

## Table of Contents

|   | Page   |
|---|--------|
| Acknowledgements.....                                     | iii    |
| Abstract in English.....                                  | v      |
| Abstract in Thai.....                                     | vii    |
| List of Tables.....                                       | xiii   |
| List of Figures.....                                      | xiv    |
| <br>Chapter I Introduction.....                           | <br>1  |
| 1.1 Problems.....   | 4      |
| 1.1.1 Population and its growth rate.....                 | 4      |
| 1.1.2 Land and natural resource management.....           | 4      |
| 1.2 Rationale.....  | 7      |
| 1.3 Objectives of the study.....                          | 8      |
| 1.4 Usefulness of the study.....                          | 8      |
| 1.5 Scope and limitation of the study.....                | 9      |
| <br>Chapter II Literature Review.....                     | <br>10 |
| 2.1 Definition of non-timber forest products (NTFPs)..... | 10     |
| 2.2 Significant roles of NTFPs.....                       | 10     |
| 2.2.1 NTFPs and food security.....                        | 12     |
| 2.2.2 NTFPs and income generation.....                    | 16     |
| 2.2.3 Seasonal importance of NTFPs.....                   | 17     |
| 2.2.4 Women and NTFPs.....                                | 19     |
| 2.3 Economic valuation and the value of NTFPs.....        | 21     |

|   |    |
|---|----|
| Chapter III Study Methodology.....  | 23 |
| 3.1 Scope of the study.....   | 23 |
| 3.2 Data collection.....  | 23 |
| 3.2.1 Primary data.....   | 23 |
| 3.2.2 Secondary data.....   | 26 |
| 3.2.3 Information collected.....  | 27 |
| 3.3 Data analysis.....  | 28 |
| Chapter IV Natural, Demographic and Socio-economic Conditions of Study Area.... | 30 |
| 4.1 General description of the area.....  | 30 |
| 4.1.1 Physical characteristics.....   | 30 |
| 4.1.2 Social-economic characteristics.....                                      | 34 |
| 4.2 Land use classification and land tenure.....                                | 39 |
| Chapter V Farming Systems of the study Area.....                                | 49 |
| 5.1 Farming system components and their interrelationships.....                 | 49 |
| 5.2 Cropping systems.....   | 54 |
| 5.2.1 Cropping pattern.....   | 54 |
| 5.2.2 Seasonal calendar.....  | 56 |
| 5.2.3 Crops production.....   | 57 |
| 5.3 Livestock management and production.....                                    | 59 |
| 5.4 Home gardening.....   | 62 |
| 5.5 Forest products collection.....   | 63 |
| 5.6 Non-farm activities.....  | 64 |
| 5.6 Household income sources.....   | 64 |
| Chapter VI Utilization of Non-timber Forest Products.....                       | 69 |
| 6.1 Perception of the forests.....  | 70 |

|  |     |
|--|-----|
| 6.2 Non-timber forest products utilization.....  | 71  |
| 6.2.1 Types of NTFPs collected.....  | 71  |
| 6.2.2 Objectives of NTFPs collection.....  | 71  |
| 6.2.3 NTFPs and uses.....  | 73  |
| 6.2.4 NTFPs for sale.....  | 83  |
| 6.3 Forest product locations.....  | 85  |
| 6.4 Seasonality of NTFPs collection.....   | 87  |
| 6.5 Legal status of NTFP collection.....   | 90  |
| Chapter VII The Contribution of Non-timber Forest Products to the Household Economy..... | 91  |
| 7.1 Contribution of NTFPs to the household economy.....                                  | 91  |
| 7.1.1 NTFPs and cash income.....   | 91  |
| 7.1.2 NTFPs and non-cash income.....   | 93  |
| 7.2 Factors affecting the utilization of NTFPs.....                                      | 95  |
| Chapter VIII Conclusions and Recommendations.....  | 102 |
| 8.1 Conclusions.....   | 102 |
| 8.2 Recommendations.....   | 105 |
| References.....  | 107 |
| Appendix.....  | 115 |
| Appendix A Wild vegetables species collected in Tat.....                                 | 115 |

|   |     |
|---|-----|
| Appendix B Wild fruit species collected in Tat.....                         | 116 |
| Appendix C Mushroom species collected in Tat.....                           | 117 |
| Appendix D Bamboo species collected in Tat.....                             | 118 |
| Appendix E Medicinal plant species collected in Tat.....                    | 119 |
| Appendix F List of wild animal species caught in Tat.....                   | 120 |
| Appendix G Price of some forest and agriculture products in Tat hamlet..... | 121 |
| Curriculum vitae.....   | 124 |

## List of Tables

| Table  | Page |
|--|------|
| 1. Demographic condition at study site.....  | 36   |
| 2. Demographic structure and education levels of people in Tat hamlet.....                               | 37   |
| 3. Land use profile in Tan Minh village.....   | 40   |
| 4. Paddy land holding by different household economic groups.....  | 42   |
| 5. Average swidden holding area by different household economic groups .....                             | 43   |
| 6. Seasonal calendar of some swidden crops in the study area.....  | 57   |
| 7. Households raising livestock in the study site.....   | 60   |
| 8. Livestock holding by household groups in the study site.....  | 61   |
| 9. Household income from different sources.....  | 65   |
| 10. Percentage of income from different sources by household economic status.....                        | 67   |
| 11. Benefits of the forest perceived by the villagers.....   | 70   |
| 12. Objectives of households in NTFPs collection .....   | 73   |
| 13. The most common vegetables and fruits collected in the study area.....                               | 76   |
| 14. The most common medicinal plants used by the Tay in the study area.....                              | 78   |
| 15. The most traded NTFPs products at the study site.....  | 84   |
| 16. Cash income from NTFPs in comparison to cash income from other sources....                           | 93   |
| 17. Non-cash income from NTFPs in comparison to non-cash income from<br>other sources.....               | 94   |
| 18. Descriptive statistics for incomes from NTFPs and variables affecting the incomes<br>from NTFPs..... | 100  |

## List of Figures

| Figure   | Page |
|--|------|
| 1. Change in forest cover in Vietnam.....  | 6    |
| 2. Area of agricultural and forest land per capita of some countries<br>in Southeast Asia..... | 7    |
| 3. Data collection method.....   | 27   |
| 4. Location of the study area.....   | 31   |
| 5. Ethnic composition of Da Bac District.....  | 35   |
| 6. Farming systems of the study area.....  | 53   |
| 7. Percentage of land area under different crops in the study area.....                        | 55   |
| 8. Household income from different sources.....  | 66   |
| 9. Percentage of income from different sources by household economic status.....               | 68   |
| 10. Purposes of utilizing fuelwood by household groups.....                                    | 81   |
| 11. Map of NTFP types and collection locations in Tat hamlet.....                              | 86   |
| 12. Seasonal of some main NTFPs in the study area.....   | 89   |
| 13. Cash income from NTFPs in comparison to total cash income from other<br>sources.....       | 92   |
| 14. Non-cash income from NTFPs in comparison to non-cash income from other<br>sources.....     | 94   |
| 15. Relationship between income from NTFPs and paddy size.....                                 | 98   |
| 16. Relationship between income from NTFPs and swidden size.....                               | 99   |