EEPSEA MODEL PROPOSAL

October 2006

The following proposal was submitted to EEPSEA and approved for funding in January 2003. It provides all the information required in a clear and concise fashion and includes a draft questionnaire. It may serve as a useful model for researchers interested in submitting proposals to EEPSEA.

This proposal uses contingent valuation, a method well suited to the objectives of this particular research project. This does not imply that all proposals submitted to EEPSEA should use CVM, or that EEPSEA has a preference for such projects.

[The proposal has been annotated to highlight important features. The notations are in italicized bold letters.]

Title of the Project: **IMPROVED MANAGEMENT OF THE ANGAT, IPO, UMIRAY AND LA MESA WATERSHEDS IN LUZON, PHILIPPINES: A CONTINGENT VALUATION STUDY**

Project Leader: **MARGARET M. CALDERON**
Institute of Renewable Natural Resources
College of Forestry and Natural Resources
University of the Philippines Los Baños
College, Laguna, Philippines 4031
Email: bargecal@laguna.net

Date of Submission: **January 15, 2003**

ABSTRACT

The study aims to estimate the value of the improved water supply to Metro Manila residents that will result from the improved management of the Angat, Apo, Umiray and La Mesa Watersheds. These watersheds are sources of water for domestic and industrial uses of Metro Manila. Specifically, the study aims to: evaluate the level of awareness of Metro Manila residents about the importance of watersheds in ensuring a sustainable water supply; determine their willingness to pay for the improved management of the four watersheds; identify the factors that affect their willingness to pay; identify the factors why water users may not be willing to pay for the improved management of the watersheds; provide rough estimates of the cost of water provision through improved watershed management and by conventional means; and develop an economic instrument that will allow Metro Manila residents to contribute to the management of the watersheds. To estimate the residents' willingness to pay, the study will employ the contingent valuation method using the dichotomous-choice question format and the spike model. The results of the study can be used by policy makers and the agencies involved in watershed management and water distribution in developing a policy that will institutionalize raw water pricing. The results of the study will be disseminated through published reports and seminars. The project duration is 12 months, and the budgetary requirement is CAD XXXXX.

[The abstract provides a clear and complete description of the project, including its objectives, methodology and policy relevance – all in one paragraph. The project involves the economic analysis of an environmental problem or policy and is thus of interest to EEPSEA.]

IMPROVED MANAGEMENT OF THE ANGAT, IPO, UMIRAY AND LA MESA WATERSHEDS IN LUZON, THE PHILIPPINES: A CONTINGENT VALUATION STUDY[1]

By

Margaret M. Calderon, Leni D. Camacho, Myrna G. Carandang and Josefina T. Dizon[2]

INTRODUCTION

Description of the Problem

Metropolitan Manila, with a population of more than 11 million, has been experiencing problems in supplying water to its residents and industries. The problem is especially pronounced during the dry season, when water rationing becomes common in many areas in the metropolis. Rapid population growth, increasing incomes, industrialization, commercialization, and urbanization have all contributed to the increase in the demand for municipal and agricultural water uses (Tabios and David, 2002). Unfortunately, the increase in demand did not have a parallel increase or improvement in the quantity and quality of water available for these uses.

[A clear statement of the environmental problem, followed by a description of the institutions responsible for dealing with it.]

The domestic water supply of Metro Manila comes from the Angat, Ipo, Umiray and La Mesa Watersheds. The National Power Corporation has jurisdiction over the Angat, Ipo and Umiray Watersheds, while the ABS-CBN Foundation, through its Bantay Kalikasan program, has been given the task of managing the La Mesa watershed.

Water distribution in Metro Manila used to be the job of the Manila Water and Sewerage System, a government agency. At present, the distribution aspect has been privatized and is now being handled by the Manila Water Company (for the east zone) and the Maynilad Water Services (for the west zone).

The water distribution companies or water concessionaires do not pay any fee for raw water to the agencies that manage the watersheds. The amounts paid by Metro Manila water users are largely for the treatment and conveyance of water to their houses or establishments.

---

[1] A research proposal submitted to the Economy and Environment Program for Southeast Asia

[2] Associate Professor, Assistant Professor, Associate Professor and University Researcher, respectively, College of Forestry and Natural Resources, University of the Philippines Los Baños.

This is not to say, however, that the agencies managing the watersheds are not financially burdened. In fact, a common complaint is that the budget allocation for watershed management is insufficient considering the size of the resource (thousands of hectares) and the threats present (illegal forest occupants, timber poachers, and the like).

David and Inocencio (2001) wrote that one of the major weaknesses in water resource management is "the failure to adopt an integrated, holistic approach in addressing the inherently interrelated issues of water supply planning and operation, demand management, pollution control, watershed and groundwater protection." The results of their study reveal that the government's water pricing policy does not at all seek to recover the full economic cost of producing water. For example, 97% of the raw water distributed by the two water concessionaires comes from the Angat Dam, but they do not pay anything despite the presence of alternative uses for water such as for irrigation. Thus, the opportunity costs are completely ignored. The authors recommended that if raw water revenues can be generated, these should be used to strengthen environmental protection, specifically to support part of the cost of watershed protection.

The head of Bantay Kalikasan, the non-government organization in-charge of managing the La Mesa Watershed, has actually broached the idea of charging environmental fees or raw water prices to officials of the water concessionaires (personal communication with Marlo Mendoza, 2002). The officials recognize the merits of the proposal. However, they are afraid to include the price of raw water in their water tariff rate because any increase can become a political issue. This fear is largely based on the perception that Metro Manila residents will resist any increase in water tariff regardless of the reason for the increase.

[This paragraph explains why - although the authorities are aware of the problem and of a possible solution to it - nothing is being done. The authors then explain that the project will provide information that will either confirm or deny current perceptions about public resistance to the solution.]

This study aims to generate empirical evidence that will inform decisions about the current move to price the raw water produced by watersheds.

Significance of the Study

[This section describes the context within which decisions about water pricing and watershed management take place.]

The proper pricing of natural resources has been identified as an important component of the Philippine Strategy for Sustainable Development that was adopted in 1989. Among other things, it advocates a price reform strategy for environmental resources like water, which have traditionally been viewed as free resources. Consequently, then President Fidel V. Ramos created the Philippine Council for Sustainable Development in 1992 through Executive Order 15. Among the tasks of this Council is the establishment of guidelines and mechanisms to expand, concretize and

operationalize the sustainable development principles embodied in the Rio Declaration, UNCED Agenda 21, National Conservation Strategy, and Philippine Agenda 21. In 1997, the Philippine Economic, Environmental and Natural Resources Accounting System was institutionalized to, among others, operationalize the proper pricing of natural and environmental resources.

The Philippine Strategy for Improved Watershed Management was formulated in 1998 under the Water Resources Development Project. The strategy stresses the need to price raw water and other watershed resources based on their true economic values, which should include the full cost of protecting and harnessing individual resources (Javier, 2001). Despite these, it can be said that there have been very limited efforts to price and collect the fees for raw water in the Philippines.

This study is a positive step in the country's efforts to price raw water, which is becoming increasingly scarce. Because of its budgetary constraints, government can no longer afford to subsidize the provision of raw water. Nor should it allow water users to continue thinking that water is abundant and cheap, the very signal it is sending if it does not correctly price raw water. The price of water should reflect the opportunity costs of competing uses, as well as the environmental cost of resource extraction and consumption (Francisco, 2002).

The results of the study can provide valuable information to policy makers and water concessionaires to fully realize the value of improved management of the Angat, Ipo, Umiray and La Mesa Watersheds to Metro Manila water users. This information can inform policies that will institutionalize raw water pricing and plowing back the revenues generated to the ecosystem that produces the water – the watersheds.

The focus of the study will be the water users in Metro Manila, many of who have been suffering from unstable water supply, especially during the summer months and when the El Niño phenomenon hits the country. Many residents belonging to the lower-income groups end up paying much higher prices for water when they have to buy this from delivery trucks.

[This paragraph highlights the potential benefits of the project to the poor.]

Given the importance of water in people's lives, it is high time that every citizen in this country should realize the need to protect the watersheds, and as such they have the responsibility to help in these efforts. The government alone cannot do it because of budgetary problems, aside from the traditionally low priority given to forest and watershed protection. All stakeholders should realize that the key to sustainable water supply is effective watershed management.

[The first four pages of the proposal show that the authors understand the problem thoroughly, and are familiar with practical aspects of it in this specific context. The idea for the project comes from the real world, not a from a textbook.]

Research Objectives

The general objective of the study is to estimate the value of the improved water supply that will result from the improved management of the Angat, Ipo, Umiray and La Mesa Watersheds to Metro Manila residents.

The specific objectives are:

1. To evaluate the level of awareness of Metro Manila residents about the importance of watersheds in ensuring a sustainable water supply;
2. To determine their willingness to pay for the improved management of the Angat, Ipo, Umiray and La Mesa Watersheds;
3. To identify the factors that affect their willingness to pay;
4. To identify the reasons why water users may not be willing to pay for the improved management of the watersheds;
5. To develop an economic instrument that will allow Metro Manila residents to contribute to the management of the watersheds;
6. To provide estimates of the cost of providing water through improved watershed management and through conventional means; and
7. To develop a mechanism by which the fund for improved watershed management will be collected and utilized.

Scope of the Study

The areas that will be the focus of the valuation study are the Angat, Ipo, Umiray and La Mesa Watersheds, from which the concessionaires draw the raw water that they treat and distribute to Metro Manila users. The agencies that are likely to use the results of the study are the National Power Corporation, Bantay-Kalikasan, Department of Environment and Natural Resources, Manila Water and Sewerage System, National Water Resources Board, Local Water Utilities Administration, and the two water concessionaires, Manila Water Company and Maynilad Water Services.

[The author cites specific agencies that can be expected to use the results - rather than vaguely referring to "policy makers". This helps make a persuasive case that the research has strong potential for policy impact.]

While watersheds provide various goods and services, the study will focus on the value of water to its users. A contingent valuation (CV) study will seek to estimate the willingness to pay of Metro Manila water users to improve the management of the watershed to ensure sustainable water supply. The respondents will also be informed that the improved management of these watersheds will likewise generate a host of other benefits like biodiversity conservation, carbon sequestration, outdoor recreation, and the like. Thus, their contribution to the trust fund described in the CV scenario will result in a whole package of environmental services.

RESEARCH METHODS

Research Questions

The study will seek to answer the following questions:

1. Are Metro Manila residents aware of the importance of watersheds and forests in ensuring a sustainable water supply?
2. Are Metro Manila residents willing to contribute to the protection of the watersheds from which their water supply is drawn?
3. If they are, what is the maximum amount that they are willing to pay for the improved management of these watersheds?
4. If they are not, what are the reasons why they are not willing to pay for the improved management of these watersheds?
5. How does the total willingness to pay compare with the cost of improving water supply through improved watershed management and other conventional means?
6. What is the most acceptable mechanism of collecting and administering the watershed management and protection fee?

[Each Research Question corresponds to an Objective. This helps organize the research design. The proposal leads logically from objectives to questions that need to be answered to the data needed to answer the questions (and thus achieve the objectives).]

Variables to be Measured

The willingness to pay of Metro Manila households for the improved management of the four watersheds will be estimated. The factors that affect their willingness to pay will also be identified. These may include income, water concessionaire serving the respondent, whether the household has experienced water rationing or not; ownership of or access to an alternative source of water (e.g. shallow or deep well); and the respondent's age, sex and educational attainment. The respondents' level of awareness about the role of forests and watersheds in sustainable water supply will also be assessed.

Methods of Data Gathering

[This project will use the contingent valuation method (CVM) to assess willingness to pay for water. CVM is a demanding method that requires the analyst to go through many steps before reaching the final design of the survey instrument. Decisions made in one each step depend on the information gathered in the previous step. The proposal describes each step clearly, showing that the authors understand these procedures and their importance.]

Primary data on the willingness to pay (WTP) of Metro Manila residents will be gathered through personal interviews. A draft questionnaire for this purpose will first be presented during focus group discussions (FGDs), to be conducted in Month 1 among the agencies involved in watershed management and water distribution, and among Metro Manila water users. The purpose of the FGDs is to generate information that will be used to refine the scenario/s for the contingent valuation survey. For the agencies, the points for discussion may include the current situation of the watersheds; problems encountered; and the important activities that are not or are partly implemented because of insufficient funds. For the Metro Manila water users, the points for discussion may include awareness about the role of watersheds in water production; experiences with water shortages and rationing; the amounts paid to water vendors other than the concessionaires, where applicable; the acceptable starting point and range of bids that will be used to elicit willingness to pay; the vehicle for the collection and mode of payment of fees; and acceptable ways of administering the revenues that will be generated in the hypothetical market that will be created.

The questionnaire will first be pre-tested to evaluate its effectiveness (Month 2). Feedback from the pre-test will be used to revise the questionnaire. The interviews will be conducted from Month 3 to Month 7. The survey enumerators or interviewers who will be involved in the study will undergo training to introduce them to the CV method, following Whittington (2002). The enumerators will be forestry or economics students from UP Los Baños, preferably in their junior or senior year, to ensure a good grasp of the study. The interviews will be conducted during weekends so that the target respondents, who are household heads, will be at home.

Secondary data will also be gathered from the National Power Corporation, Bantay Kalikasan, Manila Water and Sewerage System, National Water Resources Board, Manila Water Company and Maynilad Water Services. The secondary data from these agencies will include their budgetary allocations for watershed management, the costs of various watershed management activities, policies regarding raw water pricing, historical annual volumes of water extracted through time, water tariff rates, and other information. The costs of improving water supply through alternative means (other than improved watershed protection) will also be gathered. These costs will then be compared with the total willingness to pay of water users to determine whether or not a policy on payments for raw water is justified and should be institutionalized.

[The proposal is specific about what secondary data will be collected and from which agencies. It also makes clear what the data will be used for i.e. which research questions it will answer.]

Another focus group discussion will be conducted after processing the data from the contingent valuation survey. This will be conducted among representatives of water authorities and agencies managing the watersheds. The purpose of this focus group discussion is to identify the most feasible mechanism for institutionalizing the watershed management trust fund – how this will be collected from water users, which agencies will

be responsible for administering the fund, and what specific activities will be supported by the fund.

Sampling Procedure

For purposes of water distribution, Metro Manila has been divided into two zones: the east zone, which is serviced by the Manila Water Company; and the west zone, which is serviced by the Maynilad Water Services. These zones will be the strata of the study.

The total number of households (n) to be included in the survey will be determined using the formula:

$$n = \frac{N}{1 + Ne^2}$$

where: n = sample size;
N = total number of households in the area; and
e = desired margin of error.

As of 2000, the population of the National Capital Region is 9,932,560 (National Statistical Coordination Board). Using an average household size of 5 persons/household, the estimated number of households is 1,986,512. With a desired margin of error of 2.5%, a total of 1,500 respondents will be included in the survey. This will be proportionately allocated in each zone, using the total number of households per zone as the basis of allocation.

For each zone, the sampling units will be chosen through multi-stage sampling, as follows:

- Since each zone is composed of different municipalities, a number of municipalities will be selected at random.
- Each municipality consists of barangays, and the barangays that will be included in the study will again be randomly chosen.
- The household census will be obtained for each selected barangay. The number of households per barangay will be used as the weight in determining the number of respondents.
- The household census will be used as the sampling frame, and the respondents will be chosen through systematic sampling.

The possibility of allowing the National Census and Statistics Office (NCSO) to undertake the random sampling will be explored.

Initially, no distinction will be made as to whether the household respondents are connected to the water distributors or not.

Split sample analysis will be conducted to look at the impacts of the respondents' knowledge of other users groups' participation in building up the trust fund. Thus, the sample will be split into two groups, each group with 750 respondents. One group will be interviewed using a CV scenario in which the respondents will pay for the ecosystem benefits resulting from improved watershed management, without mentioning other users being made to pay. The other group will be informed that other users (e.g industrial water users, hydroelectric power users, recreationists) will also be made to pay for the benefits they derive.

Contingent Valuation Question Format

The contingent valuation scenario will be presented to the respondents using the dichotomous-choice referendum format. Many CVM studies have made use of this format because it has properties for incentive-compatible or truthful revelation of preferences. This means that the respondent will not have an incentive to misrepresent his or her valuation of an environmental good. The scenario that will be used is presented in Annex 1.

The number of bids, lowest and highest bids, and the bid intervals that will be used, as well as the proportion of each bid to be presented to the respondents will be determined from the focus group discussions. The chosen bids will be randomly assigned to the respondents such that each bid is presented to an equivalent sub-sample.

Possible Sources of Bias

The possible sources of bias commonly encountered in contingent valuation studies and the proposed ways of addressing these are:

a. Strategic bias. This will occur if the respondents deliberately give answers that will sway the outcome of the study in their favor.
b. Hypothetical bias. This refers to the difference between the stated payments to a hypothetical situation and the actual payments that will be made in a real situation.

The use of the dichotomous choice method minimizes the occurrence of these biases. Cheap talk will be incorporated in various sections of the questionnaire. The questionnaire will be extensively pre-tested. The proposed payment vehicle, i.e., an additional amount per m^3 of water used, is also something that the respondents can easily relate to. The additional amount per m^3 will be the same for all households, but the total contribution to the fund per month will depend on the water consumption of the household. The proponents decided not to use a fixed lumpsum donation to the fund because this might make the respondents raise equity issues.

c. Design bias. The survey design, including the amount of information provided in the interview, can affect the respondents' WTP.

Jakobsson and Dragun (1996) emphasized the need for the survey to be not too long and to provide information that is easy to understand. ***[Here and elsewhere, the authors cite literature to support a methodological choice. Although there is no "Literature Review' section, the authors show that they have read and understood the relevant literature and, more important, that they have applied specific lessons from it to the design of the proposal. For each item cited, a lesson is drawn. All items are listed in "Literature Cited" at the end of the proposal. Only literature actually cited is listed.]*** This concern will be addressed by extensively pre-testing the CV scenario that will be used in the survey. The acceptability of the sponge metaphor as a way of facilitating comprehension about the importance of watersheds will be evaluated during the pre-tests.

Data Analysis

The simple spike model will be used in the study to allow a better handling of the zero responses that are common when using the dichotomous choice question format (Kristrom 1995)[3]. In this case, a respondent will be asked whether or not he or she is willing to contribute to a trust fund that will be used for the improved management of the four watersheds supplying water to Metro Manila. This project will result in more reliable water supply and produce other environmental services, or there will be a change in environmental quality $z^0 \rightarrow z^1$ (z belongs to $\Re^1$). The willingness to pay for this change in environmental quality can be expressed as:

(1) $V(y\text{-}WTP, z^1) = V(y, z^0)$

where V(y,z) is an individual's indirect utility function and y is income. If there exists a continuum of individuals who associate different values to the project, the probability that an individual's WTP does not exceed an amount A is given by:

(2) $\Pr(WTP \leq A) = F_{wtp}(A)$

where $F_{wtp}(A)$ is a right continuous non-decreasing function. The expected WTP can then be expressed as :

(3) $$E(WTP) = \int_0^{\infty} 1 - F_{wtp}(A)dA - \int_{-\infty}^{0} F_{wtp}(A)dA$$

To be able to estimate $F_{wtp}(A)$ when binary valuation questions are used, different amounts of A will be presented to each subsample.

[3] The subsequent discussion was adapted from Kristrom 1995.

The spike-model assumes that the distribution function of WTP has the following form:

(4) $F_{wtp}(A) = 0$ if $A < 0$

p if $A = 0$

$G_{wtp}(A)$ if $A > 0$

where p belongs to (0,1) and $G_{wtp}(A)$ is a continuous and increasing function such that $G_{wtp}(0) = p$ and $\lim A \to \infty\ G_{wtp}(A) = 1$. This creates a jump-discontinuity or a spike at zero.

Estimation

The two valuation questions that will be used in the study for the spike model are:

1. Whether the respondent is willing to contribute to the trust fund for improved watershed management; and
2. Whether the respondent is willing to contribute P____/m^3 (**A**) of water consumed per month.

For each respondent, ***i,*** an indicator $\mathbf{S_i}$ will be defined to determine whether the respondent is "in-the-market" or not.

(5) $S_i = 1$ if WTP>0 (0 otherwise)

The respondent will be "in-the-market" if the additional amount that he/she will be asked to contribute to the trust fund is lower than his/her willingness to pay.

On the other hand, the variable **T** will be used to indicate the respondent's willingness to pay the suggested price **A**, or

(6) $T_i = 1$ if WTP>A (0 otherwise)

The log-likelihood for the sample is expressed in the following equation:

(7) $$l = \sum_{1}^{N} S_i T_i \ln(1 - F_{wtp}(A)) + S_i (1 - T_i) \ln(F_{wtp}(A) - F_{wtp}(0)) + (1 - S_i) \ln(F_{wtp}(0))$$

The econometric package LIMDEP will be used to program the likelihood function.

EXPECTED RESULTS AND DISSEMINATION

The study is expected to provide information about the willingness to pay of Metro Manila residents for the improved management of four watersheds from which their domestic water supply comes. This information can be used to develop a policy regarding the institutionalization of raw water pricing. Depending on the results, this study should provide the much-needed justification to make the water concessionaires in Metro Manila pay a price for raw water, their most important input in the production of water for domestic use. Likewise, the study may reveal that, contrary to the perception of the government and the water concessionaires, Metro Manila residents may in fact want to contribute to the improved management of the watersheds if this is one way of ensuring a sustainable water supply.

The study can also identify the possible factors affecting the willingness to pay of Metro Manila residents for improved watershed management, which can be important inputs in designing a vehicle through which this willingness to pay can be translated to actual payments or contributions.

The project's findings will be disseminated in seminars with officials of the government and private agencies involved in watershed management and water distribution, local government units, and water users in Metro Manila. The possibility of producing television plugs about the importance of protecting watersheds and of the need for water users to help in protecting them will be explored, with ABS-CBN as a possible partner or sponsor. ABS-CBN is one of the biggest media companies in the Philippines, and has a strong environmental program.

INSTITUTION AND PERSONNEL

The implementing institution will be the College of Forestry and Natural Resources (CFNR), University of the Philippines Los Baños. The College has been selected as a Center of Excellence for Forestry Education by the Commission on Higher Education. It offers a sub-professional course, a baccalaureate degree, a diploma course, two master's programs, and a doctoral degree. The College is a leader among forestry schools in the Philippines not only in terms of academic offerings but also in its research and extension efforts that have contributed to the advancement of forestry and environmental science and technology.

The research team will be composed of:

Study Leader:
DR. MARGARET M. CALDERON, Associate Professor, Institute of Renewable Natural Resources – Forestry Economist

Team Members:

DR. LENI D. CAMACHO, Assistant Professor, Department of Social Forestry and Forest Governance – Resource Economist

DR. MYRNA G. CARANDANG, Associate Professor, Institute of Renewable Natural Resources – Operations Research Modeling Expert

DR. JOSEFINA T, DIZON, University Researcher, Forestry Development Center – Sociologist

DR. LUCRECIO L. REBUGIO, Professor, Department of Social Forestry and Forest Governance – Policy and Institutions Specialist

The curriculum vitae of the research team are provided in Annex 2.

TIME TABLE

The project will have a duration of 12 months, broken down as follows:

MONTH	ACTIVITY
1	▪ Coordination with the concerned government and private agencies ▪ Conduct of focus group discussions ▪ Preparation of survey questionnaire ▪ Training of enumerators
2	▪ Pre-testing of questionnaire ▪ Revision of questionnaire ▪ Selection of respondents ▪ Coordination with local government units where the survey will be administered
3-7	▪ Administration of survey ▪ Gathering secondary data from agencies involved in watershed management and water distribution
8-10	▪ Data analysis
11	▪ Report writing
12	▪ Dissemination of results

BUDGET

SAMPLE BUDGET AVAILABLE ON REQUEST FROM EEPSEA

LITERATURE CITED

BOARDMAN, A. E., D. H. GREEMBERG, A. R. VINING, AND D. L. WEIMER. 2001. Cost-Benefit Analysis – Concepts and Practice, 2nd ed. New Jersey, USA: Prentice Hall.

BOYLE, K. J. undated. Contingent Valuation in Practice, Chapter 5. Part of the reading materials provided during the Training Course on Environmental and Resource Economics sponsored by EEPSEA, April 2002, Philippines.

DAVID, C. and A. B. INOCENCIO. 2001. Urban Water Pricing: Metro Manila and Metro Cebu *in* Enhancing and Sustaining Stakeholders' Participation in Watershed Management. General Technical Report Series 9. The Committee on Natural Resources, Philippine House of Representatives and the Forestry Development Center, University of the Philippines Los Baños.

FRANCISCO, H. A. 2002. Watershed-Based Water Management Strategy: The Missing Link to Sustainable Water Services. Paper presented during the Policy Forum on Water Resource Management, Philippine Institute for Development Studies.

JAKOBSSON, K. M. and A. K. DRAGUN. 1996. Contingent Valuation and Endangered Species: Methodological Issues and Application. UK and USA: Edward Elgar Publishing Limited. pp. 77-115.

JAVIER, J. A. 2001. The Philippine Strategy for Improved Watershed Resources Management *in* Enhancing and Sustaining Stakeholders' Participation in Watershed Management. General Technical Report Series 9. The Committee on Natural Resources, Philippine House of Representatives and the Forestry Development Center, University of the Philippines Los Baños.

KRISTRÖM, BENGT. 1997. Spike Models in Contingent Valuation.

MENDOZA, MARLO. Personal communication. August 1, 2002.

NATIONAL STATISTICAL COORDINATION BOARD. 2001. Philippine Statistical Yearbook.

TABIOS, G. III Q. and C. C. DAVID. 2002. Competing Uses of Water: Cases of Angat Reservoir, Laguna Lake and Groundwater Systems of Batangas City and Cebu City. Paper presented at the Water Resources Management Policy Forum, Philippines Institute for Developmental Studies, National Economic and Development Authority, Makati City.

WHITTINGTON, D. 2002. Guidance Notes on Managing and Training Enumerators for Contingent Valuation Surveys in Developing Countries. (Draft Version)

ANNEX 1: QUESTIONNAIRE FOR HOUSEHOLDS

[For a stated preference study (i.e. one using a method like CVM) a draft questionnaire is an essential part of the proposal. The questionnaire below is an initial draft. It was subsequently modified after focus groups and pretests. Even the initial draft contains many essential features of a good CV survey instrument:

- an introduction for respondents
- background questions to put respondents in a suitable frame of mind
- a clear presentation of the status quo and alternatives, in this case using photographs and a model
- an explanation of how the money collected would be used
- "cheap talk" about CVM to make respondents aware of possible biases in their responses
- socio-economic information, collected at the end, when respondents are less likely to be offended by the questions.]

Good morning/afternoon/evening! I am from the University of the Philippines Los Baños, and I am part of a research team conducting a study to estimate the value of the improved management of the watersheds supplying water to Metro Manila. I would like to assure you that the information that you will reveal in this interview will be used solely for purposes of research, and that your identity as well as your answers will be treated with confidentiality. In answering my questions, please remember that there are no correct or wrong answers. We are just after your honest opinion.

Basic Information:
Name of Respondent: _____
Barangay: _____
Municipality/City: _____
Date of Interview: _____ Interviewer: _____
Time Interview Started: _____ Time Interview Ended: _____

Part I. Background Information

A. Water Source, Use and Expenditures

1. Please rank the following needs based on the difficulty you have in availing or buying them (1 is the most difficult to avail or buy)
   _____ Food
   _____ Clothing
   _____ House/Shelter
   _____ Water
   _____ Electricity
   _____ Others, pls specify _____

2. Are you connected to the Water Distributor in the area?
   _____ Yes (Proceed to #3)
   _____ No (Proceed to #6)

3. If Yes, what is your water distributor?
   _____ Maynilad Water Services
   _____ Manila Water Company

4. What is your average water consumption/month? _____ cubic meters

5. How much do you pay for water/month on the average? _____

6. If you are not connected to a water distributor, what is your source of water?
   _____ deep well
   => If deep well, did you register with NWRB? ____Yes ____ No
   _____ water vendor
   _____ others, pls specify _____

7. If water is bought, how much do you spend/month on the average? _____

8. How would you rate the availability of water in your household? (Please check one)
   _____ Highly available (24 hrs)
   _____ Moderately available (16 hrs)
   _____ Available (8 hrs)
   _____ Not available (have to buy from water vendors)

9. How would you rate the quality of water in your household? (Please check one)
   _____ Highly acceptable (water can be drunk straight from the faucet)
   _____ Moderately acceptable (water can be used for cooking, cleaning but not for drinking)
   _____ Acceptable (water can be used for cleaning but not for cooking or drinking)

10. What are the major uses of water in your household? Please rank the following choices with 1 as the highest.
   _____ Drinking
   _____ Cooking
   _____ Bathing
   _____ Cleaning
   _____ Others, pls specify _____

11. What do you think are the causes of water supply problems?
   _____ Busted pipes
   _____ Illegal connections

_____ Insufficient raw water during the dry season
_____ Deforestation
_____ Others, pls specify _____

12. What are the negative effects of the unstable water supply to your household?
_____ Health problems
_____ Higher expenditures for water (buying or boiling water)
_____ Delays in doing household chores
_____ Personal hygiene is affected
_____ Others, pls specify _____

13. What do you think is the primary source of raw water?
_____ Deep well
_____ MWSS
_____ Maynilad or Manila Water
_____ Forest or watershed
_____ Others, pls specify _____

B. Awareness about Watersheds

1. Do you know what a watershed is?
_____ Yes (Proceed to #2)
_____ No (Proceed to #3)

2. Which of the following statements do you think is/are true about watersheds?
_____ Watersheds are the primary source of raw water.
_____ Watersheds provide other goods like timber, rattan, and animal and plant products.
_____ Watersheds provide other services like hydroelectric power, biodiversity conservation, recreation, and carbon sequestration.
_____ A good forest cover enhances the way watersheds provide various goods and services.

3. Please indicate on the following table whether or not you are familiar with the following watersheds. If yes, please check your source/s of information.

WATERSHED	FAMILIAR?		SOURCE OF INFORMATION					
	YES	NO	NEWS-PAPER	RADIO	TV	RELATIVES/ FRIENDS	WATER DISTRIBUTOR	OTHERS, PLS IDENTIFY
La Mesa								
Angat								
Umiray								
Ipo								

4. How would you rate the importance of managing and protecting these watersheds to ensure a stable water supply for Metro Manila?

_____ Important (Please proceed to #5)
_____ Not important (Please proceed to #6)
_____ I don't know

5. Well-managed and protected watersheds are important because they:
   _____absorb water and make this available for future use
   _____minimize floods during the rainy season
   _____improve water quality
   _____others, pls specify _____

6. Well-managed and protected watersheds are not important because:
   _____they don't directly affect my household
   _____I don't believe in their role in improving water supply
   _____others, pls specify _____

Part II. Assessment of the Willingness to Pay for Improved Watershed Management

A. Presentation of the Water Supply Situation

Metropolitan Manila, with a population of more than 11 million, has been experiencing problems in supplying water to its residents and industries. The problem is especially serious during the dry season, when water rationing is common in many areas. Rapid population growth, increasing incomes, the growth of industries, people migrating to the city, and urbanization have all contributed to the growing demand for water. Unfortunately, the quantity and quality of water available for these uses has not kept up with this growing demand.

The domestic water supply of Metro Manila comes from the Angat, Ipo, Umiray and La Mesa Watersheds. The National Power Corporation has jurisdiction over the Angat, Ipo and Umiray Watersheds, while the ABS-CBN Foundation, through its Bantay Kalikasan program, has been given the task of managing the La Mesa watershed.

The interviewer will show photographs of the four watersheds and describe the conditions of each.

Water distribution in Metro Manila used to be the job of the Manila Water and Sewerage System, a government agency. Recently, distribution has been privatized and is now being handled by the Manila Water Company (for the east zone) and the Maynilad Water Services (for the west zone).

The interviewer will show and discuss newspaper headlines about the water supply problems of Metro Manila in recent years.

Perhaps you are aware that water tariffs recently increased. You may also have heard about the problems the water distributors claim to have encountered, for example, that one of them is losing money.

1. I would now like to ask you how you feel about the increase in water tariff?

   _____ Happy (Please proceed to #2)
   _____ Unhappy (Please proceed to #3)
   _____ I have no feeling about the tariff increase

2. If you are happy about the increase in water tariff, it is because (you can choose more than one answer):
   _____ I am sure this will result in a better water service
   _____ I found the previous tariff too low
   _____ I found the increase insignificant because my income is high enough
   _____ Other reasons, please specify _____

3. If you are unhappy about the increase in water tariff, it is because (you can choose more than one answer):
   _____ In general, I don't want a price increase
   _____ I think the water company is passing on its inefficiency to consumers like me
   _____ An increase in water tariff in the past did not result in improved water service
   _____ There was no corresponding increase in my income, and the increase has reduced the amount of money left for my other needs
   _____ Other reasons, please specify _____

B. Description of the Role of Forests and Watersheds in Sustainable Water Supply

The interviewer will describe the role of forests and watersheds in sustainable water supply, present diagrams of the watershed and the hydrologic cycle, and show pictures of degraded and well-managed watersheds.

A watershed is like a kitchen sink. You've seen how the kitchen sink catches water from the faucet and drains this into an outlet. The watershed works in a similar manner. It also catches water, though from the rain and not from the faucet, and drains the water through a network of rivers and streams in the area, until it reaches a common outlet.

You can also think of the soil in the watershed as a sponge that absorbs water. If you cover the sink with a sponge and turn on the faucet, it will take some time before water will be drained because the sponge will absorb most of it first. Thus, the more water is absorbed, the less will go down the drain. In the case of watersheds, the more water it absorbs, the less water will go to the lowlands. In effect, the more water is

absorbed, the fewer floods there will be. Also, the more water is stored in the watershed, the better will be the water supply during times when there are no rains. We are not saying, however, that a well-managed watershed will prevent the occurrence of floods and droughts. With prolonged rains, floods can result even from the best-managed watersheds. Likewise, droughts can happen during extremely long dry seasons.

The interviewer will demonstrate this using a small basin with one hole (outlet), a container of water, and a piece of sponge big enough to cover the bottom of the basin. Initially, only a small amount will be poured, which the sponge will absorb. As more water is added, some of it will be drained or retained on the surface, representing a "flood."

However, the amount of water that can be stored in the watershed is largely affected by its land uses. It is widely accepted that maintaining a good forest cover increases the capacity of the watershed to store water and regulate its flow. But as you may already know, our country is fast losing its forest cover. Deforestation and poor land use practices are common and these have damaged the hydrologic condition of many of our watersheds. As a consequence, floods during the rainy season and droughts during the dry season are common.

C. The Trust Fund

Background of the Trust Fund

At present, the money paid by water users to the water distributors is mainly for treating and distributing water to the users. Very little, if any, is used for watershed management. The agencies responsible for managing and protecting the watersheds lack the financial resources necessary to effectively carry out their tasks. If these agencies have additional funds, they can:

1) reforest a bigger area in the watershed per year;
2) hire more forest guards to protect the watershed;
3) construct more look-out towers;
4) install more soil erosion control structures (vegetative and engineering);
5) acquire communication and transportation facilities for better patrolling and protection of the watershed;
6) conduct other activities to enhance the awareness of people about the benefits derived from the watersheds; and
7) involve various stakeholders in watershed management and protection activities.

The interviewer will show pictures of the additional activities that can be done with increased budget for watershed management and protection.

In the short term, these will help reduce or eliminate illegal logging, *kaingin* (slash-and-burn cultivation), forest fires, wildlife poaching, squatting, and other

destructive activities in the watershed. In the long run, you will have a more stable water supply because of the improved hydrology of the watershed. There will be more water during the dry months, and water rationing will be reduced, if not altogether eliminated. The occurrence of floods will be minimized. Improved watershed management can even result in lower water charges, if improved water quality reduces the cost of water treatment. Aside from these, the watersheds will also become a more reliable source of hydroelectric power, produce recreation services, and contribute to biodiversity conservation and carbon sequestration. In other words, improved watershed management will provide a whole package of benefits to you and to society as a whole.

The CV Question

Studies similar to this one have been conducted to estimate people's willingness to pay for the improvement of an environmental good. The respondents were presented hypothetical situations, and the payments were also hypothetical, as they will be for you. (In other words, the new situation described does not actually exist yet, and the respondents did not have to pay anything on the spot). The results of these studies show that some people tend not to reveal their true willingness to pay. Or they simply choose not to cooperate.

Why would a respondent not reveal his or her willingness to pay or refuse to cooperate? I guess the most obvious answer is that the respondents are afraid that they might actually be made to pay.

But I would like to request you to think carefully about whether you really care for reliable water supply or not. Also remember that this study was not commissioned by the water distributors but came about because of the research team's desire to find out how water users feel about protecting the basic resource that produces water. There are really no right or wrong answers to the questions that I will pose.

Suppose a trust fund for the improved management of the four watersheds will be created. The trust fund will be managed by a council composed of various stakeholders - water users like you, water distributors (Maynilad and Manila Water), government (Department of Environment and Natural Resources/National Water Resources Board, Manila Water and Sewerage System), Local Water Utilities Administration and local water districts, local government units, non-government organizations, and the academe. This council will decide the activities that will be supported by the fund, all of which should directly be related to watershed management. Under no circumstance will the fund be used for any other purpose.

The following question will be asked for split sample 1, where there will be no mention of other user groups being made to pay.

1. Will you be willing to vote for a legislation that will create the trust fund if its passage will require all water users to contribute X pesos/household/month to this trust fund?

_____ Yes (Proceed to #2)
_____ No (Proceed to # 4)

The following question will be asked for split sample 2, where the respondents will be informed that other user groups will be made to pay.

1. Will you be willing to vote for a legislation that will create the trust fund if its passage will require all water users to contribute X pesos/household/month to this trust fund.? I would like to inform you that the legislation will also make other groups benefiting from the watershed, e.g. hydroelectric power consumers, industries, recreationists pay a corresponding amount?
   _____ Yes (Proceed to # 2)
   _____ No (Proceed to # 4)

The following questions will be asked of respondents for both split samples.

2. How sure are you that you are willing to contribute an additional P____ per month to the fund?
   _____ Very sure
   _____ Sure (Proceed to #2b)
   _____ Not sure (Proceed to #2b)

   2a. If you answered sure or not sure, please explain why you have some doubts about your willingness to pay.
   _____
   _____
   _____

   2b. If you are not willing to pay P____/per month as your contribution, are you willing to pay any amount at all?
   _____ Yes => If yes, how much? _____
   _____ No (Proceed to #4)

3. Please indicate the reason/s why you are willing to contribute to the fund.
   _____ I want more reliable water supply.
   _____ I want the watersheds to continue producing other environmental services like flood control, biodiversity conservation, recreation and carbon sequestration.
   _____ I would like the future generations to have reliable water supply, too.
   _____ I believe that the council will do a good job in administering the fund.
   _____ Other reasons, please explain
   _____
   _____

4. If you are not willing to contribute any amount to the fund, please identify your reason/s.
   _____ I cannot afford to pay any additional amount to what I am currently paying.
   _____ I think the water tariff I am paying at present is already too high.
   _____ I think it should be the government that should finance the watershed management activities
   _____ I do not trust the council that will administer the fund.
   _____ I do not care about the reliability of water supply.
   _____ I do not believe that paying will result in improved watershed management.
   _____ I do not believe that improved watershed management will result in more reliable water supply.
   _____ I do not fully understand the question.
   _____ Other reasons, please identify
   _____
   _____

Part III. Assessment of Institutional Arrangements

1. Which do you think is the most appropriate mechanism to collect the watershed management and protection fee? (Please check only one)

_____ Amount to be added to water bill
_____ Recover through income tax of water users
_____ Other means, pls specify

2. What do you think should be the basis of charging the fee?

_____ Volume of water used
_____ Income
_____ Number of members in the household
_____ Fixed rate
_____ Others, pls specify _____

Part IV. Socio-economic Information

1. Age: _____
2. Gender: _____ Male _____ Female
3. Civil Status: _____ Single _____ Married _____ Widow/er
4. Educational attainment:
   _____ No formal schooling
   _____ Elementary level (indicate grade)

_____ Elementary graduate
_____ High school level (indicate year)
_____ High school graduate
_____ Vocational
_____ College level (indicate year)
_____ College graduate (indicate course)
_____ Master's degree units (indicate field)
_____ Master's degree holder (indicate field)
_____ PhD/MD/DDM/DVM/LlB units (please encircle)
_____ PhD/MD/DDM/DVM/LlB graduate (please encircle)
_____ Others, please specify _____

5. Occupation
   _____ Unemployed
   _____ Self-employed
   _____ Government employee
   _____ Private sector employee
   _____ Others, please specify _____

6. Household Size:
   _____ Adults
   _____ Children (15 yrs and below)

7. How many in your family, including yourself, is/are gainfully employed? _____

8. Please check the annual income bracket where your family belongs. Include the earnings of all members of the family who are working or gainfully employed, including yourself. Please be assured that the information you will reveal is for research purposes only.

	Annual Income Bracket		Annual Income Bracket
	Less than P50,000		P700,001 - P750,000
	P 50,001 - P100,000		P750,001 - P800,000
	P100,001 - P150,000		P800,001 - P850,000
	P150,001 - P200,000		P850,001 - P900,000
	P200,001 - P250,000		P900.001 - P950,000
	P250,001 - P300,000		P950,001 - P1,000,000
	P300,001 - P350,000		P1,000,001 - P1,500,000
	P350,001 - P400,000		P1,500,001 - P2,000,000
	P450,001 - P500,000		P2,000,001 - P2,500,000
	P500,001 - P600,000		P2,500,001 - P3,000,000
	P600,001 - P700,000		More than P3,000,000

9. Ownership of House:
   _____ Owned

_____ Rented
_____ Living with relative

Thank you very much for your cooperation and help.