

## 博士学位論文審査報告書

## Summary of Doctoral Thesis and Report of Examination

研究科長 殿

下記のとおり、審査結果を報告します。

To the Dean:

We report the result of Examination for the Doctoral Thesis below.

学籍番号 Student I.D. No.: 4011S011 - 4学生氏名 Name: POUDEL, Narayan Raj和文題名 Title in Japanese: コミュニティ森林管理プログラムの森林保全および管理体制へのインパクト：  
ネパール国ダン地方の事例英文題名 Title in English: THE IMPACTS OF A COMMUNITY FORESTRY PROGRAM ON FOREST  
CONDITIONS AND MANAGEMENT: Evidence from Dang District of Nepal  
記

## 1. 口述試験参加教員 Faculty Members Involved in Oral Examination

## ①審査委員会主査 Chief Referee of the Screening Committee

氏名 Name: 不破信彦 印所属 Affiliated Institution: 早稲田大学大学 アジア太平洋研究科資格 Status: 教授

博士学位名・取得大学名: Ph.D. Title Earned・Name of Institution

PhD (Agricultural and Resource Economics) University of California at Berkeley

## ②副査 (審査委員 1) Deputy Advisor (Member of Screening Committee 1)

氏名 Name: 大塚啓二郎 印所属 Affiliated Institution: 政策研究大学 大学資格 Status: 教授

博士学位名・取得大学名: Ph.D. Title Earned・Name of Institution

PhD (Economics) University of Chicago

## ③審査委員 2 Member of Screening Committee 2

氏名 Name: 浦田秀次郎 印所属 Affiliated Institution: 早稲田大学大学 アジア太平洋研究科資格 Status: 教授

博士学位名・取得大学名: Ph.D. Title Earned・Name of Institution

PhD (Economics) Stanford University

## ④審査委員 3 Member of Screening Committee 3

氏名 Name: 松岡俊二 印所属 Affiliated Institution: 早稲田大学大学 アジア太平洋研究科資格 Status: 教授

博士学位名・取得大学名: Ph.D. Title Earned・Name of Institution

博士 (学術) 広島大学

## ⑤審査委員 4 [該当者のみ] Member of Screening Committee 4 [if any]

氏名 Name: \_\_\_\_\_ 印

所属 Affiliated Institution: \_\_\_\_\_

資格 Status: \_\_\_\_\_

博士学位名・取得大学名: Ph.D. Title Earned・Name of Institution

2. 開催日時 Date / Time: (Y)2014 / (M) 4 / (D) 17 (Time) 13:30<sup>Period</sup>時限 ~ 15:30<sup>Period</sup>時限[時限 / Period] 1<sup>st</sup>: 9:00-10:30, 2<sup>nd</sup>: 10:40-12:10, 3<sup>rd</sup>: 13:00-14:30, 4<sup>th</sup>: 14:45-16:15, 5<sup>th</sup>: 16:30-18:00, 6<sup>th</sup>: 18:15-19:45, 7<sup>th</sup>: 20:00-21:303. 会場 Venue: 19号館310号室4. 合否判定 Result: 合/Passed ・ 否/Failed (該当する方に○ Circle as appropriate)

5. 添付資料 Attached document(s)

5 枚 pages (和文4,000字程度、もしくは英文1,500語程度。ただし、論文題目のみは、和文・英文を併記すること)  
(Approximately 4,000 characters in Japanese, or 1,500 words in English. The Doctoral Thesis title, however, must be written in both Japanese and English.)

博士論文審査報告書 2014年4月17日

Name: POUDEL, Narayan Raj

Title: THE IMPACTS OF A COMMUNITY FORESTRY PROGRAM ON FOREST CONDITIONS AND MANAGEMENT: Evidence from Dang District of Nepal

邦語タイトル: コミュニティ森林管理プログラムの森林保全および管理体制へのインパクト: ネパール国ダン地方の事例

## I. Overview of the Dissertation

The rapid depletion of forest resources has attracted much attention among researchers and policy makers in the developing world. Such depletion is most likely to occur in state-managed forests because the capacity of and incentives for the governments to manage forests are limited. While various forest management systems have been practiced to manage forest resources, the community forest management system, in which the use rights are handed over to community groups, has been widely accepted in recent decades.

There is an emerging consensus in the literature that the community management system can be successful in the management of non-timber forests. The literature is relatively silent, however, as to whether community management can be effective in protecting timber forests. While non-timber forests can be maintained and rehabilitated by preventing excessive extraction, production of timber requires intensive management operations, such as thinning, pruning, weeding and harvesting. It is not at all clear if community management can provide sufficient incentive for its members to conduct those operations. In addition, existing studies are often based on satellite imagery or subjective perceptions of forest conditions without detailed information on the ground, and they often lack methodological rigor, such as controlling for endogenous choice of management systems by the community.

This dissertation intends to address those gaps in the literature, by analyzing the impacts of community management on the condition of timber forests, intensity of silvicultural operations, and revenue generation, in the Tarai region of Nepal, where strong population and market pressures exist. Its econometric analysis explicitly accounts for the endogenous timing of the handover of forest management rights to Community Forest User Groups (CFUGs).

## II. Chapter Outline and Contents of Dissertation

The dissertation is organized as follows:

Chapter 1: Introduction

Chapter 2: Deforestation and Forest Degradation in Nepal

Chapter 3: Property Rights Regime, Common Pool Resources, Heterogeneity and Community Forestry

Chapter 4: Community Forestry in Nepal

Chapter 5: Study Site, Survey Methodology and Data Description

Chapter 6: The Hypotheses Tested

Chapter 7: Determinants of Deforestation, Forest Degradation and Forest management:  
Reduced form Approach

Chapter 8: Impacts of Community Forestry Program on Forest Condition and Management:  
2SLS Approach

Chapter 9: Effect of Heterogeneity on Forest Conditions and Management

Chapter 10 Summary and Conclusion

Chapter 1 presents the background of the research, its objectives, the research approaches and a brief summary of the significance and the contributions. It serves to describe the framework for the whole dissertation.

Chapter 2 defines the concepts of deforestation and forest degradation, and discusses factors affecting deforestation, trend of deforestation in the Terai region of Nepal, and socio-economic consequences of deforestation.

Chapter 3 lays out the theoretical concept of the common-pool resources, property rights and community forestry and their inter linkages. The chapter discusses how the common-pool resource dilemma occurs by illustrating 'prisoners dilemma game' and 'tragedy of commons' examples. Community forestry, in which property rights are handed over to local forest user groups, can be a solution for the common-pool resource dilemma. Furthermore, this chapter highlights the inter linkages between community forestry and various other issues such as peoples' participation, community development and poverty reduction.

Chapter 4 describes the current status and other relevant information on the community forestry in Nepal. It describes the constitution and operational plan preparation process and handing over process of the forests, followed by a section illustrating spatial distribution of the CFUGs and one describing various institutions involved in the community forestry program, such as the Ministry of Forest and Soil Conservation and District Forest Offices. This chapter concludes with a historical overview of the forest policy in Nepal since the 1950s.

Chapter 5 describes the study site, survey methodologies and the dataset used in this dissertation. Primary as well as secondary data sources are utilized in this study. Primary data were collected through the structured questionnaire and secondary data were collected mainly from the constitution, operational plan and the audit report of the CFUGs which are submitted to the District Forest Office. Cross-section data of 200 community forest from the Dang district of Nepal are used in the empirical analyses. The chapter provides a descriptive analysis of the main variables used in the subsequent chapters.

Chapter 6 postulates the three hypotheses to be tested in this study. Before forest use rights were handed over to the community, forest was *de facto* open access. This dissertation hypothesizes that, under such conditions, population pressure and demand for agricultural land and firewood must have resulted in deforestation, whereas favorable access to markets led to the felling of large timber trees for sale, resulting in forest degradation (Hypothesis 1). It is also hypothesized that both population pressure and better market access lead to more intensive management of community forests, as well as to higher revenue generation once forests are under community management by the local people (Hypothesis 2). This dissertation further hypothesizes that the regeneration of new trees can take place in those forests after handover (Hypothesis 3).

Chapter 7 reports the results of the empirical analysis examining the determinants of forest conditions (deforestation, forest degradation, mature, pole small and small tree) and forest management (intensity of forest management and revenue generation), based on reduced-form regression analyses. The regression results reveal that population pressure (measured by the number of households per unit area of forest) not only enhance the deforestation process, but also intensify the forest management and revenue collection process *after* the use rights are handed over to the community. Furthermore, the results show that better market access (as measured by the distance to road from the forest) is associated with the loss of large trees from the forests. The empirical results are thus consistent with Hypotheses 1 and 2.

Chapter 8, in contrast, examines more directly the causal impacts of community management on forest conditions (i.e., deforestation, forest degradation, mature, pole small and small tree) as well as on the intensity of forest management and on the revenue generation, by including an additional variable measuring the timing of forest handover to the regression equation. The following econometric specification is estimated:

$$\text{Forest\_Condition, Forest\_Management or Revenue}_i = \beta_0 + \beta_1 \text{Hand\_Over}_i + \delta \mathbf{X}_i + \mathbf{v}_i \quad [1]$$

where  $\text{Hand\_Over}_i$  is the year when forest was handed over to community  $i$  and treated as an endogenous variable,  $\mathbf{X}_i$  is a set of community characteristics, and  $\mathbf{v}_i$  is an error term.  $\text{Forest\_Condition}_i$  is proxied by: i) the percentage of barren, planted and encroached areas, ii) the volume of mature trees per hectare, iii) the number of pole trees per hectare, and iv) the number of small trees per hectare.  $\text{Forest\_Management}_i$  is measured by the percentage of managed forest area, and  $\text{Revenue}$  by the amount of revenue generation per hectare of forest.  $\text{Hand\_Over}_i$  is assumed to be determined by the following first-stage regression equation:

$$\text{Hand\_Over}_i = \phi_0 + \phi_1 \mathbf{Z}_i + \eta \mathbf{X}_i + \xi_i, \quad [2]$$

where  $\mathbf{Z}_i$  is a set of instrumental variables consisting of accessibility to forest offices (time taken to reach the range post) and foresters' workloads (area covered by each range posts), and  $\xi_i$  is an error term. Equations [1] and [2] above are estimated by the Two Stage Least Squares (2SLS) regression technique. Results show that age of the community forest user group is not associated with deforestation, intensity of forest management or revenue collection, but is significantly associated with the existence of immature trees. Older community forests consist of comparatively larger trees than younger community forests. The results are consistent with Hypothesis 3 that community management system helps foster the reforestation process.

Chapter 9 examines the effect of intra-group heterogeneity on forest conditions and forest management. The same econometric models as those used in chapter 6 are used in this chapter, except that an additional right hand side variable, the heterogeneity index, is added in the regression equation. Results show, however, that heterogeneity does not affect the outcome of collective action.

Finally, Chapter 10 concludes the dissertation. It briefly summarizes the main contents of the dissertation. In addition, it discusses limitations of the dissertation and suggests opportunities for further research.

### **III. Evaluation**

The main significance of the dissertation can be summarized as follows:

First, while existing studies on community forestry mostly focus on non-timber forests, where the effectiveness of community management is relatively well documented, this dissertation focuses on the impact of community forestry on timber forests. Unlike in the case of non-timber forests, intensive silviculture operations are required for the management of timber forests, and the previous literature was silent on whether community management can be effective in managing timber forests. The series of empirical results in this dissertation suggests that community management can be effective in managing timber forests as well.

Secondly, this research is based on a unique set of micro-level data collected by the author. Furthermore, this dissertation proposes a novel way of inferring the evolution of forest conditions retrospectively based on cross-sectional data of the density of trees of different sizes. Knowledge of how fast timber trees typically grow can allow one to infer the timing of when forest re-generation likely started. Thus, the author was able to identify the impact of community management by correlating the number of small, medium, and mature trees per hectare with the year when the forest use rights were handed over to the community.

Thirdly, since the timing of the handover is likely to be correlated with the unobserved characteristics of the communities, this dissertation explicitly treats the year of handover as an endogenous variable with the use of the two-stage least squares technique, unlike many existing studies. The dissertation finds that a longer period of community management is associated with the higher density of pole-size trees, indicating that community management facilitates the rehabilitation of timber forests, which is consistent with the findings of the studies on non-timber community forest management. The dissertation also finds that population pressure leads to deforestation under state management, but encourages forest management under community management.

### **IV. The Decision of the Committee**

Considering the results of careful assessment of the submitted dissertation, which is presented in section III of this report, the oral presentation of the dissertation and subsequent discussions, which was held on April 17, 2014, the Committee members came to a unanimous decision that Narayan Raj Poudel, the author of the submitted dissertation, should be granted a Ph.D.

April 17, 2014

Evaluation Committee

Main Examiner: Nobuhiko Fuwa, Ph.D (University of California, Berkeley)  
Professor, GSAPS, Waseda University

Deputy Examiner: Kejiro Otsuka, Ph.D (University of Chicago)  
Professor, National Graduate Research Institute for Policy Studies

Examiner: Shujiro Urata, Ph.D (Stanford University)  
Professor, GSAPS, Waseda University

Examiner: Shunji Matsuoka, Ph.D (Hiroshima University)

Professor, GSAPS, Waseda University