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Heterogeneous public preference for REDD+ projects under different forest management regimes

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ABSTRACT

Successful implementation of Reducing Emissions from Deforestation and Forest Degradation (REDD+) projects depends on active support and participation by local households. It has been suggested that households' support for REDD+ could be influenced by their socio-economic conditions, their experience with REDD+ projects and local forest management regimes. However, there has been little information about the effect of such contextual factors on public preference for REDD+ projects. Using a choice experiment survey in Indonesia, this paper examines heterogeneity on household preferences for REDD+ projects among three distinct forest management regimes: private, government, and community. We found that respondents in community regime are the most supportive for REDD+ projects whereas those in private regime are the least supportive. Current REDD+ interventions also have heterogeneous impacts on household preferences across forest management regimes. Added restrictions on forest-dependent livelihoods under REDD+ projects is the biggest concern of participating households; however, we note that involving households in decision-making and distributing REDD+ benefit for community projects could create a supportive environment for REDD+ projects. Female respondents from households with larger family size and limited land ownership are more likely to support REDD+ projects. These findings provide useful insights to design more targeted REDD+ projects.

1. Introduction

REDD+ is a global initiative to mitigate climate change by reducing emissions from deforestation and forest degradation as well as by promoting biodiversity conservation, sustainable forest management and forest carbon enhancement in developing countries (UN-REDD, 2017). Specifically, REDD+ aims to reduce greenhouse gases (GHGs) emissions by providing direct financial incentives from carbon emitters (e.g., developed countries and companies) to developing countries and local communities to implement sustainable forest management. It is fundamentally a payment for environmental services (PES) scheme that would sustain forest while benefiting the local households (Clements and Milner-Gulland, 2015).

A PES scheme could attract the participation of the local households if it is designed with due consideration to local cultural, economic, organisational, and political conditions (Miranda et al., 2006). Participation of local households may increase if they are involved in designing a scheme that offers flexible contracts and combines PES with integrated conservation and development projects (Raes et al., 2017). It is also necessary to allow sufficient payment to cover opportunity cost from forgone revenue by sustaining the environmental services (Robert and Stenger, 2013). Households may have a strong preference for certain features of a PES scheme which would influence their participation in the scheme (Petheram and Campbell, 2010). Therefore, understanding preference heterogeneity of the local households and the relationship with particular socio-economic and individual characteristic is important to find potential target households or regions for successful implementation of a PES scheme (Beharry-Borg et al., 2013).

The present study aims to examine households' preferences for REDD+ projects under three distinct forest management schemes. Specifically, we examine how preferences for REDD+ projects differ across three distinct forest management regimes (i.e., private, government, community), and how current REDD+ intervention affects household preferences. We hypothesise that in addition to household

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characteristics, forest management regimes and REDD+ participation status may also have a significant influence on household's preference for REDD+ projects.

Among other factors such as supportive national and local legislation, availability of alternative livelihood opportunities for households, the success – reduced emissions within a timeframe and effective stakeholder engagement – of REDD+ implementation depends crucially on the local contexts (i.e., forest management regimes, households' dependency on forests for livelihoods as well as experience in pilot projects) (Atela et al., 2015). However, only a few studies have examined the role of different forest management regimes and household experience with REDD+ projects in shaping household preference for REDD+ projects. This paper thus contributes to an improved understanding of the impact of such contextual differences that is important to ensure support and involvement of local households for effective implementation of REDD+ under different forest management regimes.

We use a discrete choice experiment (DCE) approach, which becomes an increasingly popular tool to understand people's preferences for different contract design features of PES schemes (Balderas Torres et al., 2013; Costedoat et al., 2016; Raes et al., 2017). However, there are only a few studies that have applied DCE in REDD+ contexts. For example, DCE is shown to be a reliable ex-ante method to reveal local household's preference for REDD+ projects (Rakotonarivo et al., 2017). Using the DCE, Dissanayake et al. (2015a,b) examined local households' preference for various attributes of REDD+ contract on community forests in Ethiopia and Nepal. The present paper, however, contributes to the knowledge of another aspect of PES design – that is, preferences for REDD+ projects under different forest management regimes and implementation contexts.

It is widely recognised that understanding and accommodating heterogeneous local preferences in REDD+ design and implementation are crucial to the success of this emerging instrument (Bong et al., 2016; Godden and Tehan, 2016; Moonen et al., 2016). Specifically, households' preference for REDD+ design could be influenced by forest management regime because it could affect their access to the forest as well as the benefits they receive from REDD+ projects. In some places, there is a tension that REDD+ projects could weaken rather than strengthen tenure security and access rights to forests and livelihood options of local households (Broegaard et al., 2017). In such cases, REDD+ projects should be designed and implemented based on the preferences of the local households (Sikor et al., 2017). The support and involvement of local households can contribute significantly to obtain social licences to operate for REDD+ projects (Hawthorne et al., 2016; Kim et al., 2016; Loaiza et al., 2016).

Furthermore, the previous and current participation of households in REDD+ pilot projects could positively or negatively influence their support for such projects in the future. Recent studies indicate that the level of benefit and benefit-sharing arrangements, participation in decision-making process, community interactions, socioeconomic condition, households' dependency on forest, the duration of REDD+ contract, restriction on forest livelihoods as well as local experience and knowledge about REDD+ are all important determinants of household preferences for REDD+ projects (Appiah et al., 2016; Bong et al., 2016; Komba and Muchapondwa, 2016).

We examine the case of REDD+ projects in Indonesia. As the third largest tropical rainforest nation (MoEF, 2017a), as well as a major contributor to global greenhouse gases (GHG) emissions from forestry sector (Margono et al., 2014), Indonesia, provides an excellent case for studying the heterogeneity of household preferences for REDD+ projects across varying contexts, including forest management regimes. For other countries having a similar setting to Indonesia, lessons learned from this paper could be useful to design and to implement REDD+ policy by considering contextual differences.

The rest of the paper is organised as follows. Section 2 introduces current REDD+ status and issues in Indonesia, and its various forest allocations and management regimes. Section 3 describes the empirical approach including the study area, sampling strategy, data collection, survey instrument, experimental design and model specifications. Section 4 presents the main results, followed by the discussion. The last section concludes the paper.

2. REDD+ and forest management regimes in Indonesia

2.1. The current state of REDD+ projects in Indonesia

Indonesia is the third largest tropical rainforest country with around 121 million hectares of forests (MoEF, 2017g,a). About 63% of total GHG emissions in Indonesia come from forestry sector (MoE, 2010) through deforestation and forest degradation, including conversion of forest land to agriculture, unsustainable logging, and mining (Indrarto et al., 2012). Around 613,000 ha of Indonesian forests were deforested and degraded each year from 2009 to 2012 (MoF, 2014c). Deforestation in Indonesia during the 2001–2012 period was lower than the previous period (1990–2000) with the major drivers of forest conversion ranged from logging and forest burning, subsistence agriculture, palm oil expansion, plantation forest and mining (Wijaya et al., 2015). Agriculture and subsistence logging are the main forest-based livelihoods. Furthermore, working as labour for palm oil estate, plantation forest, and mining is common among the local population.

Indonesia has shown a strong commitment to REDD+ implementation as its forestry sector plays an important role to achieve the national reduction target on GHG emissions. Of the national target of 29% GHG emissions reduction (from business as usual) by 2030, over 59% of this target is to be achieved from the forestry sector (GoI, 2016). Thus, REDD+ is widely considered as an important instrument to fulfil this national commitment. Perhaps, more importantly, REDD+ is expected to invite an influx of funding to the country.

Starting from 2008, Indonesia is among the first countries which introduced REDD+ implementation guidelines at the national level to provide the regulatory and legal framework (MoF, 2008c,b, 2009a,b). Most currently, there are several regulations issued by the Ministry of Environment and Forestry to guide REDD+ implementation, including the procedures of REDD+ implementation (MoEF, 2017e), national registry system (MoEF, 2017d), measurement, reporting and verification (MoEF, 2017b), national GHG inventory (MoEF, 2017c), and trading for certified emissions reduction (MoF, 2014b).

REDD+ implementation is moving from national to sub-national and project levels. Since the inception of REDD+ in 2008, it has been piloted through at least 66 projects in Indonesia (UN-REDD, 2015; Enrici and Hubacek, 2018), which indicates Indonesia's active engagement in REDD+ implementation with the second largest share of REDD+ projects in the world after Brazil (CIFOR, 2017). Funded by the public and private finance, REDD+ projects were initiated by various parties including the government, conservation NGO, local community, and private sector. The private sector was invited to develop and invest in REDD+ projects since the inception, through the creation of a new forest concession scheme called Ecosystem Restoration (ER) (MoF, 2008b,a). Several REDD+ projects have already been involved in voluntary carbon schemes (Kawai et al., 2017). Most of the REDD+ projects aim to sell carbon credits in the voluntary carbon market for either funding forest conservation programs or making a profit (Kawai et al., 2017). However, some of the projects are also initiated to secure forest right and land tenure for the local community (Enrici and Hubacek, 2018).

Following uncertainty in REDD+ funding mechanism at the global level (Fletcher et al., 2016; Lund et al., 2017), the implementation of REDD+ projects at the local level is also facing many challenges. REDD+ projects in Indonesia are also struggling to find long-term funding (Enrici and Hubacek, 2018) since current REDD+ funding mainly comes from aid agencies, not from the private sector and carbon market (Angelsen, 2017; Angelsen et al., 2017). By 2018, there is only one project in Indonesia that is funded by voluntary carbon market (Enrici