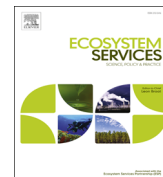




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# Farmers in NE Viet Nam rank values of ecosystems from seven land uses

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## ABSTRACT

Despite being promoted as an integral part of natural resource management and Payments for Ecosystem Services (PES) community participation is often considered restricted by 'lack of (local) knowledge'. Contrasting evidence suggest that farmers' more holistic understanding of ecosystems may challenge scientific studies and payment schemes typically focussing on a fraction of ecosystem services, e.g. Viet Nam's PES-policy which covers forest carbon, water and landscape beauty. Against this backdrop we explored how farmer groups in two villages (one with PES and one without) in northeast Viet Nam rated and justified fifteen ecosystem services from seven land-uses, including non-PES functions and non-forest land uses. The villagers gave overall analogous ranking and reasoning. For overall ecosystem services natural forests and forest plantations rated highest and paddy rice lowest, however for economic values natural forests rated lowest and rice-fish cultivation highest. With regards to the PES-policy, farmers failed to see the logic of excluding agricultural land and agrochemical pollution from water services. We recommend that research and capacity building aiming to prepare for PES-schemes embrace a wider range of local knowledge and understandings of ecosystem functions than those immediately considered for payment schemes. We present a participatory matrix ranking tool to support such purposes.

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## 1. Introduction

Of the 24 ecosystem services identified in the Millennium Ecosystem Assessment report, only a handful typically generate payments for ecosystem services (PES): water, carbon, biodiversity, cultural heritage and landscape beauty (eco-tourism) (MEA, 2005; Pascual et al., 2010). This is because they are comparatively easier to monitor and have clearer financial benefits to the payer (Scherr et al., 2006). Furthermore, a review of 457 articles on PES highlighted that (1) industrialised countries tend to focus on ecosystem services generated from agriculture while developing countries focus on forestry, and (2) most reviewed PES-schemes were government-initiated, conducted at national or large scale (notably in China, EU and the US) with variable degrees of voluntariness, which contrasted with the comparatively fewer market-initiated, typically small scale and more voluntary schemes (Schomers and Matzdorf, 2013).

The dominance of top-down PES-schemes raises questions over the degree and roles of community participation (Kosoy et al.,

2008). In developing countries inclusion of the poor is adamant because PES is often combined with rural development or poverty alleviation interventions. Participation is encouraged to ensure the longevity of projects, avoid myths and misunderstandings (Cremaschi et al., 2013) but may be restricted by institutional, legal or biophysical factors, income and knowledge levels (Bremer et al., 2014; Kwayu et al., 2014). In contrast to the free, prior, informed consent aspect of Reduced Emissions from Deforestation and forest Degradation (REDD), PES-schemes do not stipulate minimum levels of awareness raising before implementation. One concern is that PES suppliers, in particular smallholders would be in an inferior position for negotiation compared to (presumably better educated) intermediaries, such as government officials or buyers (To et al., 2012). For example, the need for mock auctions to ensure that farmers understand the reverse auction process as a means to identify payment levels, reflects their vulnerability if they had but one chance (Jindal et al., 2013). Furthermore, government officials themselves perceive PES as overly technical and complicated, possibly reflecting why they think PES is too difficult for farmers to understand (Simelton et al., 2013). These examples highlight, firstly that knowledge gaps should be addressed before PES implementation, in particular between local and scientific knowledge of ecosystem functions

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and their values (Petheram and Campbell, 2010; Danielsen et al., 2013), secondly that participatory tools for facilitating such co-learning are sparse. Against this background, we investigated how farmers rate and qualitatively justify the values of the ecosystems in their own landscape, including non-forest land uses, and whether there were differences between a village with PES schemes and one without. For this purpose, we developed a participatory matrix ranking tool that was tested in two villages in northern Viet Nam.

## 2. Methods

### 2.1. PES in Viet Nam

Viet Nam's national PES-policy Decree 99-2010-CP (Viet Nam Government, 2010) notes five services provided by forestland: clean water, watershed protection, water for spawning grounds, carbon and landscape beauty and specifies the payment rates for some. Challenges regarding the implementation and degrees of participation have been documented in several studies (To et al., 2012; Pham et al., 2013; Suhardiman et al., 2013).

While there is a scholarly debate on the use of the terms "ecosystem" and "environmental" services (Derissen and Latacz-Lohmann, 2013), Viet Nam's PES policy (Decree 99) is officially translated as payment for forest "environmental" rather than "ecosystem" services. This resembles the description of environmental services as "ecosystem service(s) minus the provisioning services for which markets can be expected to balance supply and demand" (van Noordwijk et al., 2012 p. 392). The varying definitions have little bearing on discussions in Vietnamese, especially with farmers. We adapted a list of ecosystem services from MEA (2005) paying particular attention to farmers' understanding of the goods and services provided naturally (albeit in man-made agro-ecosystems) contrasted with how provisioning goods (such as food, fiber, wood) translated into economic values. Hence, the term "ecosystem" (e.g. MEA, 2005; Braat and de Groot, 2012), is used except when quoting Decree 99.

### 2.2. Study sites

Focus-group discussions were conducted in two villages in Bac Kan province, northeastern Viet Nam. Both villages have similar land uses, representative for the mid-altitudes of the uplands in continental southeast Asia. To Dooc village in Na Ri district had 24 households and Na Ca village in Ha Vi district 60 households (Aug 2013) out of whom over 90% cultivate both agriculture and forest land. To Dooc village participated in an ongoing forest-PES pilot scheme in operation since 2009 and some farmers had attended training (Simelton et al., 2013) while Na Ca villagers had never heard of PES.

### 2.3. Participatory ranking tool

Seven land-uses were identified on the valley floors and foothills—monoculture paddy rice, rice-fish cultivation and home gardens—and on adjacent sloping land: monoculture cassava or maize, taungya agroforestry system intercropping cassava with fast-growing timber trees, forest plantation and naturally regenerated forest (see Table 1). Fourteen ecosystem services were selected and some descriptions modified (MEA, 2005) by the facilitator to fit with local contexts. In addition, the "economic" value was rated, referring to the current monetary importance of respective land use to the households. Two focus groups with eight participants each (mixed gender and age) deliberated and ranked each ecosystem service associated by land-use type while

one rapporteur took notes of the discussions. The ranking was relative with '6' representing the highest through to '0' for the lowest value, using maize seeds that easily could be altered.

## 3. Results

Table 1 gives the land uses and justifications for the ranking as given by the focus groups. Table 2 shows the ranking for the ecosystem services for lowland (plains) and upland (sloping land), respectively. Both groups rated natural forest the highest followed by tree plantation and intercropped taungya systems while paddy rice cultivation rated the lowest. The sequence only differed in that To Dooc village rated garden > upland crop > rice-fish while Na Ca village rated rice-fish > upland crop > garden. This may be a consequence of the former village having comparatively larger and more diverse home gardens and fewer households with rice-fish.

Among "provisioning" services there was a dichotomy between land uses providing food versus fuel and clean water. The "supporting" and "regulating" services were overall ranked highest for natural forests and lowest for paddy rice. The 'cultural' values included only aesthetical values (i.e. landscape beauty) as neither group said they had any sacred or spiritual values associated with any land use or plants. In the views of the villagers the naturally regenerated forest was most beautiful, followed by plantation forest, intercropping (taungya) and home garden, rice-fish, upland crop and paddy fields. One argument for rating rice-fish higher than paddy rice was that "first you see the rice field, when you come closer you see the fish" (Na Ca). Furthermore, both groups stressed that the positive ecosystem and health effects of rice-fish outweighed those associated with mono-cultivated rice. Pesticides and inorganic fertilisers were particularly seen as polluting waters and killing fish.

The "economic" values (monetary) were rated diametrically opposite those of ecosystems. Rice-fish cultivation ranked highest, followed by paddy rice, upland crops and garden. As most production was for home consumption this ranking highlights not the importance of being able to sell the produce but the ability to secure a food supply (subsistence). Moreover, farmers distinguished between monetary and ecosystem values saying that natural forests had no economic value as they were "not allowed to take out anything from these forests" (To Dooc). This highlighted a misperception of Decree 178/2001-QT-TTg on the rights and obligations of households allocated, and contracted to, forest and forestland for sharing benefits, which states the rights to benefits that households can reap from timber and non-timber forest products (Viet Nam Government, 2001), although at the time of writing the policy content is under discussion.

Contrary to our initial assumptions, the presence of PES had yet little influence on farmers' aspirations of their land use. Farmers in the PES village To Dooc anticipated they may receive carbon funds (not yet realized) while Na Ca villagers expected to maintain forest-protection funds, which in 2013 reached about the same amount (USD 10/ha/year) and had not (yet) resulted in differing land uses. Moreover, both villages were remarkably unanimous in ranking and explaining ecosystem services. Although the benefits of carbon storage are primarily global, farmers understood some basic links between climate-change information on TV and the locally visible 'carbon' in wood, leaves and roots. To Dooc-farmers are likely to have benefitted from a module in the PES-training on participatory carbon measurement, a practical skill that in contrast to more theoretical lectures had remained in vivid memory months after the training event (Simelton et al., 2013). Na Ca farmers said they gained awareness by making their own observations of the landscape and watching TV, but had many unanswered questions.

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