

# **Viability assessment of jurisdictional Reduced Emissions from Deforestation and Forest Degradation (REDD+) implementation in Vietnam**

Dissertation with the aim of achieving a doctoral degree  
at the Faculty of Mathematics, Informatics and Natural Sciences

Department of Biology  
of Universität Hamburg

Submitted by  
Prem Raj Neupane  
from Nepal

Hamburg, 2015

Day of oral defense: 07.10.2015

The following evaluators recommended the admission of the dissertation:

Supervisor: Prof. Dr. Michael Köhl

Co-supervisor: Prof. Dr. Elisabeth Magel



**Dedicated to  
all 2015 earthquake victims in Nepal**

## **Declaration**

I hereby declare, on oath, that I have written the present dissertation by my own and have not used other than the acknowledged resources and aids.

Hamburg, 16 July 2015

.....  
(Prem Raj Neupane)

I certify that the English of the dissertation "Viability assessment of jurisdictional Reduced Emissions from Deforestation and Forest Degradation (REDD+) implementation in Vietnam" written by Prem Raj Neupane from Department of Biology, Institute for World Forestry, University of Hamburg was reviewed and is correct.

The thesis was reviewed by Andrew Piper (Australian Citizen)  
- Currently working as Independent Forestry Consultant

A handwritten signature in dark ink, appearing to read 'A. Piper', is written over a horizontal dashed line.

Andrew Piper  
07 July 2015

## Summary

International climate negotiations under the United Nations Framework Convention on Climate Change (UNFCCC) conceive a nationwide approach of performance evaluation and national-level carbon accounting for REDD+. Decisions adopted in the 16<sup>th</sup> Conference of the Parties (COP16) to the UNFCCC in Cancún, 2010 acknowledged sub-national or jurisdictional approaches, as an interim measure, for REDD+ accounting and monitoring. A jurisdictional approach is the nation-wide approach under which a sub-national or provincial government implements and administers REDD+ ensuring compliance with nationally and internationally agreed-upon financial, fiduciary and reporting standards. The study is focusing on Vietnam which is working on multiple phases of REDD+ and is taking action at multiple scales. Vietnam is developing a national REDD+ strategy, building measurement, reporting and verification (MRV) capacity, establishing reference emission levels, and piloting benefit-distribution systems. The country is exploring nested approaches to integrate jurisdictional REDD+ activities into national REDD+ schemes. Jurisdictional REDD+ implementation (JRI) involves both state and non-state actors (local governments, non-profit/governmental organizations, indigenous peoples' organizations) and opens the door for private-sector engagement in REDD+. For the JRI, the government needs to identify potential jurisdictions and decide upon priority areas. In addition, whether realistic jurisdictional REDD+ implementation is achievable from technical, operational, financial and policy perspective, needs to be analyzed and evaluated before the decision for a specific jurisdiction is made. To inform such decision making, this study attempts to evaluate the viability of the jurisdictional REDD+ implementation in Dinh Hoa, Vietnam. Dinh Hoa is a mountainous district inhabited largely by ethnic minorities and is deeply poverty stricken. In the district, forestry is major land use and 70% of the total forest area is managed by households. Based on designated ecological function, forests are classified as Special use, Protection and Production forests in Vietnam. The district possesses all the forest types, and is rich in natural forest formations and biodiversity. The study provides an understanding of JRI feasibility in a jurisdiction (i.e. the Dinh Hoa district) and suggests potential REDD+ activities in household-based forestry - a major forest management regime in Vietnam. The research examined the viability of the jurisdictional REDD+ implementation as a combination of technical, operational, financial and political aspects using multiple methods and analytical techniques.

The study conducted ground-based forest inventories to estimate carbon stocks in forests. Besides biomass and carbon densities for the different forest types, the study provides data on soil organic carbon, litter and understorey carbon pools, which is currently scarce in Vietnam. Forest cover change was assessed using remote sensing and geographic information systems. Based on findings of the forest inventories and forest cover change analysis, technically feasible REDD+ activities were identified. The study used household surveys to assess the perception and attitude of local households towards forest management, forest land allocation and REDD+. Forest use-rights, tenure, and willingness and capacity of the forest owners to participate in REDD+ were assessed. Outcomes of the assessments were used to evaluate operational feasibility and local acceptability of the JRI. Net present value (NPV) and benefit-cost ratio (BCR) were used to measure financial viability of natural forests and planted forest management. A rigorous desk review of national legal and regulatory frameworks and institutional arrangements for REDD+ implementation was conducted to explore whether the frameworks and the arrangements are supportive for operationalizing jurisdictional REDD+.

In the household-based forest management (HBFM) regime, subsistence households were managing small and fragmented patches of forests with differing forest carbon stocks. From technical perspective, *conservation of forest carbon stocks through protection of existing forests and enhancement of forest carbon stocks- through restoration of degraded forest lands with assisted natural regeneration* would be promising REDD+ activities for Protection forests and Special use forests. A recent trend of conversion of degraded natural forests to planted forests indicates *sustainable management of forests through enrichment planting*, and *reducing emissions from deforestation through avoided planned deforestation* might be further activities to be considered. The study suggests estimation of emission factors and preparation of reference emission levels for each activity; and calculation of corresponding financial values for explicit determination of REDD+ activities.

Benefit-cost ratio of greater than one and NPV of benefits of US\$25 per ha per year revealed household-based natural forest management is economically feasible in Vietnam. The NPV indicates opportunity costs of forest conservation under REDD+ to the household. This implies that carbon markets under a REDD+ mechanism may entail high opportunity costs compared with the current carbon price in international market. JRI might be financially attractive to the households, if it provides incomes additional to the current income from the forest management under the HBFM. Moreover, the HBFM enhanced small-holders' access to external finance, increased employment opportunities and promoted cross-sectoral linkage between forestry and agriculture, which are key for sustainable management of forests.

Jurisdictional REDD+ implementation is politically acceptable and compliant with requirements of national legal and regulatory frameworks, UNFCCC REDD+ process, and other relevant processes, such as Verified Carbon Standard. The Vietnamese multi-tiered and partially decentralized institutional arrangements for REDD+ implementation are in principle highly supportive to a jurisdictional REDD+ approach. The arrangement constitutes a network of institutions with substantial decentralization of fiscal, administrative and monitoring authorities from national level authorities to province and district level authorities of REDD+ implementation. However, low level of knowledge and understanding about REDD+ among local stakeholders is an impediment for the JRI. Capacity of all state and non-state actors, particularly of ethnic minority groups, and forest-adjacent/dependent households needs to be strengthened to enhance their complete and effective participation in program design and implementation, benefit sharing, as well as safeguards design and monitoring.

The small-holders showed positive perception towards the household-based forest management regime and positive attitudes to forest land allocation and REDD+ initiatives. Positive perceptions and attitudes on conservation initiatives are good indicators for the sustainability of a REDD+ mechanism and indicate the likelihood that the local residents will continue to be involved in the implementation of the regime. Participation of local stakeholders is considered as building block for efficiency of REDD+ and its success which depends on its legitimacy. The substantive participation of the households and state-actors in the forest management regime encouraged an inclusive and informed decision-making process. Long-term land tenure, secured and explicit forest-use rights, mutually understood and respected roles and responsibilities, and accessible institutions and processes ensured traditional, legal and local legitimacy.

Thus, jurisdictional REDD+ implementation is conceptually feasible and operational, provided that REDD+ activities are coherent to and embrace the concomitant policies, programs and practices. This is equally important for political adoption and local legitimacy of REDD+ at local level. The study suggested jurisdictional REDD+ implementation is technically feasible, operationally achievable, financially viable, and politically acceptable. However, to achieve fully operational JRI, REDD+ activities should be additional to and embedded into concomitant forest management and land use policies and programs at jurisdictional levels.



## Acknowledgements

Most professors teach students how to find right answers. The 'GURU' ('गुरु') has been teaching me how to ask the right questions since few years. The questions guided by his remarkable mentoring, inspiring counselling and patience to keep me moving forward, made an ordinary student to stand on the verge of a doctoral degree. I would like to express my deepest gratitude to my गुरु and supervisor Prof. Dr. Michael Köhl. I am especially grateful for his confidence and the freedom he gave me to do this work.

My sincere gratitude goes to Prof. Dr. Elisabeth Magel for her willingness to be second supervisor for this thesis. My special thanks to Prof. Dr. Jürgen Pretzch and Prof. Dr. Peter Dart for their scholarly guidance in the beginning of my research career.

Dr. Joachim Krug, you introduced me with Prof. Köhl and to World Forestry, Hamburg. You have been a mentor, a colleague, and a sincere friend. Not enough words to thank you!!! My sincere thanks to Prof. Dr. Do Anh Tai, without your support, our work in Vietnam would not be as smooth as it is. Thanks to you, Prof. Dr. Lan and entire family for your generous support and hospitality, which always made me feel at home. Dr. Thomas Schneider, thank you for always appreciating my work that helped me to work harder and keep moving. It has been great to work with you. Prof. Dr. Dang Van Minh, thank you for the guidance and support during my field work. My sincere thanks to Prof. Dr. Tran Dai Nghia for your coordination and support.

It was not possible to conduct a study on land use and land cover change without contributions from Vũ Tiến Điển and Thu-Huong Luong. Dr. Daniel Plugge, your guidance and support meant a lot for this thesis. I am grateful to you. I would like to thank Mr Hung and other colleagues of laboratory of Thai Nguyen University of Agriculture and Forestry for their tireless support during lab-work. Mr Tran Quang Dieu, a key member of my research team, deserves a million thanks. I would like to thank Mr Tu, Mr Cuong, Mr Phê, Mr Hưng and Mr Trang for their support during forest inventory. My sincere thanks to Mr Khiem, Mr Ha, Mr Dzung, Mr Thuan and Mrs Thi Thanh Ha Nguyen for their support and company during my stay in Vietnam. Dear Tung, Hanh and Juniors, thank you for the wonderful moments. Time spent in Orange is memorable. Thank you Mr Hong Ngoc Y, Vietnam Forestry University for being always there for any support I need.

I am grateful to Daniel Kübler for being always available for resolving any of my statistical queries related to R. It was always fun to irritate you- my Göttingeli friend Philip Mundhenk, with stupid stat questions. Konstantin, you have helped me through my most stressful time. You have been very good friend, exceptional flat mate and wonderful colleague. Frau Doris Wöbb, you have been always accessible and supportive to me and to all international students. My sincere gratitude to you. Kai Timo Schönfeld, Volker Mues, Bernhard Kenter, Manuela Kenter, Sheila Zamora, Sybille Wöbb, Sabine Kruse, Stefanie Stenner and Neda Lotfiomran - always have been great to work with you. Jutta Lax and Margret Köthke, I enjoyed working with you in Nepal and in Hamburg. Thank you Mr Kulow for your instant IT support. Giulio di Lallo, Vlad Strîmbu, Christian Hack, Sebastian Gräfe and Laura Prill, I enjoyed working with you.

I take this opportunity to express my gratitude to Dr. Tek Maraseni, Prof. Dr. Arne Pommerening, Dr. Uwe Muuss, Prof. Dr. Klaus von Gadow and Prof. Dr. Morag McDonald, you people have always inspired me and boosted my self-esteem. I would like to offer my sincere thanks to Irma Mika, Andrew Piper, K. P. Acharya, Devesh Mani Tripathi, Dr. Pham Quoc Hung and Dr. Pham Manh Cuong for your wishes and support.

I am obliged to Thünen Institute for World Forestry and University of Hamburg for providing me an opportunity to work in Vietnam. I am highly indebted to colleagues from Dinh Hoa- commune leaders and foresters and entire family of Thai Nguyen University for supporting me for this research and logistics. Local people generously invited a complete stranger to stay for months. Thank you all for your beautiful heart! I am unable to mention each individual in this acknowledgement, but it does not suggest a lack of gratitude and there are none left appreciated.

I am indebted to you Jan Eric Voss, a friend for life. You were always there either during my master study or work or my PhD study, you have been my constant support throughout. In you I have found a friend, brother and family, thank you so much for your unconditional friendship!!!

Finally, and most importantly, I would like to express my gratitude to my wife Archana, without your continuous proof read of countless pages full of climate jargons and editing assistance; I would not have finished this thesis. Your faith on me and support, encouragement, patience and unwavering love were undeniably the bedrock upon which my life has been built. The completion of my PhD has been a long journey. Thank you Prej for your patience with me, bearing my absence and for the happiness you brought into my life. My families in Chitwan, Kusunti, Tapoban, Damauli, Dettenhausen, Pokhara and FON have been encouraging and supportive. You all are my inspiration for being who I am and where I am!!! साष्टांग दण्डवत् to my parents for their faith on me and blessings.

My sincere gratitude to Late Nara Narayan Baba.

**ॐ नमः शिवाय!!!**