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Can REDD+ social safeguards reach the 'right' people? Lessons from Madagascar

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ABSTRACT

There is extensive debate about the potential impact of the climate mechanism REDD+ on the welfare of forest-dwelling people. To provide emission reductions, REDD+ must slow the rate of deforestation and forest degradation: such a change will tend to result in local opportunity cost to farmers at the forest frontier. Social safeguard processes to mitigate negative impacts of REDD+ are being developed and can learn from existing safeguard procedures such as those implemented by the World Bank. Madagascar has a number of REDD+ pilot projects with World Bank support including the Corridor Ankeniheny-Zahamena (CAZ). Nearly two thousand households around the corridor have been identified as 'project affected persons' (PAPs) and given compensation. We compare households identified as project affected persons with those not identified. We found households with more socio-political power locally, those with greater food security, and those that are more accessible were more likely to be identified as eligible for compensation while many people likely to be negatively impacted by the REDD+ project did not receive compensation. We identify three issues which make it difficult for a social safeguard assessment to effectively target the households for compensation: (a) poor information on location of communities and challenging access means that information does not reach remote households; (b) reluctance of people dependant on shifting agriculture to reveal this due to government sanctions; and (c) reliance by safeguard assessors on non-representative local institutions. We suggest that in cases where the majority of households are likely to bear costs and identification of affected households is challenging, the optimal, and principled, strategy may be blanket compensation offered to all the households in affected communities; avoiding the dead weight costs of ineffective safeguard assessments. The Paris Agreement in December 2015 recognised REDD+ as a key policy instrument for climate change mitigation and explicitly recognised the need to respect human rights in all climate actions. However, safeguards will be prone to failure unless those entitled to compensation are aware of their rights and enabled to seek redress where safeguards fail. This research shows that existing safeguard commitments are not always being fulfilled and those implementing social safeguards in REDD+ should not continue with business as usual.

1. Introduction

The idea of a global mechanism to incentivize reduction of carbon emissions from deforestation and forest degradation (REDD+) has gained considerable momentum over the last decade (UNFCCC, 2014). Many tropical developing countries are embracing REDD+ as an opportunity to fund their forest conservation programmes: for example the FAO's Voluntary REDD+ Database currently lists 40 countries receiving REDD+ funding for more than 1900 REDD+ arrangements (FAO, 2015). Advocates have claimed that REDD+ offers a win-win-win (Angelsen and Atmadja, 2008): climate mitigation while also conserving tropical forests (good for biodiversity) and protecting indigenous rights and providing livelihood support for local communities (good for people). However, there are growing concerns that REDD+ could exacerbate poverty in forest-edge communities by restricting access to land and forest resources, especially for those with insecure tenure (Chhatre et al., 2012; Beymer-Farris and Bassett, 2012). Social

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safeguards, to minimise any potentially negative impacts of REDD+ on local communities, have been a focus of debate in recent years (Corbera and Schroeder, 2011; Peskett et al., 2008; Peskett, 2011; Duchelle and Jagger, 2014). The 16th Conference of the Parties of the United Nations Framework Convention on Climate Change (UNFCCC) had agreed in 2010 to a broad set of safeguards relating to REDD+, and that such safeguards should be 'promoted and supported' while undertaking REDD+ activities (UNFCCC, 2011, Appendix I). Furthermore, the Paris Agreement from the recently concluded 21st Conference of the Parties of the UNFCCC has recognised REDD+ as one of the key policy instruments for climate change mitigation, and has endorsed all previous agreements related to REDD+ (UNFCCC, 2015 Article 5, pp 23–24). For countries to receive results-based REDD+ finance, they should have a country-level Safeguard Information System (SIS) in place (SBSTA, 2012,Peskett and Todd, 2013). However, there are concerns that existing UNFCCC requirements on safeguards are not legally binding and therefore weak (Visseren-Hamakers et al., 2012; Savaresi, 2013); and progress on core aspects of social safeguards is highly variable across REDD+ countries (Jagger et al., 2014). Furthermore, there are multiple REDD+ safeguards standards linked to the bodies involved in funding REDD+ projects and associated activities linked to REDD+, such as REDD readiness activities at the national level. Commentators have noted that these different standards do not align, including on key aspects such as Free Prior Informed Consent (Arhin, 2014; Savaresi, 2013), and range in their approach from prevention and mitigation of negative impacts ('risk-based approach'), to proactively seeking to improve livelihoods and welfare of the people (Arhin, 2014; McDermott et al., 2012; Roe et al., 2013).

There is a detailed literature highlighting the challenges of targeting external development projects in rural areas: local elites (who are less poor and more influential locally) will tend to capture the attention of outsiders and push their view of what 'the community' needs and how it should be provided (Chambers, 1983, pp 18, 160–167). Social safeguards in a REDD+ project involve assessing who will lose out due to the project and how this loss should be compensated. Concern has been expressed that the process of social safeguards assessments, and benefit sharing, in REDD+ projects, is vulnerable to local elite capture (Pascual et al., 2014); meaning the process introduced to protect the interests of the poor can in fact exacerbate social inequalities.

REDD+ social safeguards are not being built in a vacuum; multilateral and bilateral donors (such as the development banks) already have social safeguard systems in place for projects they fund (Hall, 2007; Roe et al., 2013). In recent years, the World Bank has also become a major funding body for REDD+ through its Forest Carbon Partnership Facility (FCPF). It has been argued that World Bank safeguards, although substantially overlapping with UNFCCC safeguards in their content, differ in their approach to implementation. They aim to prevent and mitigate negative impacts without any requirements to show additional social benefits (often termed a 'risk-based approach'); and are less stringent in ensuring the rights of indigenous peoples (see McDermott et al., 2012, pp 67–68 for a comprehensive account). Since the World Bank's safeguards for its REDD+ funding draws heavily on its existing safeguard policies, lessons from the implementation of social safeguards around World Bank-funded protected areas are clearly highly relevant to the development of social safeguards in the context of REDD+. Given that REDD+ forms part of the global climate change agreement (The Paris Agreement) from the UNFCCC meeting in December 2015, it is timely to look in detail at how social safeguards seeking to compensate those who lose out due to conservation restrictions have been implemented on the ground,

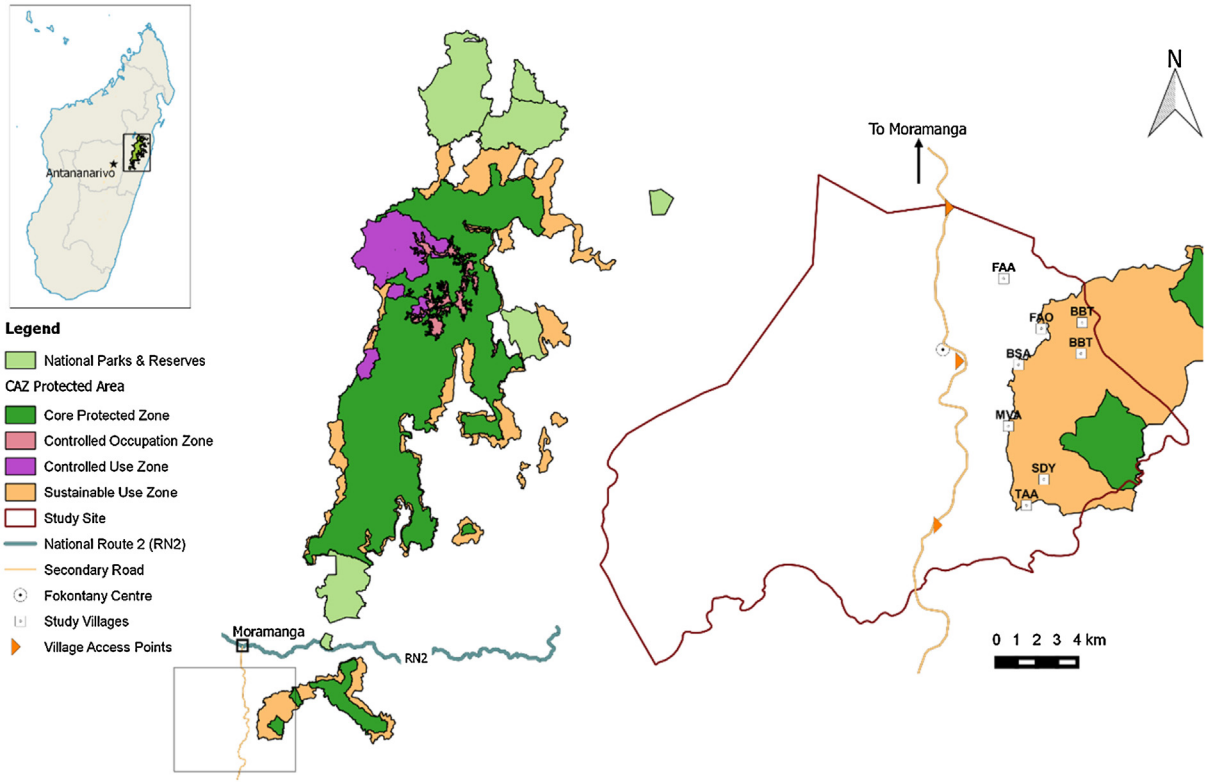

Fig. 1. Map of the Corridor Ankeniheny-Zahamena (CAZ) Protected Area and the study site. Zonation map of the CAZ protected area and the location of existing National Parks & Reserves within the corridor is shown on the left, with the location of the study site in the south-west corner of the corridor outlined. A close-up view of the study site with the centre of the *Ampahitra fokontany*, primary access points to the villages, and the location of study villages on the right. NB the location of the villages comes from our field data and was not available in advance.

and whether lessons can be learnt for the implementation of social safeguards under REDD+.

Madagascar started a major expansion of its terrestrial protected areas following the commitment by its President to triple the country's protected areas during the IUCN World Parks Congress in 2003 (Ferguson, 2009; Freudenberger, 2010). A number of protected areas in the most carbon-rich biome of Madagascar (the eastern rainforests) have been set up with REDD+ as part of the long-term funding model. Examples include REDD+ pilot projects in Makira, Corridor Forestier Ambositra-Vondrozo (COFAV), and Corridor Ankeniheny-Zahamena (CAZ) (Ferguson, 2009; Brimont et al., 2015). The eastern rainforests of Madagascar and the surrounding countryside are home to many tens of thousands of smallholder famers with mostly weak land tenure, dependent on a system of shifting agriculture (known locally as '*tavy*') and collection of wild harvested products (Bertrand, 1999; Hume, 2006; Styger et al., 2007; World Bank, 2012). This social context is shared with many other countries where REDD+ is being implemented.

In this paper, we focus on the social safeguards implemented as part of the Corridor Ankeniheny-Zahamena (CAZ) protected area establishment with support from the World Bank. Based on household surveys with a stratified random sample of households, we identify factors that influence the likelihood of a household being identified as eligible for receiving compensation for economic impacts from the creation of CAZ protected area. We then discuss the challenges of implementing fair and equitable safeguard assessment in CAZ, and the lessons this can provide for countries with a similar social context in developing REDD+ safeguard systems.

2. Methods

2.1. Study site

Corridor Ankeniheny-Zahamena (CAZ) is one of the new protected areas set up in Madagascar following the country's commitment at the IUCN World Parks Congress 2003 in Durban and granted formal status as an IUCN category VI protected area in April 2015 (Republic of Madagascar, 2015). This 382,000 ha belt of rainforest lies to the east of the capital Antananarivo (Fig. 1). CAZ links a number of existing protected areas including Zahamena National Park, Mangerivola Special Reserve, Mantadia National Park, and Analamazoatra Special Reserve. The forests of CAZ are recognised as extremely important for conserving Madagascar's unique biodiversity but are under pressure from expansion of agricultural land at the forest frontier, illegal logging and artisanal mining (Ratsimbazafy et al., 2011). More than 60,000 people live in over 450 villages in and around this protected area and rely primarily on shifting agriculture, and on collecting forest products for their livelihoods (World Bank, 2012). The Malagasy government has been pursuing a strategy of decentralisation of management of forest resources since 1996 (Pollini et al., 2014), and many community-forest management associations have been established, known locally as *Communauté de Base* (COBA) or *Vondron'Olona Ifotony* (VOI), including in many of the villages surrounding CAZ.

Part of the plans for long-term funding for CAZ involve carbon sequestration through REDD+. The World Bank has been funding the initial stages of the REDD+ project in CAZ, including establishment of the protected area. The World Bank requires that all projects carry out social safeguards assessment to identify any residual social impacts so these can be mitigated (Lockwood and Quintela, 2006, p 331). The framework for identifying those eligible for receiving compensation to mitigate residual impacts from the creation of the new protected areas in Madagascar was formulated in 2003 as part of the Third Phase of Environmental Programme (PE3) funded by the World Bank (World Bank, 2003). The CAZ environmental and social safeguards plan follows the World Bank guidelines and PE3 framework in laying out the process of identifying and compensating households identified as project affected persons (PAPs) (World Bank, 2012). Both the PE3 framework and CAZ safeguards plan state that anyone whose sources of income and standard of living would be negatively affected by the restriction of access to the natural resources due to the creation of these protected areas are considered PAPs (ibid.). These documents also specify the need to give special consideration to the poor and vulnerable groups who are generally likely to be marginalised in the society; this principle is central to social safeguards of any World Bank funded project (Hall, 2007). The social safeguard process in CAZ classified PAP households into 'major' and 'minor' categories—the former dependent on natural resources in the protected areas as their main or only source of livelihood; with the latter relying on the natural resources occasionally and the benefits derived not being their main source of income. Safeguards assessment for CAZ considered households who self-identified as users of resources from the core of the proposed protected area, and as practising shifting agriculture, to be major PAPs (World Bank, 2012, p 76). The initial safeguard assessment conducted in 2010 identified 2101 major PAPs and 399 minor PAPs out of 12,383 households assessed (World Bank, 2012). All 2500 PAP households were also classified as being vulnerable following the criteria set out by EP3 (World Bank, 2012, p 77, 2003, pp 8–9). The list of PAPs was later revised down to 2427 households of which 1835 signed letter of engagement to receive compensation – no distinction was made between 'major' and 'minor' PAPs, which was delivered in 2014 (in our study villages, soon after our survey – by a process and team unconnected to our survey). The safeguards assessment evaluated "the losses generated by the project" on the PAP households" taking into account "all possible forms of loss due to the new protection area creation" in designing the type and value of compensation (in the form of micro-projects) (World Bank, 2012, pp xxiv–xxv, pp 101–107).

Our study focuses on a single *fokontany* – the smallest administrative unit in Madagascar – *Ampahitra*, in the south-west corner of CAZ, where safeguards assessments were carried out and compensation provided as part of CAZ protected area creation (Fig. 1). A secondary road (untarred) connects this *fokontany* with the nearby town of Moramanga to the north. The three village access points (Fig. 1) are at 10 km, 20 km and 31 km respectively from Moramanga, and the travel times to these access points in a 4×4 vehicle are 30, 60 and 90 min, respectively in dry road condition (these roughly double in wet conditions). Villages are situated from 2.5 km to 6.2 km straight-line distance from the nearest of these access points. The safeguard assessment and compensation was only implemented in villages in the eastern half of this large *fokontany* as they border the CAZ protected area; we therefore focused our research only in these villages (Fig. 1). Piloting and preliminary visits to communities were conducted between January 2014 and June 2014. Sampling and data collection was carried out between June and August 2014. We took the approach of a detailed and rigorous study in a single area as this allowed us to build the relationships and site-based knowledge to ensure our sampling was truly representative of the households in the study area (avoiding the risk of under-sampling hard to reach households). Wider sampling of the households to cover a larger area in CAZ would not have allowed us to carry out this study with the same depth and rigour. We have no reason to believe that the safeguards assessment in Ampahitra was anomalous compared with the rest of the CAZ as the same team implemented the safeguards assessment in the whole of CAZ following the same assessment protocol.

2.2. Sampling

There is poor information available on the location and size of communities in much of rural Madagascar making it difficult to develop a rigorous sampling frame. The aim of this research was to visit a representative sample of residents of the area and compare the characteristics of these inhabitants with those identified by the World Bank safeguarding process as PAPs (and so eligible to receive compensation). Therefore, building a robust sampling frame representative of resident households within the study site was vital to the success of this research. Using the available maps as a starting point, we worked with the president of the *fokontany* and key informants at the *fokontany* level to construct a sketch map showing locations of all villages in the study area. We identified eight villages along the border of CAZ, and in some cases lying within the sustainable use zone based on the latest boundary information (as of August 2013) (Fig. 1). Of these, six are considered official villages by the local administration and had a recognised village chief (chef de village), while two others (labelled 'BBT' in Fig. 1) lack this formal status but contained permanent residents and primary schools. Importantly, only three of the eight villages appeared on the best available map of the area, two correctly labelled (Foiben-Taosarintanin'i Madagasikara (FTM), 1990)). Since the two unofficial villages were at close proximity to each other, we considered them together as one sampling unit for the purpose of this study. Thus, we had seven sampling units (six official villages + two unofficial villages grouped as one unit) which formed the basis for stratification of our sample. We visited each village and carried out detailed mapping of the hamlets and scattered households with key informants at the village level (village chief where available or village elders). We then visited the hamlets, and in some cases scattered households, with key informants to map their location with a GPS, confirm the number of households present and ask for information of other households we may have missed. This approach required us to spend a considerable amount of time (approximately 50 person days across eight villages) building the sampling frame, which was a comprehensive list of households residing within the eight villages surveyed including outlying hamlets and isolated households. This process also allowed us to get to know the area well before the survey began. We identified in total 417 households residing within our study site across the seven sampling units explained above. With the aim of interviewing a minimum of 200 households in total, we randomly sampled at 65% (to allow for replacement) from each sampling unit (proportional random sampling) to obtain a random sample of 268 households in total. Ultimately, 203 households were surveyed in total from the seven sampling units, with roughly 50% of the households surveyed from each unit. Of the sampled households who were approached for the survey, only two declined to be interviewed, and three withdrew from their interviews before completion.

2.3. Data collection and ethical concerns

In each village, we started with unstructured key informant interviews with the village elders and, where available, the village chief (chef de village) who is the recognised representative of the village by local authorities. The issues discussed included land use history, forest dependency, the CAZ protected area and the safeguards process. At the household level, we used a structured survey questionnaire to collect data on demographic characteristics, land access/use, livestock holding, other physical assets and social capital (Supplementary material). We could not obtaininformation about the households identified as PAPs in advance, so our

Table 1
Variables used in the model to analyse the factors influencing PAP identification. Expected direction of impact of the explanatory variables is indicated by the sign within square brackets beside each variable in the first column.

Variables	Description	Summary statistics		
			Model subsample (N = 141)	Full sample (N = 203)
Dependent				
PAP household	Binary variable indicating whether a household surveyed for this study was identified as Project Affected Person (PAP) from the establishment of the CAZ protected area. [0 = NO; 1 = YES]	YES	36 (25%)	40 (20%)
Explanatory				
Extra wild harvest [+]	Binary variable indicating whether a household collects additional wild harvested products, apart from commonly collected products such as firewood. [0 = NO; 1 = YES]	YES	105 (75%)	147 (72%)
Tavy seed [+]	Numeric variable measuring the quantity of rice seed required to farm the households' shifting agriculture (*tavy*) plots, measured in *kapoaka* (a local unit roughly equivalent to a cup); used as a proxy for plot area	Mean Std. dev. Median	237 249 150	217 219 150
Household age [−]	Numeric variable indicating the number of years a household has been established in any of the surveyed villages in *Ampahitra fokontany*	Mean Std. dev. Median	14 9 11	12 10 10
Accessibility [−]	Numeric variable measuring the straight-line distance (km) from a household's dwelling to the primary access point for their village on the motorable road; used as an indicator of household's accessibility	Mean Std. dev. Median	4.8 1.4 5.1	4.8 1.4 5.9
Livestock owned [−]	Numeric variable indicating the total livestock ownership of a household measured as 'Tropical Livestock Unit' (Chilonda and Otte 2006); used as an indicator of household wealth	Mean Std. dev. Median	1 1.9 0.1	0.9 1.9 0.1
Food security [−]	Numeric variable indicating the number of months a household has sufficient food for two good meals per day	Mean Std. dev. Median	6 3 6	6 3 6
Literate household head [+]	Binary variable indicating whether the household head is literate. [0 = NO; 1 = YES]	YES (Missing)	87 (62%) 1	117 (58%) 1
COBA membership [+]	Categorical variable indicating a household's membership in community-based forest management association (known locally as COBA or VOI). NM = No membership; GM = General member; DM = Decision-making member	NM GM DM	86 (61%) 45 (32%) 10 (7%)	136 (67%) 56 (28%) 11 (5%)

survey was conducted 'blind', without prior knowledge of households' PAP status. This helped reduce the potential for observer bias in sampling and recording of responses. Towards the end of the survey we included a set of questions aimed at identifying whether the World Bank process had identified the household as a PAP. Household heads were the primary respondents of the surveys, with their spouses or grown-up children assisting in the recall whenever necessary, particularly on agriculture and collection of wild harvested products. For a few cases where the household heads were not present (five in total), we interviewed their spouses and/or their grown-up children; however, we still collected key information about the household heads, such as their education level, age, and their settlement history in the village. The questionnaire went through two stages of piloting in neighbouring *fokontany* where livelihoods are similar. RM, SR, AR and two additional assistants – all native Malagasy speakers familiar with the dialect of the region – carried out the interviews. MP (basic Malagasy) and NH (fluent in conversational Malagasy) attended a subset of interviews. We asked selected households if they were available for an interview and made an appointment at a convenient time. After introducing the project and its objectives to the selected respondents, we explained that participation in the research was voluntary and they could leave at any time. In addition, we gave each household a leaflet explaining the aims of the research and with contacts of the project and photos and names of the research team. We explained that no information that could identify them would be shared with others. Bangor University College of Natural Sciences ethics committee approved this study, and all members of the survey team received ethics training before carrying out fieldwork. We discussed extensively the ethics of presenting the location of villages in this paper, particularly those within the protected area boundary. The existence of these communities within the protected area boundary is no secret: some are official villages recognised by the local administration, while others are recognised indirectly through the existence of state-supported primary school. We feel that acknowledging their existence and long-term residence could help demonstrate their legitimacy in the eyes of authorities at the regional and national level, as many of our study villages do not feature on any of the official maps currently available. We have been careful, however, not to reveal the identity of the individual households by removing all identifiers from the data sets, including their geo-location; and by presenting data only in aggregate form.

2.4. Analysis

Based on the criteria for the identification of the PAPs outlined in the documents discussed above, we expected PAP households in and around CAZ to be those who: (1) depend more on wild harvested products for their livelihoods; (2) depend on *tavy* (shifting agriculture); (3) are recently established—i.e., still have the need to convert forest into farmland. In addition, we included local socio-economic and political factors, which are often among the key determinants of who benefits from conservation and development projects in a developing country context, in the model analysing the factors influencing PAP identification in *Ampahitra*. These included: (1) accessibility of the household; (2) assets/wealth; (3) food security; (4) household head's literacy; and (5) membership of the local community-based forest management association (COBA). Table 1 provides a detailed summary of all the variables included in our model. Given the nature of our dependent variable, we used a binomial family generalised linear model (GLM) with a logit link function in our estimation. We carried out all our data analysis in R 3.2.1 (R Core Team, 2015).

The social safeguards assessment to identify PAP households related to the creation of the CAZ protected area was conducted in March–May 2010 following the World Bank's environmental and

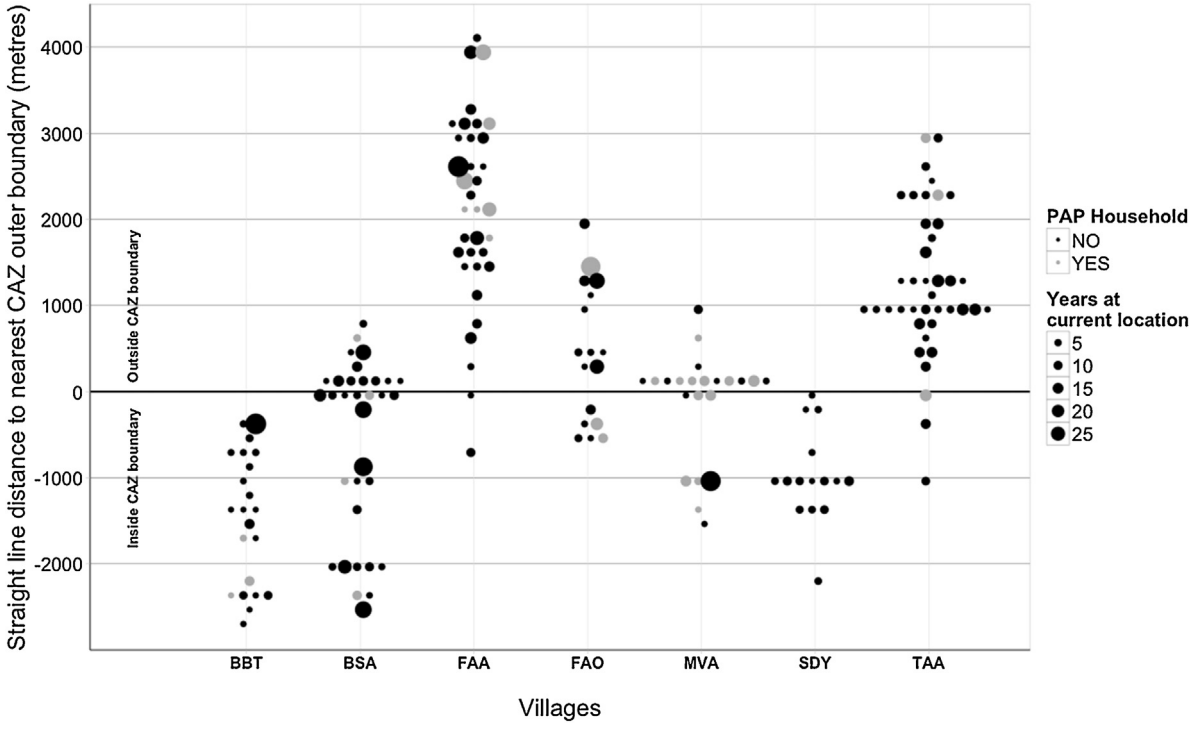

Fig. 2. Straight-line distance from the primary dwellings of 184 households stratified by villages to the nearest CAZ outer boundary (location data for the remaining 19 surveyed households is not available). The intercept line (0) indicates the CAZ boundary with households located inside the boundary below and those outside above the line. Lighter dots indicate the households identified as PAPs. Size of the dots reflect the household age (the number of years the household has been established in its current location, on a continuous scale from a minimum of one year to a maximum of 47 years). The size guide on the side provides indicative ages for five break points.

social safeguards assessment guidelines (World Bank, 2012, pp 27–28). Since the original safeguards assessment would only have considered the households already established in the area at the time of the assessment, we only include households that were established at least five years prior to our survey in our model. This gives us a sub-sample of 141 households for analysing the factors influencing the identification of PAP in *Ampahitra*, of which 36 households were identified as PAPs. The proportion of PAP households in our study obtained through 'blind' sampling is broadly in line with the overall proportion of the PAP households in the CAZ (20%) (World Bank, 2012). However, to present general characteristics of our sample and of the surveyed households we use the full sample (203 households) (Table 1). We used 'beeswarm' and 'ggplot2' packages in R to produce Fig. 2 (Eklund, 2015; Wickham, 2009), 'sjPlot' with 'ggplot2' to produce Fig. 3 (Lüdecke, 2015; Wickham, 2009), and 'ggplot2' package to produce Fig. 4 (Wickham, 2009).

Before carrying out the GLM regression, we checked for correlation between predictor variables. Because of the presence of categorical as well as numeric variables among our predictors, we performed three different tests to check for relationships between them. Spearman-method test showed generally low-level correlation between our numeric predictors, while Pearson's Chi-squared test for categorical variables indicated no relationships between the predictors. Finally, we looked at the distribution of numeric variables across the different groups of categorical variables to check for any systematic relationships and found none. After estimating the GLM model for PAP identification, we again tested for the effect of potential multi-collinearity in our model using variation inflation factor for generalised linear model (GVIF) (Fox and Weisberg, 2011). GVIFs for all of the predictor variables were well within the levels considered acceptable (GVIFs for all predictors <2).

3. Results

3.1. Household characteristics and location in relation to the CAZ protected area

All the key socio-economic data from our survey indicate a population living under extreme poverty and highly dependent on forest resources for their livelihood (Tables 1 and 2). The majority of the population lives in one-room houses built primarily with materials collected from the forest or fallows; only six households in our sample had a tin roof. Average livestock holding of the households, one of the common indicators of wealth in rural agricultural populations, are very low (0.86 tropical livestock units (Chilonda and Otte, 2006; Table 1, Region: South Africa))—only 0.65 units per household when four outliers are excluded. On our measure of food security, another commonly used poverty indicator, our surveyed households could only produce sufficient food to feed their families for half the year on average. Seventy-two percent of the surveyed households collected a range of wild-harvested products in addition to common ones such as firewood, indicating a high dependence on forest resources. They are also highly dependent on forests for agriculture: with half of the surveyed households gaining access to land through direct forest clearance, and almost all of the surveyed households reliant to some degree on shifting agriculture. Only a quarter of the households surveyed had access to irrigated rice fields (Table 2); however, these households had relatively higher food security on average than those without access, indicating that access to irrigated rice fields is positively associated with household wealth (6.8 months vs 5.7 months, t-test p-value = 0.028).

Poor living conditions, relatively low literacy among the household heads (58%), and low accessibility to the information and other primary services as indicated by the average walking

Table 2
Key socio-economic characteristics of the surveyed households (in addition to those listed in Table 1). The figures in parentheses in the first column refer to the total number of valid observations for each variable.

Variables	Description	Summary statistics
Household size (203)	Total number of individuals considered member of the household	Mean and median: 6 Std. dev.: 2.6
Village-born HH head (203)	Whether the respondent household head was born in the village (i.e., migrant or not)	YES: 62 (31%)
Village residency for migrants (141)	Number of years since moving to the village (for migrants)	Mean: 11.8 Std. dev.: 10.6 Median: 9
Reason for move for migrants (141)	Main reason for moving to the village (for migrants)	Land availability: 107 (76%)
Ethnic group (203)	Ethnic group to which the respondent household head belongs	Betsimisaraka: 148 (73%) Bezanozano: 33 (16%) Others: 22 (11%)
Primary occupation (203)	Main occupation of the household head	Agriculture: 185 (91%) Daily wage labour: 16 (8%)
Number of rooms (200)	Total number of rooms in the primary dwelling of the household	1 room: 147 (74%) 2 rooms: 49 (24%)
Roof type (201)	Type of roof in the primary dwelling of the household	Thatch and other plant materials: 195 (97%) Tin: 6 (3%)
Access to land (203)	Proportion of households with access to at least one plot of land through inheritance, or forest clearance, or purchase, or rent, or borrowing	Forest clearance: 99 (49%) Inheritance: 73 (36%) Borrowed: 51 (25%) Bought: 26 (13%) Rented: 15 (7%)
Tavy (203)	Whether the household practices shifting agriculture	YES: 196 (97%)
Paddy field (tanimbary) (203)	Whether the household has access to at least one irrigated rice (paddy) field	YES: 51 (25%)
Distance to centre (203)	Numeric variable indicating the walking distance from a household to administrative centre of the *fokontany* in minutes.	Mean and median: 150 Std. dev.: 64
Training received (203)	Whether the household has received at least one training from conservation/development organisations within the last three years	YES: 35 (17%)

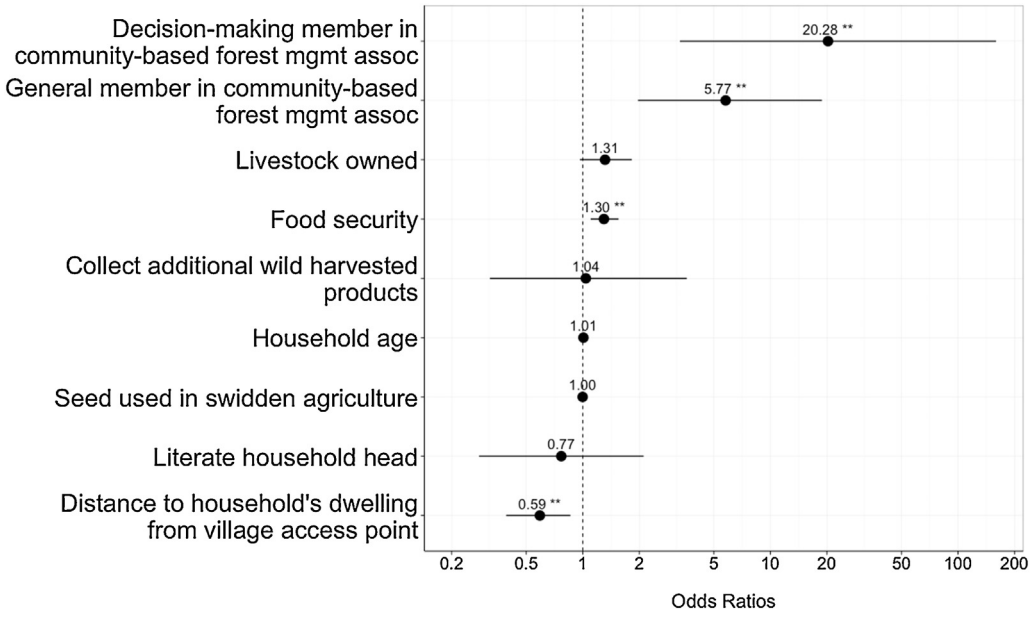

Fig. 3. Odds-ratio plot for the estimated model showing the factors associated with a household being identified as a PAP. Asterisks (**) next to the value labels indicate statistically significant factors in the model (p-value <0.01).

distance from the households' primary dwellings to the local administrative centre (2.5 h), mean these households are classified as vulnerable according to the criteria set under the EP3 framework (World Bank, 2003).

Our analysis of distance from the primary dwellings of the surveyed households to the nearest outer boundary of the CAZ protected area shows that a large number of households live within the boundary of the protected area (Fig. 2). Many of these households were established at their current location many years before the creation of the protected area, as indicated by the number of years since their establishment in the village (Fig. 2). Furthermore, some of the villages surveyed, such as SDY and BBT (Figs. 1 and 2), lie entirely inside the sustainable use zone of the protected area; these are officially recognised villages with primary schools, not temporary communities of migrants. A number of households with primary dwellings inside the protected area had been identified as PAPs; however, the majority (82%) of sampled households with primary dwellings inside the protected area boundary were not identified as PAPs, including the entire village of SDY (Fig. 2). In contrast, our survey showed that four recently established households within our study sample were able to receive safeguards compensation as PAPs despite not being in existence at the time of the original assessments (Table 1).

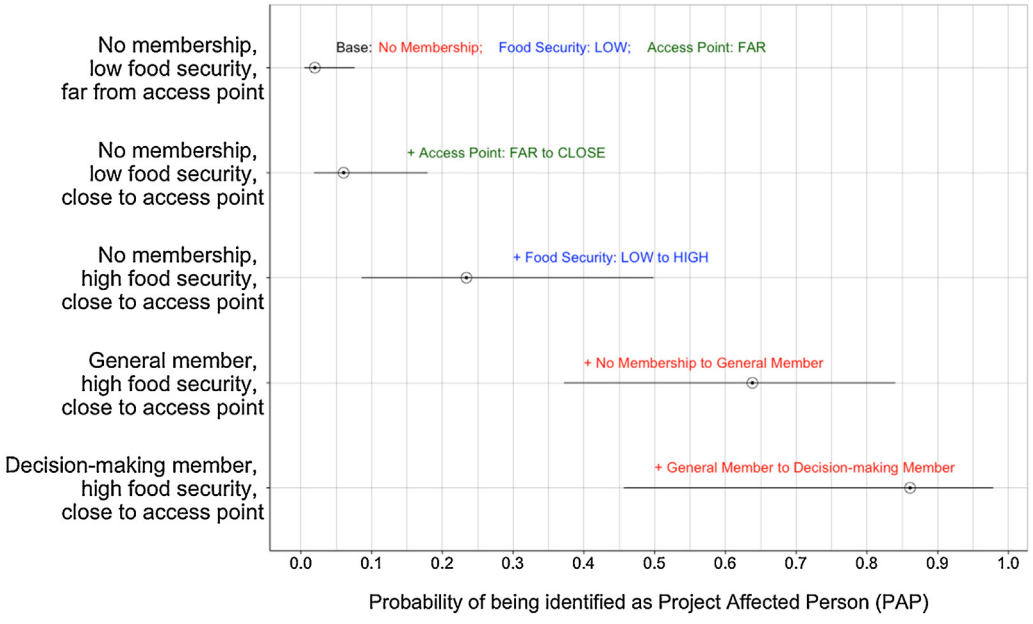

Fig. 4. Marginal effects plot showing the combined impacts of three significant factors (accessibility, food security and membership in community-based forest management association) on the probability of a household being identified as a PAP, with all other factors in the model fixed at their median value. We use first and third quartile figures to set 'Close to Access Point' (3.7 km) and 'Far from Access Point' (5.9 km), and 'Low food security' (three months) and 'high food security' (nine months) for these estimations.

3.2. Factors influencing the identification of PAPs in Ampahitra

Results from the binomial Generalised Linear Model (GLM) show that the two most significant factors in predicting whether a household was identified as a PAP or not was whether someone from the household was a member of the local community-based forest management association (COBA), and whether they were among the 'decision-making members' of these organisations (Fig. 3). Food security also shows a significant positive influence on whether a household is identified as a PAP or not with more food secure households more likely to be identified as PAPs than poorer households who lack sufficient food to feed their families for a year. Furthermore, accessibility of the households, measured by the distance to their dwellings from the primary access point to their village on the motorable road, was also a significant factor influencing the PAP identification with inaccessible households less likely to be identified as PAPs. The other factors included in the model were not significant in influencing the identification of PAPs.

Analysis of the combined marginal effects of accessibility, food security and association membership shows that a household with no association membership, low food security and low accessibility had only around two percent probability of being identified as a PAP, with other factors at their median level (Fig. 4). In contrast, for those with decision-making membership in the association, high food security and high accessibility, the probability of being identified as a PAP increased to about 85%. The probability of being identified as a PAP increased from around six percent to around 24% as the food security changed from low (first quartile) to high (third quartile) for a household living close to an access point without association membership. Association membership has a very strong effect; increasing the chance of a highly food secure household living close to the access point being identified as a PAP from about 24% to about 64% if they are a general member, and to about 86% if they are a decision-making member of the association (Fig. 4).

Although initial assessment of safeguards to identify PAPs around CAZ was done in 2010, the actual compensation to the households was only provided during 2014. This long gap between the initial assessment and actual intervention – primarily due to the political crisis in the country starting in 2009 – has meant that recently established households in *Ampahitra* were not considered for compensation, as they would not have been part of that initial assessment to identify PAPs. In our study, these newer households make up 30% (62/203) of the total surveyed households of which only 45 households are migrants. Our survey results show that these newly established households are similar to the rest of the households in terms of their forest dependency, practice of tavy, and other socio-economic characteristics in general. As such, these newly established households are equally likely to be affected by forest use restrictions from the establishment of the CAZ protected area. In fact four of these newly established households were due to receive safeguards compensation as PAPs. Our household surveys and key informant interviews have suggested that some of these newly created households were due to receive compensation as PAPs because they were reported as such by their parents at the time of original assessments even though they had yet to form their own household at that time.

4. Discussion

Requirements regarding the development of safeguard information systems (SIS) have been a key issue of discussion and of contention in the international negotiations of REDD+ (Duchelle and Jagger, 2014; Jagger et al., 2014; Menton et al., 2014). Several organisations, especially those representing indigenous people, have argued that current guidelines are not strong enough in safeguarding vulnerable groups (Menton et al., 2014) and that benefit distribution in existing projects has suffered from elite capture (see for example, Platteau and Gaspart, 2003; Platteau, 2004; Mansuri and Rao, 2004; Corbera et al., 2007; Larson, 2011; Pascual et al., 2014). In this context, it is important to note that the Paris Agreement of the UNFCCC explicitly directs the Parties to the Convention to 'respect, promote and consider' human rights, rights of indigenous peoples and those of the vulnerable groups while taking actions to address climate change (UNFCCC, 2015, p 21). Most REDD+ countries already have some kind of existing system of environmental and social safeguards, often in line with safeguards that the World Bank and other international donor agencies require. Therefore, many argue that a first step in having an effective REDD+ SIS could be to ensure existing systems are effectively implemented, instead of duplicating systems thereby increasing bureaucratic requirements (Lasco et al., 2013). This makes our study of the implementation of the social safeguard assessment of a REDD+ pilot project carried out with World Bank funding (and so subject to World Bank safeguards) particularly pertinent.

Our surveyed households – both those identified as eligible for compensation by the social safeguard assessment, and those not identified as eligible – were very similar in most of their socio-economic characteristics apart from three key factors. First, households containing members of local forest management associations were significantly more likely to be identified as a PAP than those without members, and those with a decision-making member of the association further increased their chances of being identified as a PAP. Second, households with higher food security, measured as 'reported total number of months that all members of the household have at least two good meals a day', had a significantly greater chance of being identified as a PAP than those with lower food security. Third, less accessible households, measured by the distance of their dwelling from the primary access point to their village on the motorable road, were less likely to be identified as PAPs than those living closer to the access point. We also observed that one village, entirely within the protected area boundary, had no PAPs identified within it, and our interviews there suggests that no safeguard assessments were done in that village. Our interpretation of these results is that while the safeguard assessment has captured many households likely to bear significant costs from forest use restrictions, many others likely to bear similar costs were missed. We suggest that omissions from the safeguard assessment are non-random and that certain household characteristics make households more likely to be identified as eligible to receive safeguard compensation. We conclude that having socio-political power locally, as reflected by membership of (or a decision-making position in) the local forest management associations, is associated with increased likelihood of being identified as a PAP (and therefore opportunity to benefit from compensation). Similarly, those with higher food security (a proxy for wealth more generally) have a higher chance of being identified as eligible for compensation. In addition we suggest that many remote and inaccessible households, and in some cases entire remote communities, were excluded from the safeguard assessment process altogether. We interpret this as evidence of local elite capture, a common problem identified in conservation and development projects (Crook, 2003; Olowu, 2003; Platteau and Gaspart, 2003; Pollini et al., 2014; Sommerville et al., 2010), as well as of systematic bias in the assessment process favouring more accessible households and communities, similar to that highlighted by Brimont et al. (2015) in their study of the Makira REDD+ project in Madagascar.

We suggest that the process of PAP identification in the CAZ REDD+ project has struggled due to three factors, which we discuss in turn. We then discuss what lessons can be learnt from this study for the development of social safeguard systems in REDD+.

4.1. Factors making identification of those negatively impacted by conservation restrictions challenging

4.1.1. Poor information on the location of populations and difficult access

Of the eight villages in our study area, only three appear on available maps and gazetteers (only two correctly labelled) despite all having primary schools and well-established permanent populations. In some villages not visited by the safeguard assessment team, some households were identified as PAPs. However, our discussions in the field suggest that these were households who heard about the safeguard assessment and sent representatives to meet the assessment team in another location. In one village not visited by the safeguard assessment team, no PAPs were identified. It is difficult to argue that people in this community are less impacted by the REDD+ project than others in the area as their livelihoods are similarly dependent on shifting agriculture and, given the location of the community entirely within the boundary of the protected area, they are certainly required to stop this activity. A more parsimonious explanation for the lack of PAPs in that village is that the village is difficult to access and relatively isolated from information flows from the administrative centre. Indeed, our modelling of the factors influencing PAP identification has shown accessibility as one of the key factors determining whether a household is identified as a PAP, suggesting a systematic bias against those less accessible (Fig. 3). In the context of our study, this is a surprising result given that the households living far from the access points were mostly living close to or even within the protected forest (Fig. 1); and were just as dependent on forest for their livelihoods if not more so. One explanation could be that those living near the access points are more likely to get the information about the safeguards assessments, and be aware of external agents coming in the area. Similarly, the difficult terrain meant that those conducting the safeguard assessment did not penetrate deeply into the area and so more remote households were more likely to be omitted.

Systematic targeting of easy-to-access households (and exclusion of difficult-to-reach ones) in rural development projects and government services provisioning is not a new phenomenon; Chambers (1983, pp 13–16) termed this 'spatial bias' more than three decades ago. Recent research suggest that this kind of targeting is still a common occurrence in low-income countries whereby off-road and difficult-to-access communities are left out (Booth et al., 2000; Porter, 2002; Francken et al., 2012). "To live off-road is to be invisible" is how Porter (2002, p 291) characterises people and communities living with poor road access in Ghana and Nigeria. This statement aptly captures the situation of many of the households and communities in our study area who were left out by the CAZ safeguards assessment, and are literally invisible to outsiders, as their villages do not appear on official maps. Within Madagascar, Francken et al. (2012) found that both government and NGOs allocated cyclone relief to more easily accessible areas, often to non-affected communities at the expense of inaccessible but cyclone affected ones. Brimont et al. (2015) also found, in their study of Makira REDD+ pilot project, that the development interventions related to conservation programs tended to target 'easily accessible areas' (p. 762).

4.1.2. Unwillingness of people to self-identify as engaged in potentially illegal activities

There is growing literature demonstrating that people do not give honest answers to direct questions about sensitive behaviours such as illegal natural resource use (St. John et al., 2010; Razafimanahaka et al., 2012). The CAZ REDD+ project seeks to reduce emissions by reducing land clearance, which is mostly driven by shifting agriculture. Therefore, the social safeguard assessment seeks to identify those who will be economically displaced from this livelihood within the protected area boundary. However, there is a long history in Madagascar of state efforts to prevent burning of forest and grasslands for farming and pasture, including a series of anti-fire legislations in both the colonial and post-colonial era (Kull, 2002, 2004). In 2002, the then president of Madagascar even linked the government budget for rural communes (municipalities) to their success in eradicating fire (Kull and Laris, 2009). Furthermore, growing prominence of Madagascar as an international biodiversity hotspot and active presence of large international conservation NGOs in the country has made the anti-fire rhetoric stronger in recent years (ibid.). Identifying those economically affected by the REDD+ project by asking them to self-identify is therefore extremely problematic as those who do clear forestland for agriculture, may not be willing to admit this to an external actor not easily distinguished from the enforcement authorities that occasionally jail farmers.

4.1.3. Reliance on existing non-representative institutions risks exacerbating existing inequalities

The majority of households on the periphery of the CAZ REDD+ project are extremely poor. However, like communities anywhere in the world (Agrawal and Gibson, 1999), they are not homogeneous, and individuals (and the households to which they belong) vary significantly in terms of their social and political standing, and ability to interact with outsiders. Studies of community-based natural resource management institutions in Madagascar have shown that they are often not representative of their local communities (Pollini et al., 2014) and can facilitate elite capture (see for example, Sommerville et al., 2010; Ratsimbazafy et al., 2011). Local elites may act as 'gatekeepers' in the community (Chambers, 1983, pp 18–19), able to influence greatly the distribution of benefits from programmes such as the social safeguard assessment.

We found that households containing members of local forest management associations (especially those containing a committee member), and those easily accessible and with higher food security were more likely to be identified as PAPs. It is difficult to make a case that these characteristics are likely to be associated with people most negatively impacted by the REDD+ project. We argue it is more likely that membership of forest management associations, and especially decision-making positions in these associations, gives individuals more access to the external agents involved in the safeguard assessment process, and makes them better able to ensure that they, or their families, benefit from the compensation available. We are not suggesting corruption; we have no evidence to suggest that the households identified as PAPs do not bear costs from the REDD+ project, however we are suggesting that by working through non-representative institutions, the safeguard process is reinforcing existing social and political power structures, and inequalities.

Elite capture of benefits is a well-documented problem in community-based conservation and development projects around the world (Blom et al., 2010; Corbera and Pascual, 2012; Pascual et al., 2014; Platteau and Gaspart, 2003). In a recent study of one REDD+ project in Indonesia, Howson and Kindon (2015) report that locals with greater socio-economic power were able to skew the access to benefits in their favour. The potential for elite capture can be minimised by working as directly as possible with the individual households. However, in many cases, external agents (such as those carrying out a safeguard assessment) may need to consult existing institutions in order to gather information about households. These institutions should not be assumed representative of a local community or their interests and any information must be carefully triangulated to avoid undue influence on the safeguards process.

4.2. Lessons for the development of social safeguard systems in REDD+

Our results suggest that carrying out an assessment to identify individual households eligible to receive compensation in a REDD+ project is challenging, costly and likely to be prone to local elite capture. Identification of individual eligible households is made challenging by poor information on location of populations (and costs and logistical challenges of reaching all such households for an assessment). Greater investment in improved mapping of local populations, especially forest dwellers, and in clarifying land tenure to know who has rights to the land affected by the project before a REDD+ project is established could be an important part of a solution (Sunderlin et al., 2014). Clear and strong tenure rights for forest peoples is seen as one of the fundamental steps in ensuring their rights to benefit from future REDD+ projects (Ribot and Larson, 2012; Sikor et al., 2010), especially amidst the concern that REDD+ might encourage recentralisation of forest management (Phelps et al., 2010). However, as Ribot and Larson (2012) argue, clarifying rights will not be sufficient—they have to be transparent and enforced with sanctions for them to be effective and in order to ensure accountability.

The challenges arising from people's strategic behaviour in a social safeguard assessment at the household level are more difficult to resolve. People will tend to understate their reliance on land clearance if they perceive a risk of sanctions, and overstate their reliance if they perceive a potential benefit. Finally, any external assessor may need information from existing institutions; however, where such institutions are not representative, there is additional potential for local social and political elites to bias the process in their favour. One way around this dilemma could be to do away with detailed assessments at the household level and replace these with blanket compensation offered to all the households in communities identified as potentially vulnerable. This would be likely to be cost effective where the majority of households are extremely poor and are likely to be relatively similar in their socio-economic conditions and in their forest dependency. Compensating everybody in the vulnerable community would mean equal compensation at the household level regardless of an individual household's loss due to forest use restrictions. In the case of CAZ safeguards the same compensation was offered to households identified as eligible, regardless of the magnitude of their loss (World Bank, 2012—note that we have not evaluated whether this compensation was appropriate or sufficient). While the form and mechanism of compensation requires careful consideration (and is beyond the scope of this paper), in conditions where the majority of the households are likely to be eligible for compensation and costs of eligibility assessment are high, the optimal solution could be to compensate them all equally.

Those designing REDD+ social safeguard systems may wish to consider the costs and benefits of better targeting (which reduces the number of false positives—households that are compensated that should not be) relative to those of compensating extra households, at the margin, to determine the "optimal" level of targeting effort. However, the optimal strategy depends on the viewpoint (whose optimum?). At a societal level, over-compensation is not a cost but a transfer (from rich to poor), and at worst cancels out. Whereas targeting costs (paying consultants to carry out extensive fieldwork) is a dead weight cost. The optimal level of effort given to targeting compensation will depend on how false negatives (uncompensated households that bear net costs as a result) decrease as targeting effort is increased relative to blanket compensation, and how these are valued. To the REDD+ implementer, false negatives only matter if they are sanctioned for not identifying the households who should have been identified, while to society such false negatives may imply very large welfare losses due to costs felt to people who are already very poor. This highlights the need for REDD+ implementers to be accountable for their decisions, and for households to be aware of their rights and able to appeal decisions. Studies indicate that donor-driven programs and their implementers are rarely evaluated properly or sanctioned for failed outcomes (Martens, 2004; Bräutigam and Knack, 2004; Williamson, 2010). This would suggest that a more effective strategy to avoid welfare losses in the short run in cases like this might be to require implementers to compensate every household in affected communities. The long-term solution, however, must lie in ensuring the rights of local communities and households are strengthened, including mandatory Free Prior Informed Consent, and in ensuring organisations implementing programs like REDD+ are accountable to the local communities by establishing accessible and robust appeals procedures (Beymer-Farris and Bassett, 2012; Ribot and Larson, 2012; Poteete and Ribot, 2011).

REDD+ is seen by some as an efficient way to reduce emissions, with potential additional benefits in terms of providing funding for alternative livelihood activities. However, unless social safeguarding is being done properly it is simply a case of costs being borne by those living in forest edge communities in the tropics, who are often the poorest, are often historically marginalised, and have contributed least to climate change. Strong and effectively-enforced safeguards in REDD+ is a must if it is to avoid worsening forest people's historical exclusion from equitable benefits (Sikor et al., 2010).

5. Conclusion

Our study has highlighted problems that are familiar to any who have studied conservation and development projects in low-income countries over the last three decades. What is new and worrying is that these problems, in particular that of local elite capture, seem to exist even in projects that are supposed to be inherently pro-poor, and that are supposed to be helping those who are affected negatively by conservation projects. The safeguards approach is often termed a 'do-no-harm approach' as it is devised to minimise the potential negative impact of a policy or a project (Hall, 2007). Safeguards in REDD+ should not just be about 'doing no harm'. To be able to effectively change the livelihoods of some of the poorest peoples in forest dependent communities, REDD+ should aspire to improve social and ecological welfare wherever they are implemented, and REDD+ safeguards should guarantee that improvement in livelihoods and social welfare are achieved. As Ribot and Larson (2012) state (emphasis added): "If REDD is to challenge business as usual and to benefit local populations, safeguard policies must not just protect rights, but *must also establish, strengthen, and secure rights*". The Paris Agreement gives explicit recognition of the need to respect and promote human rights (especially those of vulnerable groups) while taking actions to address climate change which is a welcome step forward. However this research demonstrates that without a more effective effort to understand the local context and willingness to make special effort to reach the hard to reach, even the aspiration of doing no harm could fail.

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Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at http://dx.doi.org/10.1016/j.gloenvcha.2016.01.004.

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