

Land use in climate policy – forest based options at local level with cases from India

Matilda Palm

Department of Earth Sciences, University of Gothenburg

Akademisk avhandling

som för avläggande av Filosofie Doktorsexamen i Naturvetenskap med inriktning mot Naturgeografi som beslut av lärarförslagsnämnden vid Institutionen för Geovetenskaper, Göteborgs Universitet, kommer att offentligens försvaras fredagen den 27 november 2009, kl 10.00 i Stora Hörsalen, Geovetarcentrum, Guldhedsgatan 5A, Göteborgs Universitet.

Examinator: Prof. Lars Franzén

Fakultetsopponent: Assoc. Prof. Emily Boyd

School of Earth and Environment, University of Leeds, UK

Matilda Palm

Department of Earth Sciences, University of Gothenburg, Box 460, SE-405 30, Gothenburg,
Sweden

ABSTRACT

With India's large population, an increased pressure on forest and agricultural land indicate a growing demand for environmental services that is sustainable for the future. Fertile agricultural land is limited and with an increased demand for energy production the development expands to degraded lands, the wasteland. About one fifth of India's total area is classified as wasteland with estimated biomass productivity of less than 20% of their overall potential. Re-vegetation of wasteland can be one way to reclaim the productivity and restore the carbon storage in the soils

This thesis combines five separate papers and results in an improved understanding of the local, regional and global implications of different initiatives on land use change. It also analyses the environmental and socioeconomic effects of different efforts, both theoretical and practical. The research presented in this thesis was motivated by a perceived lack of local case studies exploring the contexts of climate policy.

The results in this thesis confirm that the performance of individual forest-based project activities will depend on local conditions, for example land availability and local acceptance. In other words, successful implementation of forest-based project activities will require local participation and is likely to involve multiple forest products and environmental services that are prioritised by the local community. Further the results illustrate the environmental and socioeconomic benefits from a large-scale establishment of multi-functional biomass production systems on wasteland could be substantial, for example decreased erosion, increased infiltration and income generation. However, in many cases, the establishment of afforestation and reforestation activities is hindered by low land productivity, water scarcity and a lack of financial resources for investments. Compensatory systems may help to overcome the financial barrier; however, the price of carbon needs to be significantly increased if these measures are to have any large-scale impact. The land suitability analysis uses environmental thresholds in GIS analyses to create data layers showing the amount of wasteland available for plantations. Using tree different options for land use management the result shows that over 70% of the wasteland in the district of Tumkur can be planted with suggested six species. The literature review shows that policymakers set the research agenda by declaration, which states the focus, while researchers feed the decision-making process until a decision is made.

Keywords: Carbon sequestration, sustainable development, bioenergy, afforestation, CDM, rural development

ISBN 978-91-628-7950-1

ISSN 1400-3813

Earth Science Centre

Doctoral thesis A129