

Participatory Economic Evaluation – Experience in Forest Valuation with Villagers in Vietnam

Dr. Guido Kuchelmeister

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Dr. Guido Kuchelmeister

Program Consult for Development Forestry, Agroforestry, Soil & Water Conservation

Graf-Kirchberg-Str. 26, 89257 Illertissen Tel.: +49/7303/41626 Fax: +49/7303/42114

Email: Office@kuchelmeister-consult.de Internet: www.kuchelmeister-consult.de

1. Introduction

In the transitional period from the planned to the market economy, the Government of Vietnam has encouraged re-allocation of barren land for smallholder forest resource development. Under the framework of the recent 5-Million-ha Reforestation Program supported by diverse donor agencies, the German-based Kreditanstalt fuer Wiederaufbau (KfW) is co-financing several forestry projects to support smallholder establishment of production forests with protective functions on barren land. Projects are executed by the working group of two consulting firms (GFA Terra Systems and GWB).

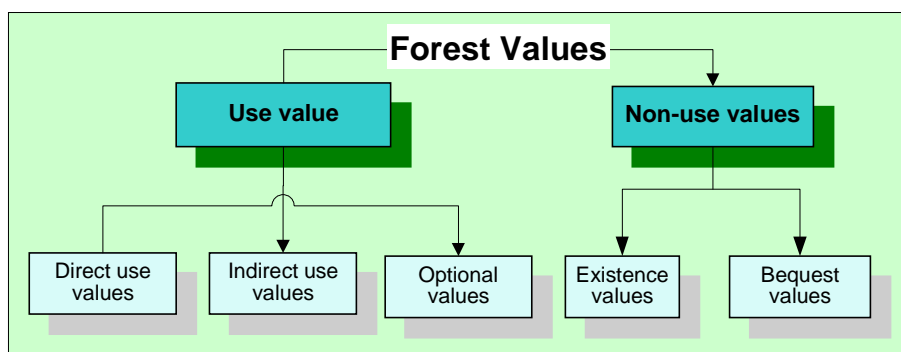
Forest ecosystem services in the project area are complex in nature and highly site-specific. Also local decision makers and villagers are sceptical about results of economic analysis of forest models that is conducted in a style which is not transparent enough for people to understand. The limitations of conventional valuation has recently encouraged active involvement of villagers in the economic valuation of their forests.

In December 2001 during a KfW short term assignment¹ the author elaborated and tested a Participatory Economic Valuation (PEV) procedure in Vietnam. The paper outlines challenges in economic valuation in Vietnam, the basic assumption, advantages of PEV compared to conventional valuation approaches, describes implementation stages and results of the field exercise in villages in Northern Vietnam, and key lessons learned.

2. Forest Values

Forests have many tangible and less tangible benefits (Figure 1). Economic values of forests are simply measures of how important forest goods and services are to people – what they are worth. Direct use values are all goods and benefits (either sold or consumed) of using forest resources directly to produce timber and non-timber products (fuel wood, medicinal plants, food, wildlife, etc.) and no commodity benefits such as forest recreation. Indirect use value are all environmental services, i.e. benefits that protect, improve and sustain the productivity of other land uses, properties and infrastructure. Values include the services of habitat, watershed and soil protection, and carbon storage. Optional value are if the current use of forest land is saved for a later date; it means maintaining options by avoiding irreversible damage to soil, water resources; maintaining stock for future use. Non-use or passive value are bequest value, i.e. value of keeping forest resource intact for future generations and existence value, i.e. intrinsic value of the forest resource. Spirit forests are a typical non-use value of forests in Vietnam.

Figure 1. Classification of Forest Values



¹ This paper is based on the consultancy report (see KUCHELMEISTER 2001).

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The Total Economic Value is the sum of all values, which are compatible, i.e. can be derived together from the same piece of land. The true economic value of forest lands are all costs and benefits of the total forest value. The costs and benefits include all public and private ones, occurring on-forest site and off-site.

Upstream forest land use practises have important impacts on water resources such as good water quality, less sediments, or more regular water flow for downstream users. However, much controversy exists about the direction and magnitude of such impacts. Payment for environmental services by downstream users to upstream users depends much on perceived and agreed upon mechanism for sharing of resulting benefits and costs by all recourse users in a watershed context.

When smallholders decide to establish and manage their forest plots they consider the amount of income and other benefits they can expect from it. Villagers may also appreciate the environmental benefits, e.g. the function of forested watershed in water supply and erosion control.

The distinction between local, national, regional and global values depends on who captures the benefits. In an operational sense, they are not necessarily mutually exclusive. The distinction is important to understand the incentives for conserving these values².

3. Challenges in Economic Evaluation

Challenges related to economy valuation of forest benefits in Vietnam include:

- Active involvement of villagers to value their forests is still a new field in participatory approaches in land use development.
- Since nature does not have a market value, forest ecosystem services are too often perceived not having any value at all. Market prices do a poor job in valuation of these benefits.
- Often ecosystem service is only really “valued” when it has been lost already, and the consequences of this loss become fully apparent. This is a common experience by farmers participating in KfW projects in Vietnam.
- Many forest ecosystem services are complex in nature and highly site-specific. That makes it difficult to generalize across sites.
- Local decision makers and villagers are often sceptical about results of economic analysis when they have been conducted in a style which are complicated and not transparent enough to be understood; and data are perceived as inaccurate and assumptions made perceived as obscure.

4. Participatory Economic Valuation (PEV)

The limitations of conventional valuation suggest that it might be a good thing to encourage active involvement of villagers in the economic valuation of their forests. However, this is a new field in participatory approaches in land use development. To date little practical experience in this field exists in developing countries.

Participatory Economic Valuation (PEV) procedure: The purpose of PEV by the project is to assist forest smallholders and local leaders to improve forest resource development decisions. The basic assumptions of PEV are that the best currently available information on

² State of the art on forest valuation in developing countries see BISHOP 1999; CAMPBELL & LUCKERT 2002. On payment of forest environmental services in developing countries refer to NASI et al 2002; one example of participatory natural resource valuation in Indonesia have been outlined by CANNON 1999.

the costs and benefits of different land uses is held by local decision-makers, technicians and land users.

The advantages of PEV – compared to conventional valuation approaches – are: (i) PEV fully utilizes the data and knowledge of local decision-makers and villagers; (ii) PEV maximizes the involvement and feedback of these groups; (iii) PEV raises awareness about the importance of forest valuation and knowledge of how to do it.

To enable local people to fully participate in valuation, PEV must be conducted in a style which (i) is simple and transparent enough to be understood; (ii) is based on data perceived as accurate; and (iii) uses assumptions perceived to be reasonable.

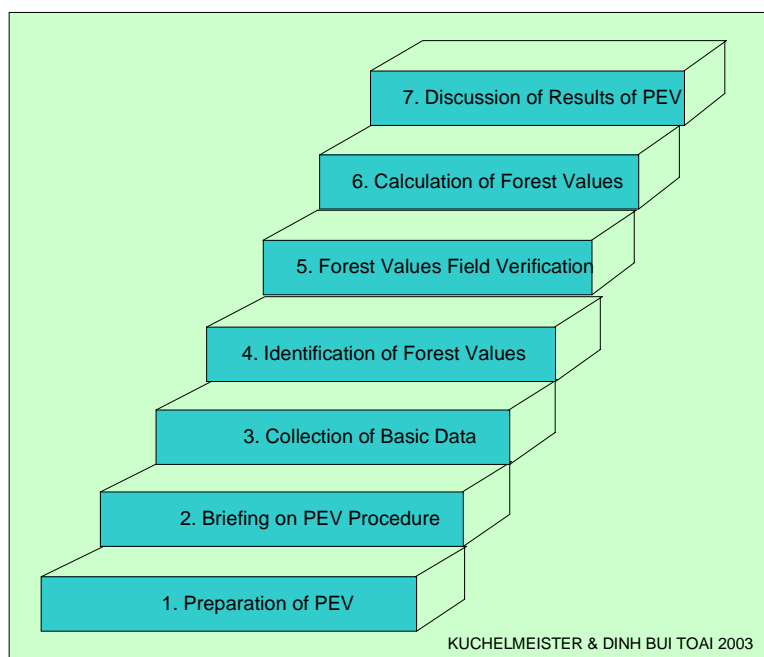
This can be achieved by building on local knowledge (e.g. of perceived physical environmental impacts in terms of change in yield of rice production by villagers) and economic data and assumptions, combined with field checks with villagers. The core focus of PEV is village valuation by forest extensionists with a group of villagers and commune (township) representatives. All steps in the calculation and results must be visualized and reconfirmed by the participants in the village valuation. It is important to include women in the valuation exercise to ensure that their perspective is not missed.

Uncertainties about assumptions made in calculation are addressed by calculating two scenarios (high and low value) for each forest model.

PEV tools used in the PEV exercise included the 3-D model (a three dimensional image of the village), topographical maps, land use maps, ruler, pens, blackboard, and large sheets of paper (A₀).

Forest Benefits: Forests provide environmental benefits from the village to global scale. The scope of assessment was limited to forest environmental services (FES) for which future local payment is not unlikely. For that reason environmental forest services from which the global community will benefit, but payment is currently not feasible (like carbon sequestration), have been excluded in valuation.

Figure 2: Participatory Economic Forest Valuation (PEV) with Villagers



Procedure: The PEV procedure consists of a minimum of 7 steps, beginning with preparation of background data like collection of secondary yield and market data (step 1), followed by briefing villagers about the purpose, scope and expected results of PEV and collection of basic village data including forest resources (step 2). Then basic village data are collected (step 3). To get a first overview of what type of forest values the villagers perceive, the major direct benefits, forest environmental services, optional values, and non-use values in the village and beyond are identified (step 4). It

is important to discuss whether men and women have different perceptions of forest values. To reconfirm the identified forest values, sites are visited and the physical impact area is calculated (step 5). Then, the direct benefits and costs of predominant forest models in the village are calculated, subsequently also environmental services, optional values and non-

use values are valued (step 6). Finally the results of the PEV exercise are discussed at a village meeting and recommendations for further actions are made by the villagers (step 7).

5. Results of PEV in Northern Vietnam

PEV field exercise: In December 2001 the PEV concept elaborated by the author during a KfW short term assignment was refined with key project staff and then tested with project extensionists in seven villages in the Provinces of Bac Giang and Lang Son in North Vietnam. For testing the PEV approach only villages were selected where a significant area of the forest canopy was already closed.

Results of Exercise: Forest values identified were direct benefits (timber and non-timber products like star anise and resin), environmental benefits (protection of irrigation facilities, improvement of farm land and fish productivity), optional values (forest land reserved for future land use mainly for tree crop development). “Spirit forests” represent the only forest value independent of their actual current and future use (non-use value). Reducing soil erosion and settling sediments in small water reservoirs are the most visible impacts of afforestation of barren slopes. Table 1 and Table 2 present examples of calculation.

Table 1. High Value - Forest Environmental Service (FES) on Paddy Productivity

Items	1995 Before Forest Protection	2001 After Forest Protection
Labour costs	4,860,000 VND ^{a)}	3,240,000 VND ^{b)}
Cash costs	3,215,700 VND	3,215,700 VND
Total costs	8,075,700 VND	6,455,700 VND
VND/kg of paddy	3,739 VND ^{c)}	1,196 VND ^{d)}
Saving per kg of paddy		2,543 VND ^{d)}
Total savings/ha		13,732,200 VND
Annual FES from 1 ha forest		597,052 VND ^{e)}
Assumptions:		
a) Labour costs: 324 work days/ha; labour costs valued at 15,000 VND/work day;		
b) Labour cost: 216 workdays/ha; labour costs valued at 15,000 VND/work day;		
c) Paddy yield: 2,160 kg/ha, sometimes total crop failure can occur;		
d) Paddy yield: 2,700 kg/ha/season; two seasons are equivalent to 5,400 kg/ha;		
e) After canopy closed (4-5 yrs) 23 ha forested land improved paddy cultivation on an area of one ha;		
PEV Exercise in Khon Khoan Village, Bang Khanh Commune, Loc Binh District, Lang Son		
Source: KUCHELMEISTER 2001		

Different ways of calculation were tested. Table 2 presents two ways of valuation of the forest environmental service impacts. The first option compared the different costs of producing one kg of fish before and after protective impact of the forest took place; option two compares the net benefit before and after protection. In later case the total environmental benefit is significant higher. Since it can also occur that for some production practices the net benefit is negative - when including opportunity cost for labour - the villagers in the villages in which PEV was practiced have indicated that they feel more comfortable with calculation of the first option.

Table 2. Income Change from Fish Ponds Due to Forest Environmental Service (FES)

Items		Before Forest Protection	After Forest Protection	Balance
Option 1				
1	Additional income per Sao (360 m²)			
2	Cross income:	520,000 VND ^{a)}	900,000 VND ^{b)}	380,000 VND
3	Costs per Sao			
4	Water pumping	60,000 VND ^{c)}	5,000 VND ^{d)}	-55,000 VND
5	Mineral fertilizer	21,000 VND ^{e)}	0 VND ^{f)}	-21,000 VND
6	Other costs	188,400 VND ^{g)}	188,400 VND ^{g)}	
7	Total costs	269,400 VND	193,400 VND	-76,000 VND
8	Fish cost (VND/kg) – rounded	5,480 VND	2,150 VND	3,030 VND ^{h)}
9	Net additional income from 1 Sao (due to reduced fish costs)			272,700 VND ⁱ⁾
10	Net additional income from 12 Sao (two ponds) (0.43 ha)			3,272,400 VND
11	Annual FES (rounded)			41,950 VND ^{j)}
Option 2				
12	Annual net income from 1 Sao (Cross income minus total costs)	250,600 VND	706,600 VND	456,000 VND
13	Annual net income from 12 Sao			5,242,000 VND
14	Annual FES (rounded)			70,150 VND
Assumptions				
a) 52 kg/Sao; farm gate price of fish 10,000 VND/kg;				
b) 90 kg/Sao; farm gate price same as under a);				
c) Originally the fish pond owner pumped water from a dirty river below the ponds; pumping cost for water from river (100 m);				
d) Several years after the forest above the village has been established he conveyed water by constructing of a simple bamboo pipe line, more than 200 m length; calculated life period of 10 years;				
e) Kali and Phosphorus;				
f) Due to higher water quality no fertilizer where required;				
g) Other costs are equal before and after forest protection and are costs for fingerlings (40,000 VND/Sao); fish feeding with cassava (38,400 VND/Sao); tax costs (19,000 VND/Sao; tools (1,000 VND/Sao); and labour (90,000 VND/Sao);				
h) Total cost divided by kg fish per Sao, see under a);				
i) Net additional income is 90 kg multiplied 3,030 VND/kg;				
j) Annual forest environmental services from watershed service from 12 Sao fish ponds are directly impacted from 78 ha forest;				
Bac Dong Village, Gia Cat Commune, of Loc District, Long Son Province				
Source: KUCHELMEISTER 2001				

Results of calculation (with methods of option 1) of forest environmental services (FES) included:

- Enhanced paddy productivity (15,600 to 600,000 VND/ha/year or 1.2 to 46 EUR³/ha/year). The highest value is equivalent to the farm gate price of a big pig or the market value of paddy (unshelled rice) from 0.1 ha.
- Annual reduced costs for extraction of sedimentation from micro-irrigation facilities (225,000 VND/ha or 17.3 EUR/ha); and
- Increased annual fish productivity in small village ponds (41,900 VND/ha or 3.2 EUR/ha). This is equivalent to the farm gate price of 4 kg fish.

Optional values for forest land reserved for tree crop cultivation ranged between 8.0 and 94.5 million VND/ha (615 and 7,270 EUR/ha). “Spirit Forests” (non-use value) can have a high value in terms of biodiversity, but villagers did not dare to give a monetary value. The undiscounted Total Economic Value (TEV) per village household in one sample village was

³ The rate of exchange used was 1 EUR equivalent to 13,000 VND (Vietnamese Dong).

between 23.2 and 39.9 million VND/household (1,785 to 3,070 EUR/household) and the discounted TEV between 5.3 and 11.2 million VND/household (410 and 860 EUR/household). For the high value scenario the undiscounted FEV was around 6% and optional value 1%. The FES for one ha of pine plantation discounted was 14% and FES undiscounted equivalent to 6%.

One example of Willingness to Pay (WTP) for disproportionately perceived private environmental forest services (i.e. increased fish pond productivity due to improved water supply and quality from forests) was identified. The owner of the fish ponds indicated that he would be willing to pay for forest conservation at least 10 % of the incremental income due to the FES. This is equivalent to an annual fee of nearly 300,000 VND.

Perception of environmental forest benefits was highest where villagers had experienced a period with natural forests, followed by deforestation and unsustainable upland land use including subsequent reforestation. Especially elder villagers highly appreciated the environmental benefits of forests. From the viewpoint of villagers, the distinction between production and protection forests as defined by Vietnamese Law does not make sense in a situation where a production forest in a village also has a significant protective benefit (e.g. when a forested micro-watershed directly protects and improves the productivity of a significant area of paddy land).

6. Lessons Learned

The exercise in Vietnam reconfirmed that the best realistic economic data for existing forest models can be gained from technicians and farmers, especially those who have developed local forest practices.

The tested bottom-up approach of valuation also proved to be a good medium of communication to identify the production forests in the village for which clear cutting should be avoided at all costs in order to maintain the watershed benefits. In this case PEV provides economic arguments for conversion of unstable pure plantation to continuous cover forests (CCF).

Discussion of the **results of the village valuation** should focus on:

- ❑ How to reconcile the forest management objectives (production and protection goals)?
- ❑ What silvicultural options are available to realize the management objectives?
- ❑ How to retain the environmental benefits of a specific production forest identified with significant protective functions?
- ❑ How to improve or establish financial mechanism to retain the perceived environmental services from specific production forests (e.g. special water fee for forest protection)?
- ❑ Is there a need to amend village forest regulations? If yes, what amendment should be made?

How to deal with time preference, i.e. addressing the fact that people attach greater value to receiving money immediately than they do to obtaining the same amount in the distant future, is still a challenge in the task of further refining participatory resource valuation.

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