was analyzed using the framework developed by Hanemann (1984) based on the random utility model.
- binary probit regression model was run to calculate parametric mean willingness to pay (WTP).
- Turnbull formula employed to arrive at non-parametric estimate of WTP.
- Individual household's WTP was aggregated to arrive at total WTP.

Socio-economic Profile

	Mean
Age (years)	47.7
Gender (1, if male)	0.3
Smoking (1 if respondent is smoking)	0.1
Education (years)	10
Household size	5.3
Household income (PhP/US\$)	14,650/324.84
Monthly electricity bill (PhP/US\$)	1,003/22.24

Awareness about Watersheds/CDO River Basin

	% of All Respondents
Respondent correctly identified a watershed	51.3
Respondent is familiar with the Cagayan de Oro River Basin	43.7
Respondent has heard of the Cagayan de Oro River Basin Management Council (CDORBMC)	14.7
Through	(% of Respondednt who have heard of CDORBMC, n=145)
Newspaper	6.2
TV	38.0
Radio	35.1
Seminar/conference/talks	9.0
Friends/family	6.2
Others	5.5
Respondent knows/has correctly identified the head of the CDORBMC	0.0
Respondent aware that the CDO river Basin includes the forestlands in Talakag, Bukidnon	68.8
Respondent aware that the CDO river water originates from the mountain ranges in Bukidnon	82.0
Respondent aware that the loss or degradation of forestlands affects the quantity and quality of water supply	88.5

Respondents Attitude about Watershed Protection

Statement	% of All Respondents Who Agreed
The loss or degradation of forestlands was the main cause of flooding during typhoons Sendong and Pablo.	86.6
The condition of forestlands in Mt Kitanglad and Mt Kalatungan in Bukidnon does not have anything to do with my family's livelihood.	44.5
I am willing to donate money for the restoration and preservation of forests within Cagayan de Oro City.	49.4
If the forests in Bukidnon are part of the Cagayan de Oro River Basin/watershed, I am willing to donate money for reforestation in Bukidnon.	49.4
All Filipinos must contribute to the rehabilitation and preservation of all forestlands in the Philippines.	62.7
There are other more important environmental concerns than the loss of forest cover.	52.5
The current condition of the CDO River Basin/watershed is alarming.	74.7

Respondents' Familiarity with CDORBMC Rehabilitation and Preservation Program and Payment for Environmental Services (CVM Scenario)

	% of All Respondents
Respondent has heard of the CDORBMC program on CDO River Basin rehabilitation and preservation, and payment for environmental services	10.1
	% of Respondents who have Heard about the Program, n=97
Source of information	
Newspaper	10.3
TV	48.5
Radio	49.5
Seminar/conference/talk	19.6
Friends/family	18.6
Others	14.4
Amount of information	
Some (25%)	54.0
Half (50%)	27.4
Much (75%)	17.4
All (100%)	1.2

Bid Function

Bid (Program Cost)	Number of Respondents	Yes Answers (%)
1% of water bill	154	76.6
5% of water bill	148	62.8
10% of water bill	167	47.3
20% of water bill	169	24.9
30% of water bill	163	18.4
50% of water bill	162	11.1

Binary Logit Regression Results

Variable	Description	Coefficient
Constant		1.476***
Bid	Program price to household as % of water bill	-0.081***
Household Income	monthly in PhP	0.000
Respondent Gender	1 if male, 0 if female	0.204
Respondent Age	in years	-0.023***
Respondent Education	In years	-0.003
SeminarParticipate	1 if respondent has taken part in a seminar on watershed	-0.665**
LivelihoodEffect	1 if respondent thinks that the condition of the CDORB affects their livelihood	0.351**
BukidnonForestPart	1 if respondent is willing to contribute if Bukidnon forest is part of the CDORB	1.159***
CDORBStateAlarm	1 if respondent thinks that the current state of the CDORB is alarming	0.459**
Log-likelihood		

WTP for the CDO River Basin rehabilitation and preservation

non-parametric mean WTP	12.19% of the water bill
parametric mean WTP	17.58% of the water bill
total household population in CDO (2010 Census)	137,465 households
mean monthly water bill per household	PhP531.8
total value of benefits (stable supply of good quality water, flood control, fishing and recreational value, biodiversity) that can be derived from the rehabilitation and preservation of the CDO River Basin	PhP8,911,364 - 12,851,663 (US\$197,591 - 284,959) per month or PhP106,936,365 - 154,219,960 (US\$2,371,094 - 3,419,511) per year

Thank you!