CHOICE EXPERIMENTS AS A POLICY MAKING TOOL FOR *IWRM* IN MEXICO

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INTRODUCTION

Higher variability on the quantity and quality of water available in rivers, lakes and underground reservoirs will affect household´s well being.

Integrated Water Resources Management (IWRM) is a good instrument to implement adaptation to climate change in the water sector.

INTRODUCTION

IWRM should be based on a collaborative approach, involving water users, planners and policy makers at all levels.

They all need a key management Instrument:

INFORMATION ¡¡¡¡¡¡

Specifically:

Generating information on the economic value of water will play a central role in the water provision management.

Analyzing such information and using it for policy decisions in the context of IWRM.

INTRODUCTION

Information is needed to design public policies to guarantee water quality and quantity

Investments will imply to mobilize a huge amount of funds

Among the potential investments for the water sector:

1. Restoration of deteriorated basins
2. Conservation of basins
3. Water Infraestructure investments

INTRODUCTION

WHO WILL PAID FOR THEM?

HOW MUCH?

GENERATE USEFUL INFORMATION FOR POLICY MAKING

PUBLIC CONTRIBUTIONS (government)
PRIVATE CONTRIBUTIONS (Consumers)

Given the scale of such expenses, monetary contributions from *water consumers* would be needed to pay for financing such infrastructure for adaptation purposes.

OBJECTIVES

So, we aim at proposing the use of Choice Experiments (a type of economic valuation method) to elicit households' Willingness to Pay (a tax) for protecting water quantity and quality, by restoring basins or enhancing infraestructure, in the face of climate change.

Choice experiments might constitute an excellent policy making tool to get information and analyze it for implementing appropriate adaptation policies to climate change in the context of IWRM.

OBJECTIVES

WHY IS THIS TECNIQUE NEEDED?

Choice experiment results might constitute an important source of _information_ for policy makers to take decisions on the value of water, the amount of taxes and the amount of investments needed to adapt to climate change in the context of IWRM.

THE METHODOLOGY: CHOICE EXPERIMENTS

CHOICE EXPERIMENT

A choice experiment to elicit the _willingness to pay_ for high quality water and its provision in basins at Mexico in the face of climate change.

Non-Market Experimental Valuation to circumvent the absence of markets and market prices

Creates a hypothetical market in which individuals are called to participate

Survey based data collection

Based on:

Lancaster's (1966) characteristics theory of value: Demand is defined over the characteristics/attributes defining a good and not on the good itself

Random utility theory: How individuals make choices over discrete alternatives

CHOICE EXPERIMENT

Our methodology to elicit people´s willingness to pay consists in carrying out a discrete choice experiment in four steps:

(1) Survey instrument and data collection

(2) Discrete choice experiment

(3) Econometric model and estimation of households' willingness to pay

(4) Validation of the results.

DATA COLLECTION

Survey Design:

A representative stated preference household´s survey. Respondents randomly selected from the whole set of water users (water users census), pretested and validated.

Example of Policy choices attributes Profiles

Attributes	Levels
Cost	2 USD/family 8 USD/familiy
Prediction probability	10% 20%
Average Number of occurrences of the event	5 in 48 years 10 in 48 years
Decrease in the water supply at home	0 hours per month 300 hours per month
Water quality	little contaminated very contaminated
Ecological risk	low High

Example of choice question for the event: scarce flows of water in the basin

	A	B	C
Extreme event prediction probability	10%	10%	
Average Number of occurrences of extreme events	5 low flow in 48 years	10 low flow in 48 years	
Decrease in water supply at home	300 hours per month	0 hours per month	I do not choose any option
Water quality	Low contaminated	Low contaminated	
Ecological risk	Low	Low	
Price of the policy	$ 2	$ 8	

CHOICE EXPERIMENT

- Data are analyzed using the Multinomial Logit Model or its variants

- In this type of experiments respondents of a survey are often shown alternative options of a "policy" they might be able to purchase, by paying a tax, in the near future.

- Then, survey´s respondents are asked to pick their most preferred option. In our case, the offered policy might be a restoration plan, which implies that households will decide to accept or reject a water tax that might help to secure appropriate water attributes in the face of climate change.

Choice Experiment

– **We expect that the results of such experiment reveal the number of respondents who are willing to pay to keep water quantity and quality by carrying out some of the restoration plans or neither or them.**

– **We will also determine the average willingness to pay for protecting the   basin, which can be the basis for establishing a local tax per household in the water bill to finance the project.**

Example for a Small Basin

- In this study we find a relatively high willingness to pay, not only to secure the household´s own water provision but also to maintain a good quality of it, by restoring a basin that supplies water to Catacocha Town in the context of climate change.

- We carried out a survey among 248 respondents in the area.

- We find that about 71% of the respondents are willing to pay a higher annual local tax of about 1.3 dollars per month in order to protect the basin and secure water quality and almost half a dollar to secure water provision at home.

- We find that the number of extreme events has positive impact in the determination of the WTP, which implies that climate change perception is pushing WTP.

DATA ANALYSIS

Econometric modeling and estimation of households' willingness to pay

Choice Modeling implies to estimate a regression model that contains both a deterministic and random utility component. Utility is a measure of consumer´s welfare resulting from the consumption of a good or service. The deterministic component captures the influence of attributes and characteristics known by the researcher and the random component contains the influence of non observable attributes.

Empirical Results

Our survey results show that about X percent of the respondents are willing to pay an annual local tax of about X dollars to secure water quality and quantity.

Variable	Definition	Coefficient [a]	Standard Error
COS	Price	-0.104**	0.0138
PPR	Prediction probability of extreme events	0.206**	0.0949
OEV	Average Number of occurrences of the event	0.065**	0.0894
DSE	Decrease in the water supply at home	0.582**	0.0818
CAA	Water quality	1.544**	0.0870
REC	Ecological risk	0.100**	0.1058
ASC	Constant	-0.859**	0.1420
	n(Choice Set)	5208	
	L(,O)	-1900,028	
	L(β)	-1670,446	
	Chi-squared (d.f. = 7)	471	
	ρ^2	0.121	
	adjusted ρ^2	0.128	

Welfare Changes

Situation	Base Situation	Situation 1	Situation 2	Situation 3
Prediction probability	non-labeled	non-labeled	non-labeled	labeled
Average Number of occurrences of the event	non-labeled	non-labeled	non-labeled	non-labeled
Decrease in the water supply at home	non-labeled	non-labeled	Labeled	non-labeled
Water quality	non-labeled	labeled	non-labeled	non-labeled
Ecological risk	non-labeled	non-labeled	non-labeled	non-labeled
Cost (USD/family)	6.55 USD (100%)	14.85 USD (327%)	5.60 USD (15%)	1.96 USD (70%)