



# Linking Watershed Protection and Water Consumption: WTP by Domestic Water Users in Ho Chi Minh City

Dang Thanh Ha

Nong Lam University, Ho Chi Minh City, Vietnam.



## Introduction

Watershed protection activities conducted by upstream communities are important for maintaining water flow and quality that benefit a large number of downstream people. Funding for watershed protection comes mainly from the central and provincial government budget, putting high burden for the government. Payment for Environmental Services (PES) is currently being considered as a promising mechanism to achieve sustainable watershed management and poverty alleviation. However policy-makers are concerning that water users might consider the payment for watershed protection as an unwelcome tax or fee. Given this situation, assessing water users' willingness to pay for the watershed protection services is of great importance.

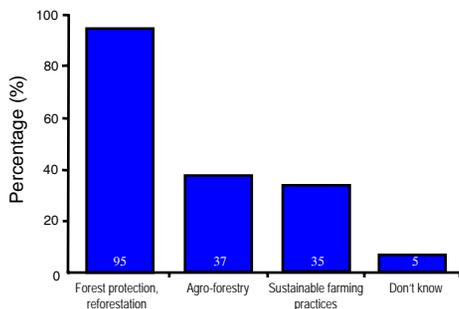
## Objective

This study was conducted to estimate the Willingness To Pay (WTP) of residents in Ho Chi Minh City for watershed protection services, determine the level of potential fund if this WPT were captured, and identify the payment form and mechanism preferred by water users.

## Methods

- Contingent valuation method (CVM) was employed to estimate the WTP of water users for watershed protection services.
- The CV survey was conducted among 600 sample households using stratified random sampling.
- The binomial logit model was applied to determine the mean WTP of respondents using the dichotomous or discrete choice valuation format.

### Perception on Activities Important for Watershed Services



## Logit Model Estimation on WTP

Independent variable	Coefficient	Standard error
Intercept	-0.8248	0.6887
Household size	-0.1206	0.1054
Household income	0.0003	0.0001 ***
Bid Amount	-0.0543	0.0043 ***
Volume of water used	0.0363	0.0184 **
Age of the respondent	-0.0065	0.0108
Gender of the respondent	0.0623	0.2327
House ownership	1.5974	0.3883 ***
Familiar with the watershed	0.3545	0.1322 ***
Number of observations	600	
Loglikelihood (LogL)	-240	
Chi-squared	343	
Mean WTP (VND/year)	52,743	

\*\*\*, \*\* Statistically significant at the 1% and 5%.

## Potential Fund for Watershed Protection and Possible Activities Supported.

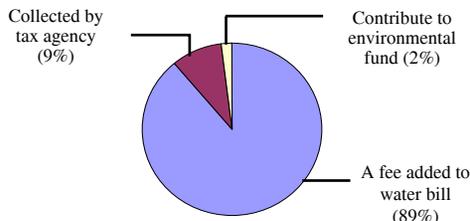
Items	Percentage of WTP captured					
	20%	30%	40%	50%	60%	70%
Fee equivalent (VND/m <sup>3</sup> )	46	69	92	116	139	162
Fund available (Mill. USD/year)	0.91	1.36	1.82	2.27	2.73	3.18
<i>Possible activities supported:</i>						
Reforestation area (thousand ha/year)	2.6	4.0	5.3	6.6	7.9	9.3
Forest protection area (thousand ha/year)	132	198	265	331	397	463
Nr of poor households contracted*	4,410	6,615	8,820	11,025	13,230	15,435

\* Assuming 30 ha of forests contracted per household for protection

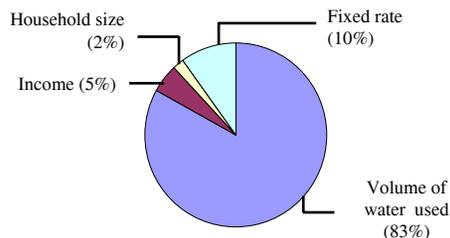
## Results

- Majority of respondents (93%) would be willing to pay more for water protection.
- Household's income, amount of water use, house ownership, and respondent's knowledge about the watershed are significant factors affecting their WTP.
- Preferred payment form is a fee charged based on the volume of water used and added to the monthly water bill.
- Mean WTP is about 6.6% of the water bill or 0.7% of households' income or 231 VND/m<sup>3</sup>.
- Maximum potential revenue estimated from WTP of domestic water users in HCMC is about 72.8 Billion VND or about 4.6 Million USD per year.

### Preferred Mechanism for Fee Collection



### Preferred Basis for Charging the Fee



## Recommendations

- Raw water for domestic water supply should be priced based on the user pay principle.
- Revenue generated from watershed protection fee should be channeled directly to pay watershed service providers.
- PES should not only focus on reforestation and forest protection but also other sustainable forms of land uses such as agro-forestry and sustainable farming practices.
- There is a need for PES-specific supportive legal and regulatory frameworks to effectively implementing PES mechanism.

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