REDD net case study

Networking for equity in forest climate policy

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Market and non-market costs of REDD+ perceived by local communities: a case study in East Cambodia

Srek Ktum, one of the villages in the case study area, Mondulkiri Province, Cambodia.

KEY POINTS

- Forest dependent communities' perceptions of non-market costs should be included when assessing the costs associated with REDD+, as they are the actors who will largely bear these costs.
- Opportunity cost analysis is a useful tool for measuring the market costs of avoiding deforestation. However, it does not capture all the locally relevant costs of REDD+ since it fails to quantify non-market costs. In order to fill this gap the study uses a Contingent Valuation (CV) technique by directly interviewing forest dependent communities.
- This study finds that in the Mondulkiri province, Cambodia, 17% of the overall costs perceived by local communities of a proposed REDD+ project relate to non-market costs. These are additional to the costs found by applying an opportunity costs analysis (market costs).
- This paper suggests that these non-market costs could be offset by different types of in-kind compensation such as: clarifying land tenure for local communities; expanding local opportunities in the resin market and enhancing the provision of education in the area.

INTRODUCTION

Forest dependent communities use forests for a range of timber and non-timber products, for sale and subsistence use. Their formal and informal use of forests means that they are likely to be most affected by the implementation of REDD+, therefore their perceptions should be included when assessing the costs of implementing REDD+ to ensure that REDD+ is implemented equitably and will be effective.

Most attention has been focused on identifying national level costs of REDD+, but less on those perceived at local level, namely by local and indigenous communities. The national level opportunity costs of REDD+ can be useful to give a macro picture to implementing authorities, but may not provide an accurate representation of the opportunity costs perceived by a particular community that will be affected by a given project.

Opportunity costs represent the most important component of the costs of REDD+, not only because they represent the largest share of REDD+ costs but also because they may form the basis for decisions on

DISCLAIMER

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compensation of forest dependent communities for participating in REDD+. Beyond the foregone economic benefits of the alternative land use there are other socio-cultural or non-market costs that can be represented by the psychological and cultural impact of the change of activity. Examples of such costs include '*spiritual or emotional impacts of livelihood change, loss of freedom and erosion of social capital*' (World Bank 2011:1-4).

This study uses local estimates to measure the opportunity costs in a specific area in Eastern Cambodia where a REDD+ project is in its early stages (Caravani 2011). Based on face-to-face interviews, the study argues that opportunity costs analysis, while useful in measuring the market costs of avoiding deforestation, does not capture all the locally relevant costs of REDD+ projects since it fails to quantify non-market costs. In order to fill this gap we use a Contingent Valuation (CV) technique. This is a participatory approach based on a 'bottom-up' estimate of the costs perceived by local communities and it is proposed as a complementary way to assess the costs of REDD+ at the local level.

DEFORESTATION AND REDD+ IN CAMBODIA

The development of REDD+ in Cambodia has been primarily stimulated and supported by development partners such as FAO, UNDP, JICA, UN-REDD Programme, the World Bank's FCPF and other partners and NGOs.

Cambodia submitted its Readiness Plan Idea Note (R-PIN) to the World Bank Forest Carbon Partnership Facility (FCPF) in late 2008 and was accepted into the FCPF in early 2009. In August 2009, Cambodia was invited to join the UN-REDD Programme, and was granted observer status on the UN-REDD Policy Board in October 2009 (R-PP 2011). The Readiness Preparation Proposal was submitted in January 2011 and it was approved in August 2011 by the UN-REDD Program Policy Board. However, key challenges remain in place for REDD+'s implementation in Cambodia. The country suffers lack of demarcation of forest areas, weak land tenure rights and doubts about available financing, in particular for up-front REDD+ investments.

The Community-Based Production Forestry Project in the Seima Protection Forest

This study is based upon field research in six villages of the Seima Protection Forest (SPF) in the Mondulkiri province in Eastern Cambodia. The SPF was designated a protection forest in August 2009 and was identified as the most important wildlife conservation area in Cambodia, providing habitat for over 40 species on the IUCN Red List. The Forestry Administration (FA) manages the project in partnership with the Wildlife Conservation Society (WCS).

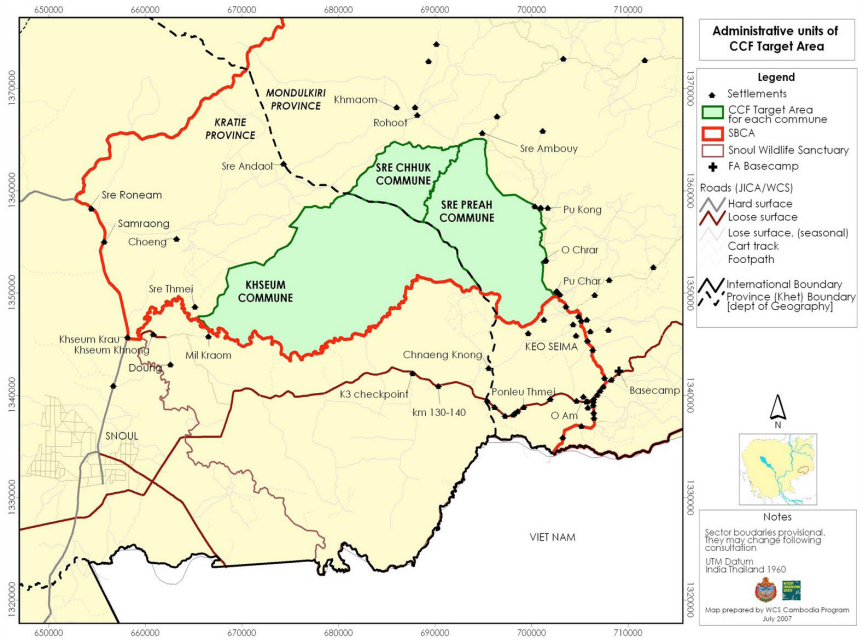
The Community-Based Production Forestry project (CBPF) consists of two main areas of activities: a Core Protection Forest where a REDD+ project will be implemented, where deforestation is 100% prohibited, and Buffer Protection Forest areas, where suitable development activities can occur and timber will be harvested in a sustainable way. This second type of activity is the Community-Based Forest Enterprise (CBFE) project. Here timber harvesting rights will be assigned to Community-based Forest Enterprises (CFEs) set up at the commune level and timber products will be sold on the domestic market.

This study mainly focuses on the REDD+ project in the Core Protection Forest area. It is the second REDD+ pilot site (after Oddar Meanchey in the North West of the country) and the first in a conservation area. It covers about 187,000 hectares and according to estimates of a feasibility study (Pearson et al. 2008) the whole area will save about 1,566,000 tCO_2e in the first 5 years, generating approximately $5.4 million revenue (Evans 2011).

The project anticipates working with the indigenous communities of the Seima Protection Forest. Indigenous community is defined by Article 23 of the 2001 Cambodian Law as "*a group of people that resides in the territory of the Kingdom of Cambodia whose members manifest ethnic, social, cultural and economic unity and who practice a traditional lifestyle, and who cultivate the lands in their possession according to customary rules of collective use*".

The project aims to involve and interact closely with Community Councils, which are composed of village leaders and members of a Forest Management group. Its main roles are to "*hold the management rights to the forest area, develop and execute management plans, market and sell forest products, and share benefits with the communities*" (Pollard et al. 2010:V). Detailed community consultations on benefit sharing of REDD+ and timber revenues generated by the CBFE projects have not been held yet.

FIGURE 1: MAP OF PROJECT AREA



Source: WCS 2007

Typical dwelling of local communities in the Mondulkiri Province, made entirely of timber and non-timber products from the surrounding forest

Data from WCS show that the 2008 deforestation rate in the SPF area was 0.29% per year. With a total forest area of 305,000ha the deforestation rate of 0.29% implies that 885ha of forest are lost each year. The forest is home to 16,600 people, with an average household size of 6.6.

Historically slash and burn along with shifting cultivation may have driven deforestation, however, the construction of new roads has opened the forest to further threats, for example, commercial rubber plantations which are logging in the area (Pers comm). Further analysis is needed to assess the current level of responsibility of small scale farmers in causing deforestation in this area.

METHODS USED FOR EVALUATE COSTS OF REDD+ AS PERCEIVED BY FOREST COMMUNITIES

Two methods have been used in this study to assess the costs of REDD+ projects perceived by local communities. First, opportunity cost analysis to quantify the market costs, and second, contingent valuation to estimate both, the market (and to compare them with the opportunity costs findings) and non-market costs of avoiding deforestation.

Opportunity costs and other REDD+ costs

"*Opportunity costs are the forgone profits from alternative land uses such as cash or food crops (including revenues from timber sales), which correspond to the minimum price to be paid for REDD services*" (Wertz-Kanounnikof 2008:6). They can be estimated as the net profits per hectare per year foregone by maintaining forest cover i.e. from not logging and converting land to agriculture or other more lucrative activities such as oil palm or rubber plantations.

The other two main components of REDD+ costs are:

(i) Implementation costs: e.g. costs of monitoring a forest to prevent illegal logging, relocating timber harvesting activities away from natural forests to degraded land due to be reforested and agricultural intensification (Pagiola and Bosquet, 2009); and

(ii) Transaction costs: the costs of a transaction involving a REDD+ payment as confirmation that the REDD+ project achieved a certain level of emission reduction. The components of transaction costs include identifying REDD+ programmes, negotiating transactions, and monitoring, reporting and verifying emissions reductions and preventing deforestation moving to other areas (leakage).

While these two costs are mainly perceived by REDD+ countries and by government agencies, opportunity costs are entirely born by forest dependent communities and will be the focus of this study. Chomitz (2006) and others have identified the main factors that influence opportunity costs.

These are:

- Type of land use (e.g. type of cultivation, or type of animal grazed, or type of timber);
- Soil and climate conditions, which affect yields;
- Scale of operation – small, medium, large;
- Inputs and technology;
- Distance from the market and quality of transport infrastructure;
- Energy prices (e.g. gasoline for machinery and transport);
- Carbon density estimates.

Other factors that influence these estimates include:

- Differences in cost of labour;
- Change of agriculture commodities prices over time;
- Difference in discount rates and time horizon applied.

Three main approaches to estimate opportunity costs are found in the literature (Grieg-Gran 2008):

(i) Local estimates

This approach uses household surveys to directly ask local communities to quantify the income that they obtain from a particular land use. The results can be reliable for a specific context and geographical location but are not necessarily reliable for extrapolation over a wider area. As local conditions change more rapidly than national ones these estimates need to be frequently updated.

(ii) Global estimates

This approach typically uses national data to estimate the average productions costs and revenues per hectare or per tonne of agriculture product. While this may give REDD+ implementing authorities a reasonable macro picture, it may not provide an accurate representation of the opportunity costs perceived by a particular community that will be affected by a given project.

(iii) Land prices

In theory land price should be a good indicator of the opportunity costs of avoiding deforestation because it should represent the discounted flow of returns from that land if it is put to its most productive use. However in practice land prices are not very representative, especially in developing countries. For example in Brazil land can be obtained for free and can be claimed by clearing the forest (Alston et al 2000)

so its price is not a good indicator of the level of opportunity costs. Furthermore, Chomitz (2006) notes how costs of different land uses and other characteristics that influence its price are often omitted in land prices studies.

In this study we use a micro-level approach, based upon particular local conditions, to capture the local opportunity costs perceived by forest dependent communities. The aim of this work is to give a realistic picture - using primary data - of the situation of communities in the Mondulkiri province in East Cambodia.

Pros and cons of opportunity costs

Opportunity costs are considered in the literature as the most important component of costs a country or a group of people would incur when reducing its rate of forests loss within REDD+, so an accurate estimate of such costs is very useful. Opportunity costs also represent indicators of the key drivers of deforestation. For example if the opportunity costs of REDD+ are higher for areas of land under cassava production than pasture land, it suggests that it will be more difficult to encourage a change in practice towards forest conservation by cassava farmers as they have more to lose from doing so.

Furthermore, opportunity costs help to identify compensation required (or amount of income that alternative activities would need to provide) for those who change their land use practices when implementing REDD+.

However the main limits of the opportunity costs are that its estimates are very context specific, they need to be updated frequently because of price changes over time and they may not capture non-market costs such as the psychological impacts of land use changes caused by REDD+ projects. Among the main weaknesses of opportunity costs as an appropriate method to assess the costs perceived by local communities, is the lack of quantitative estimates of these non-market costs. The study proposes that this gap can be filled by applying Contingent Valuation.

Contingent Valuation

Contingent valuation (CV) is '*a survey-based stated preference methodology that provides respondents the opportunity to make an economic decision concerning the relevant non-market good*' (Carson et al. 2001:198). CV is used to evaluate public goods that are not tradable on the market. Forests, in most cases, are public resources that provide non-market environmental benefits. On the other hand restriction of use of forests causes non-market costs to forest dependent communities such as loss of freedom and foregone access to the forest. CV can be used to assess these costs.

CV is based on the construction of a scenario where the asset in question can be traded. It explicitly asks individuals to place value upon an asset. Respondents are asked to elicit the value of an environmental improvement through the maximum Willingness To Pay (WTP) for the positive change or are asked to elicit the value of a loss and the relative compensation through the minimum Willingness To Accept (WTA) to tolerate such a loss.

Most CV studies used this technique to elicit the use and non-use values of natural resources. Smith et al. (1998) applied CV to elicit the Peruvian farmers' Willingness To Pay (WTP) for environmental services. WTP has mainly been used to give a monetary value to environmental services such as biodiversity e.g. spoonbill conservation (Jin et al. 2008) and introduction of national park fees (Schultz et al. 1998). Willingness To Accept (WTA) is less frequently used in the literature to estimate the costs of restrictions on access to tropical forests. Shyamsunder and Kramer (1996) is one of few studies that use CV through WTA to value the loss of access to tropical rainforests in Madagascar. CV doesn't seem to have been applied to elicit the non-market costs of a REDD+ project.

Field research for this study consisted of thirty four face-to-face interviews, undertaken in April 2011 in six villages: O'rona, Srek Ktum, Pu-Char, Pu Kong, Sre Preah and O Chrar in the District of Keo Seima, Mondulkiri Province.

RESULTS

Opportunity Costs results

Opportunity costs for the REDD+ project (i.e. strict protection of the forest) were calculated. The opportunity costs reported in Figure 2 were estimated by calculating the difference between the profits made from each agricultural product and the profits made from the forest (in this case resin). Due to the low density of suitable trees (Evans et al. 2003) the average profit of resin on 1 hectare of land in one year is only $5.70.

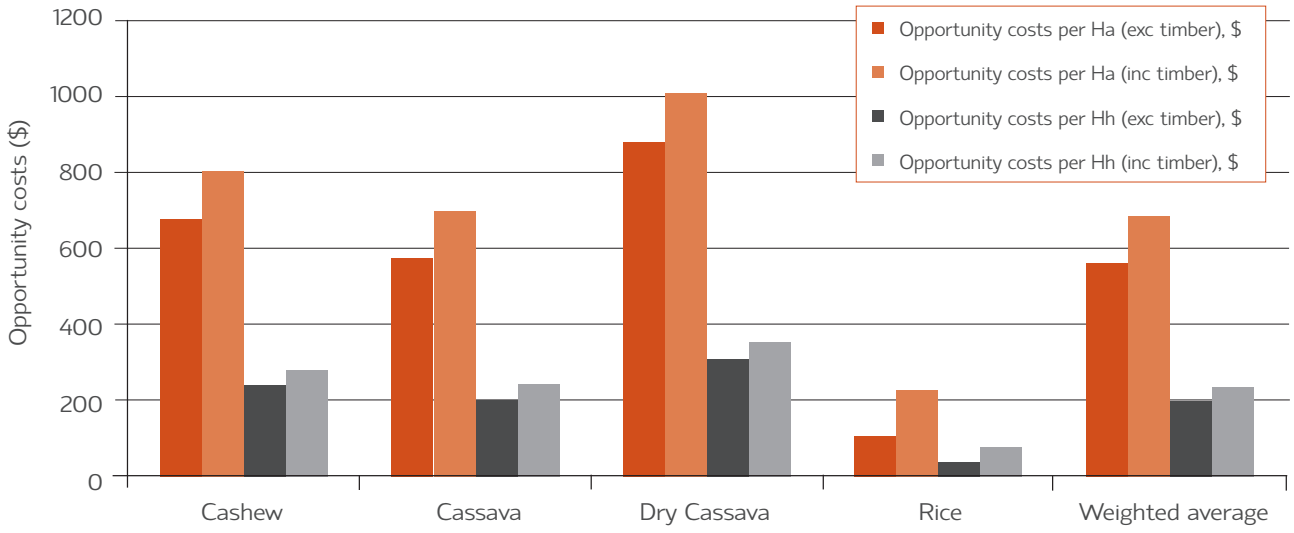
A Net Present Value (NPV) calculation with a 5% discount rate was used to consider the annual income to be paid to compensate farmers for the one-off loss of timber over 30 years (duration of the project). Data of income from timber is based on a market analysis undertaken in 2008 (Blackett 2008). The NPV was not used for cultivation income because it is assumed that it is an annual income repeated each year.The main costs reported were gasoline used for the motorbike when transporting the products to the Keo Seima market and other machinery for activities such as clearing grass and ploughing. An average opportunity cost value was weighted by the area of production for each crop to take into account the fact that some products are more commonly farmed than others.

The farmers interviewed were not involved in rubber plantations but this activity is very lucrative in the area, and is therefore a potentially important driver of deforestation. Profits from rubber are excluded from the average profits of the different products as these profits are made by commercial enterprises, not local farmers. The profits made from rubber are reported as approximately $950 per hectare (ha) (Delarue, 2009).

We find that the average net profits foregone when implementing a REDD+ project are $567 per ha/year and $198 per hh/year. When including the one-off timber income, the annual opportunity costs rises to $692 per ha/year and to $242 per hh/year. This is calculated by subtracting the profits made from standing forest from agricultural profits. In calculating profits from standing forest (only resin production) an average household deforestation rate of 0.35ha was used (Caravani 2011). This is shown in figure 2.

A comparison of the local level opportunity costs in the CBFE project area with the REDD+ project area, showed that the

FIGURE 2: ANNUAL OPPORTUNITY COSTS PER HECTARE AND PER HOUSEHOLD EXCLUDING AND INCLUDING TIMBER



opportunity costs are almost identical (difference of 0.3 US$ per ha/per yr). This is because the rules of the CBFE allow an extremely low level of permissible logging so a hectare of forest would be worth a very low amount of permissible logging income. The opportunity costs of the CBFE project were calculated by the difference of income between each agricultural product minus the income from resin and minus the income from sustainable logging. This estimate may however be a drastic underestimate of the financial benefits of the CBFE project to the community. This is because the returns from managed logging will be distributed amongst all of the project's participants, and this value will not be relative to the number of hectares of foregone deforestation, but rather will be a share of the total profits made on the entire project buffer area. The real opportunity costs will depend upon the number of participants and the final method of distributing logging profits, i.e. the exact benefit sharing system adopted.

Opportunity costs curve

Figure 3 shows the opportunity cost for each crop type for one unit of carbon stored. The cost of storing 1 tonne of CO_2e by reducing deforestation for the purpose of rubber cultivation is extremely high. This is because the rubber trees store a relatively high level of carbon compared with other crops and so the CO_2e benefit of leaving the trees standing is relatively low. Another recent study from West Cambodia shows that rubber plantations have the highest opportunity costs compared to other agricultural products, which in that case where soy bean, maize and sugar cane (Ashwell et al. 2011).

The average opportunity costs per frame of emissions reductions for the REDD+ project is $7.76. The average opportunity costs for unit of carbon stored for the REDD+ project including profits from timber is $8.90. If we just take the average of the non-rubber agriculture products, i.e. the activities that the farmers in Mondulkiri predominantly undertake, these opportunity costs fall significantly to $1.46 per tonne of CO_2e or $1.79 per tonne including profit from timber. These opportunity costs are higher than the expected income from the project which is $0.7/ton per year. Thus additional sources of funding for the project would be needed to cover the opportunity costs of farmers participating.

These results are in line with the findings of McKinsey cost curve (2009:121), which identifies slush and burn agriculture as "*offering high potential abatement at a very low average cost of below €2 per tCO_2e*".

Contingent Valuation results

The mean WTA compensation for loss of cultivatable land per hectare per year, and foregone profits from deforestation, including both market and non-market costs, is $766.

The mean non-market cost was $130. This equates to 17% of the total costs. Some respondents (16/33) said that they were no non-market costs. Considering only those who gave a non-zero response, non-market costs were 30% of total costs.

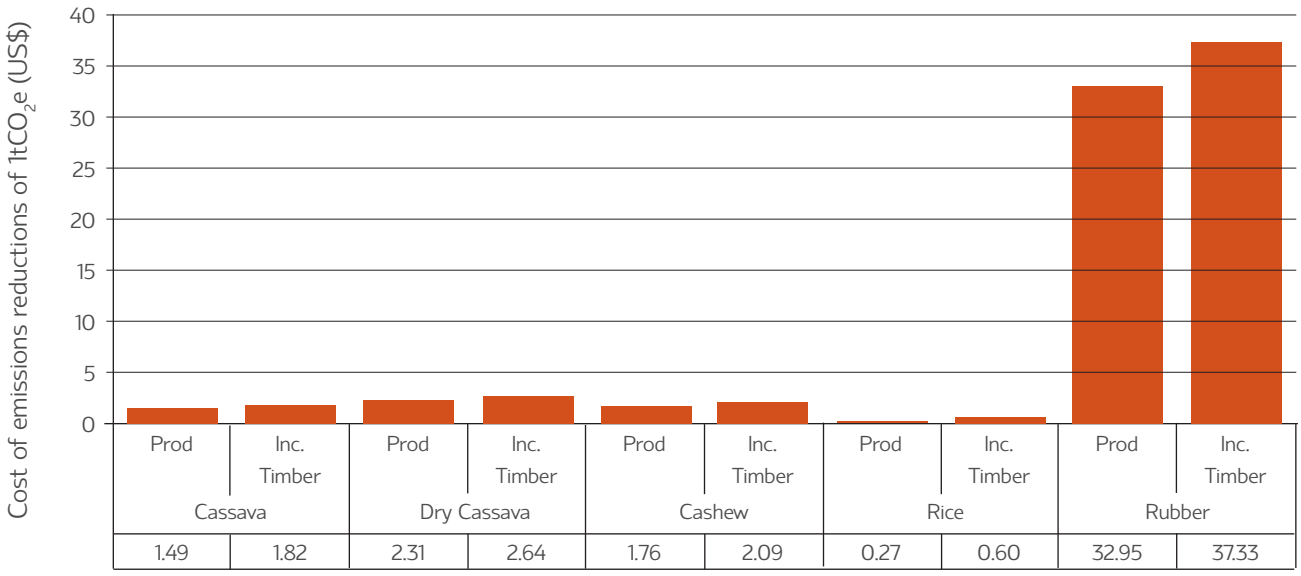
This implies that the mean WTA per hectare per year including only the market costs is $636. This is slightly higher than the results obtained from the opportunity cost analysis ($567). The difference may reflect the value of both the goods that are consumed at the household level and so do not make it to the market, and the possible foregone profits from illegal deforestation (although no interviewees said that they deforested).

These similar mean results of the opportunity costs analysis and CV analysis without non-market costs, suggest that CV is a reliable instrument for assessing the market and non-market costs of REDD+. Furthermore, non-market costs appear to be a not negligible portion of the total costs perceived by farmers, demonstrating how crucial their estimation is using CV.

Non-market costs

The main non-market costs reported were related to perceived restrictions on the use of the forest. Respondents were concerned that the project, once implemented, would interfere with their right to use the forest as they always have. If this was not directly through prohibition on access, it would be indirectly through a

FIGURE 3: OPPORTUNITY COST OF 1 TONNE OF CO_2e (EMISSIONS REDUCTIONS) BY IMPLEMENTATION OF REDD+ PROJECT



sense that the forest was no longer completely accessible to them. These include:

1) The foregone freedom of accessing the forest at any time of the day;
2) Losing the ability to consider the forest as a place to relieve themselves of anxiety and enjoy their free time;
3) Presence of external police and controls which may limit their ability to go to the forest;
4) Reduction in time spent with the rest of the family if alternative job opportunities are available;
5) Impact of losing cultivable land and so changing their livelihood.

The project design should take into consideration whether or not these activities should be limited and if so how to do it in a manner that is sensitive to local famers' concerns. As of August 2011 information regarding if and how the project may limit these activities was lacking.

Main limitations of the methodology used

The original intention of this study was to use CV to estimate the costs to local communities of the REDD+ project. However, the exact details of the proposed REDD+ project are still not finalized, and knowledge of the project amongst the local farmers is not very widespread. Furthermore, by doing two pilot surveys it emerged that farmers were unwilling to report any deforestation that they were undertaking. This is because the area is already protected so there was some resistance to admit such illegal actions. Therefore the hypothetical scenario had to be changed and instead of asking the costs of implementing the REDD+ project we asked the costs of stopping cultivation of current land and stopping further deforestation. As such, we use the CV methodology to focus on asking farmers to estimate their minimum WTA compensation for the foregone benefits were they required to stop undertaking such activities. This allows us to get an estimate of the value (including both market and not market value) to the farmers of the foregone benefits from their cultivated land and from the foregone deforestation.

This figure should not necessarily be used as the level of compensation required to implement the project since the project:
a. does not aim to reduce the level of cultivation from current levels but rather to restrict future expansion; and
b. has other elements beyond purely monetary compensation.

However, these figures will give an indication of the level of compensation required by farmers if the project were to decide to limit the amount of land farmers can cultivate. If an increase in cultivated land is worth less to a forest dweller than a reduction of cultivation by the same amount (as consistent with non-linear utility functions) then the likely perceived costs of a limitation on deforestation would be less than estimated here. As such, this study is likely to overestimate the amount of compensation required.

POLICY IMPLICATIONS

This section will first provide some suggestions for REDD+ policies in general and more specifically for the REDD+ project examined in this case study.

Methods of evaluation

This study finds that the opportunity costs estimates are useful but don't fully reflect the costs 'perceived' by local communities, in particular those related to the non-market costs of avoided deforestation. CV can be used to measure total costs perceived by communities including the non market costs. However, there are some difficulties in achieving unbiased results.

Farmers may be reluctant to admit that they are involved in deforestation in a protected forest, which renders questions about limiting deforestation difficult. An alternative, which was used here, is to ask farmers to also consider the value of the

land that they currently cultivate, including both market and non-market costs.

Although respondents seemed to give proper thought to their CV answers, a common problem was that farmers seemed to have difficulties in imagining a hypothetical situation. They could give very accurate data on their current agricultural activities but had more difficulties in responding to the CV questions.

Type of compensation required for participation in project

Farmers, when asked if they could choose whether compensation for participating in the REDD+ project should be delivered as only cash or also including non-cash, the latter was preferred in 100% of cases. Overall, cash on its own was considered to give short-term benefits and there was a general preference towards a mix of cash and in-kind benefits.

A desire for a mix of compensation is evidence of low discount rate behaviour: a preference for longer term benefits perceived in the future rather then purely short term benefits (e.g. cash). Researchers such as Teh et al. (2011) have found that low discount rate behaviour is an indicator of interest towards sustainability. This is supported by the interest from farmers interviewed in leaving the forest for future generations expressed by farmers, which demonstrates interest in sustainability. This contradicts many studies that show high discount rate behaviour widespread in developing countries because of shorter life expectancy (Blanchard & Fischer, 1989; Easterly, 2002; Gowdy et al. 2010).

Internalising non-market costs

One method of splitting the cash and the non-cash parts of REDD+ compensation could be to follow the CV results related to the market and non-market stated costs. For example, following the results from the survey 17% of the costs are related to non-market costs which could be directly offset by some in-kind compensation.

In-kind compensation should be targeted to minimise the non-market costs perceived by local communities. In this case, since the presence of external police was perceived as a threat to the farmers interviewed, a portion of the non-cash compensation should be delivered by ensuring that local farmers are engaged in undertaking patrolling activities and part of the cash compensation could be used to pay their wages. Another concern raised during interviews was the lack of land rights of the communities, something which REDD+ non-cash compensation could invest in.

Role of the Community

There is widespread trust in community institutions in this area, as investment through them is considered to deliver longer-term benefits than individual household payments. Respondents overwhelmingly support the Community Council as the implementing institution of this project. This suggests that part of the compensation could be diverted towards a Community Fund, administered by the Community Council in order to improve infrastructure and fund long term development projects. These results seem to reflect the aim of the project, which is to empower the existing institutional structure of participating communities.

Implications for this REDD+ project

Encouraging resin production

An interesting finding obtained with a simple regression analysis is that if the main share of farmers' income derives from resin collection farmers' WTA is lower, while if the main share is cultivation, WTA is higher. This demonstrates that farmers who gain economic benefit from the forest standing (e.g. resin) face lower opportunity costs, and therefore require (through CV) lower compensation to participate in the project. Activities to support sustainable resin production should thus be enhanced in the area as part of the REDD+ project.

Land titles

As mentioned above, a fundamental aspect that the project should consider as in-kind compensation for participating communities is clarification and strengthening of their tenure rights to land. This would empower farmers and would reduce an important non-market cost which is the fear of losing the land. One of the main reasons why farmers appeared happy about starting the project was the expectation that it would bring them these rights and therefore reduce the fear of displacement. Many studies (Sunderlin et al 2008; Westholm et al. 2011; Hatcher 2009) stress the vital role of land tenure regimes in the REDD+ debates. In accordance with Cotula and Mayers (2009) tenure rights should be the "*start point, not an afterthought*" of REDD+ projects.

Risk of land grabs by private rubber companies

Connected with the above is the strong concern expressed by all farmers interviewed about the expansion of private rubber plantations. One respondent reported that an entire village, Orona, had been made to sign a contract that gave permission to the company to claim the land, but had been told that the contracts were to recognise their land rights. Because the

Buffalo used for cultivating agricultural land in the case study area.

villagers can't read, they have been taken advantage of by more powerful groups. Anecdotal evidence suggests that these types of actions have been widespread in the Mondulkiri province, and are often accompanied by violence. REDD+ project developers will therefore need to address the issue of rubber plantation expansion by, amongst other things, addressing land tenure security in the project area.

Furthermore, the role of the Forestry Administration is very important in this context. It works closely with project administrators to ensure smooth implementation of projects, however also has to cooperate with government interests, which may support concessions for logging and plantations a more profitable option.

Promoting education

A lack of education, and therefore lack of knowledge and capacity to effectively engage in REDD+ or other projects in the area was something highlighted by a number of the respondents. In this area land rights are not defined, and strong institutions and officials that can protect communities are not in place, increasing the vulnerability of communities. Furthermore, although meetings to explain the projects have been frequent in the last months, most women commented saying that because they can't write, they forget the information received. Basic education is therefore a fundamental instrument to provide people with the capability to decide what they want and to enable them to effectively engage to ensure their interests are represented.

CONCLUSION

The estimates of local opportunity costs found in this study are similar to those found in the literature (Olsen and Bishop 2009; Mc Kinsey 2009). But this study also highlights a limitation of using opportunity costs, which is that they fail to capture all the costs perceived by local communities, namely non-market costs. By applying the Contingent Valuation method to assess these costs the study offers a new 'bottom up' and participatory approach to estimating the total local level costs of REDD+ activities at a local level.

The main results from the opportunity costs analysis suggest that the cost of reducing emissions by 1 tonne of CO_2e, by addressing small scale agriculture as the driver of deforestation, where land is deforested and converted to typical agricultural production, is US$1.79/tonne CO_2e. CV shows that the actual costs are higher and that 17% of the overall costs relate to non-market costs. These are additional to the costs found by applying an opportunity costs analysis.

This paper suggests that these non-market costs could be offset by different types of in-kind compensation. Non-monetary compensation and cash was shown in this area to be preferred to only cash compensation. Overall the field survey finds that farmers in the area prefer long-term benefits including environmental ones, compared with compensation in the form of cash. Widespread trust in Community institutions is a signal that compensation could be delivered through a Community Fund and then distributed through longer term investments. The main suggestions for the implementation of the REDD+ project include support for resin production which is an activity that can offer both economic potential and forest conservation. Contributing to land titling processes should empower farmers and this would assist the project to address the threat to project activities of expansion of privately owned rubber plantations. Finally, education seems fundamental and strongly required as a mean to achieve meaningful and effective community engagement and participation in the project.

This study aimed to propose a new method to assess and to quantify the non-market costs of a REDD+ project by applying Contingent Valuation. This methodology demonstrates good potential for doing this, however this study demonstrates the need for further use and experimentation with this methodology, with greater numbers of respondents, and the need to follow how non-market and opportunity costs change over time as project activities are implemented. This approach also enhances the participation of local communities as well as providing useful information to project implementers about the design of project activities.

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This case study is based on the Masters dissertation of Alice Caravani, undertaken at LSE. For a copy of the full paper please contact her at: alice.caravani@googlemail.com.

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ABOUT REDD-NET

REDD-net is an international knowledge forum for southern civil society organizations through which they can access information about efforts to Reduce Emissions from Deforestation and forest Degradation, share their own experiences and help to build pro-poor REDD projects and policies. REDD-net is a partnership between Centro Agrononómico Tropical de Investigación y Enseñanza (CATIE), the Overseas Development Institute, RECOFTC – The Center for People and Forests and Uganda Coalition for Sustainable Development. REDD-net is funded by Norad.

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