

## TABLE OF CONTENTS

	Page
Acknowledgements	i
Abstract	iii
Thai Abstract	v
Table of Contents	vii
List of Tables	x
List of Figures	xiii
List of Appendix Tables	xiv
Abbreviations and Symbols	xv
<b>CHAPTER I INTRODUCTION</b>	<b>1</b>
1.1 Statement of Problems	1
1.2 Rationale	6
1.3 Objectives of the Study	7
1.4 Literature Review	8
<b>CHAPTER II RESEARCH METHODS</b>	<b>14</b>
2.1 Scope of the Study	14
2.2 Conceptual Framework	15
2.3 Data Collection	17
2.4 Information Collected	18
2.5 Sampling Technique	19
2.6 Analysis of Data	21
2.7 Farmers' Perception about Distribution Program	29
2.8 Assessment of Constraints and Improvements	29

<b>CHAPTER III</b>	<b>STUDY AREAS AND RESOURCE BASE INFORMATION</b>	<b>30</b>
3.1	General Characteristics of the Study Areas	30
3.1.1	Location and Agroclimatic Condition	30
3.1.2	Demographic and Socio-Economic Status	32
3.1.3	Institutional Development	34
3.2	Resource Base Information	36
3.2.1	Land Distribution and Use	37
3.2.2	Animal Raising	39
3.2.3	Tree Species	39
3.2.4	Family Members in Farm and Off-Farm Activities	41
3.3	Highlights	43
<b>CHAPTER IV</b>	<b>FARMING SYSTEM AND SITUATION OF ADOPTERS AND NON ADOPTERS OF THE RESEARCH SITES</b>	<b>44</b>
4.1	Crop Sub-system	45
4.1.1	Land Holdings and Land Use Priority	45
4.1.2	Crop Production	47
4.1.3	Farm Feed Production	49
4.2	Livestock Sub-system	50
4.2.1	Livestock Holding size	51
4.2.2	Herd Composition and Distribution Related to Socio-Economic Characteristics	52
4.2.3	Feed and Prevalent Feeding Pattern to the Livestock	53
4.2.4	Demand and Supply of Fodder for the Ruminants	57
4.2.5	Fodder Trees in the Feed Value	58
4.2.6	Livestock Production	59
4.3	Tree Sub-system	62
4.3.1	Availability of Fodder Tree Species	62
4.3.2	Existing Fodder Tree Species on the Farm Land	64
4.3.3	Purpose of Growing Fodder Trees on the Farm Land	66
4.3.4	Preference of Fodder Tree Species	67
4.4	Household Sub-system	70
4.4.1	Household Categorization by Holding Size	70
4.4.2	Household Income Source	72
4.4.3	Perception of Household about Activities	73
4.4.4	Participation of Household in Livestock Activities	74

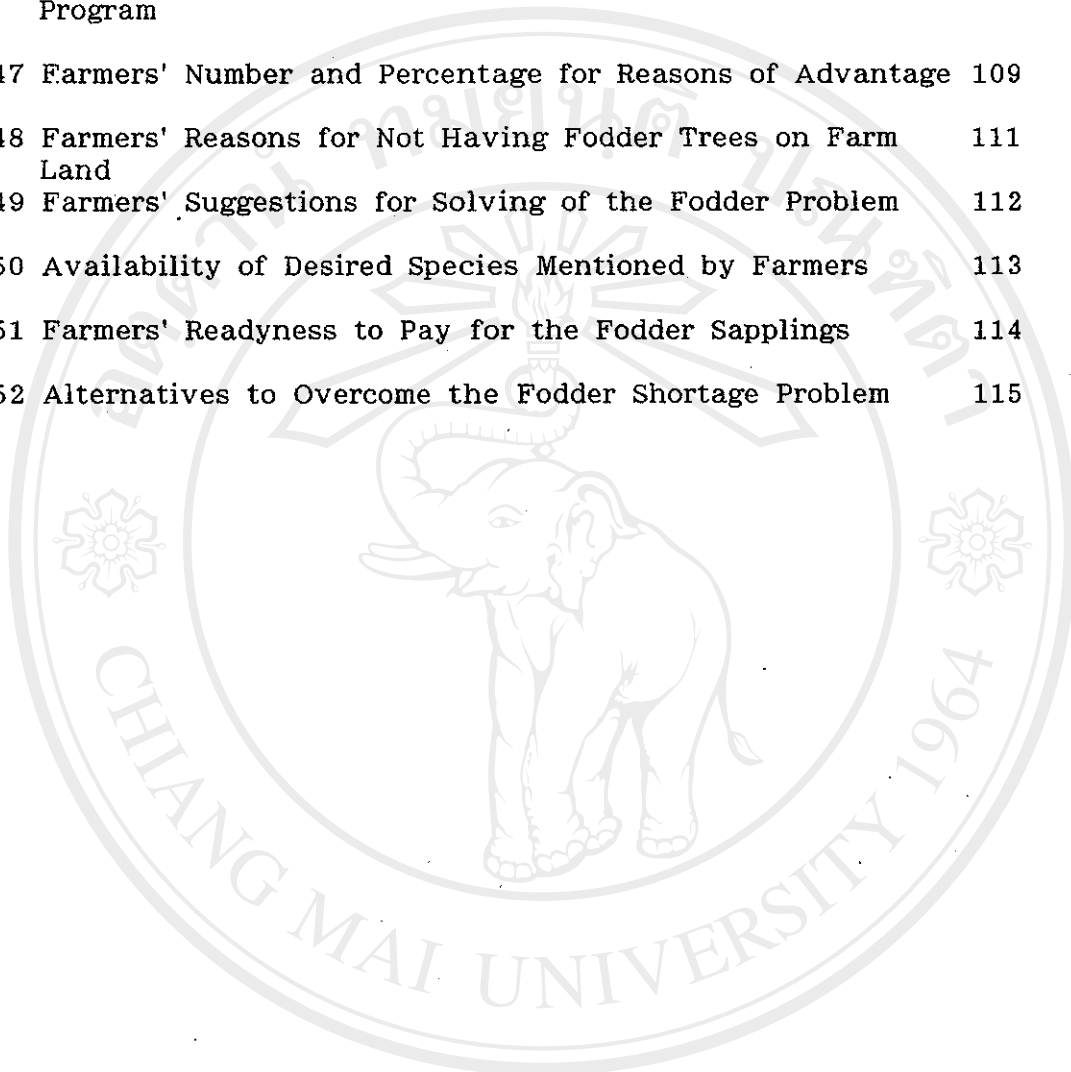
4.4.5	Decision Making in Fodder Tree Management	77
4.5	Integration of System Components on Farm Household	79
4.6	Highlights	83
<b>CHAPTER V</b>	<b>ANALYSIS OF FODDER TREES ADOPTION</b>	<b>85</b>
5.1	Adoption Performance Measurement	85
5.1.1	Extent of Adoption	85
5.1.2	Effect of Adoption	88
5.2	Relationship between Socio-Economic Factors and Adoption	90
5.2.1	Variables and their Measurements	91
5.2.2	Descriptive Statistics Results	91
5.2.3	Logit Analysis Result	94
5.3	Perception About the Sappling Distribution Program	103
5.3.1	Agencies Involved and Preference	103
5.3.2	Usefulness of the Program	105
5.3.3	Source of Inspiration	107
5.3.4	Future Prospective of the Program	108
5.4	Assessment of Constraints and Improvement	109
5.4.1	Constraint in Fodder Tree Adoption and Production	110
5.4.2	Possibility of Improvement of the Program	111
5.5	Highlights	115
<b>CHAPTER VI</b>	<b>SUMMARY, CONCLUSION AND IMPLICATION</b>	<b>117</b>
6.1	Summary	117
6.2	Conclusion	123
6.3	Policy Implication	127
<b>REFERENCES</b>		<b>129</b>
<b>APPENDICES</b>		<b>136</b>
<b>CURICULUM VITAE</b>		<b>153</b>

## LIST OF TABLES

	Page
Table 1 Livestock Population in Nepal	3
Table 2 Demographic Features of the Sampled Households	32
Table 3 Composition of Sampled Household Population by Sex and Age	33
Table 4 Literacy Percentage in the Sampled Household by Gender	33
Table 5 Caste Composition in Village Development Committee	34
Table 6 Distances of the Resources from the Household (in km.)	36
Table 7 Distribution of Land Use of the Study Sites	37
Table 8 Livestock Population in the Study Sites	39
Table 9 Density Cover and Production of Fodder Tree per Household	40
Table 10 Dominant Fodder Tree Species on Farm Land in Terms of Total Number, Production and Households Number	41
Table 11 Farm Family Labor Supply by Gender and Age in the Sites	42
Table 12 Division of Family Labor in Farming System Activities by Gender	42
Table 13 Number and Percentage of Farmers in Occupational Activities	43
Table 14 Number of Farmers in Different Groups of Household Sub-System on the Basis of Fodder Trees	45
Table 15 Total Holdings of Different Types of Land in Hectare	46
Table 16 Private Land Holding and Priority of Land Use	47
Table 17 Crop Production, Consumption and Sales	48
Table 18 Percentage of Farm Feed Production, Purchase and Expense per Annum	50
Table 19 Average Livestock Holding in Livestock Unit (lu)	51
Table 20 Herd Composition Classified by Socio-Economic Characters	53

Table 21	Average Quantity Availability, Production and Requirements of Fodder for Ruminants per Household	57
Table 22	Farmers Opinion about Tree Fodder Value in Livestock Feed	59
Table 23	Livestock Products Production, Percentage Sold and Consumption per lu per Annum	60
Table 24	Percentage of Income from the Livestock	61
Table 25	Purpose of Growing Fodder Trees on Farm the Land	66
Table 26	Farmers' Preference of Fodder Tree Species	68
Table 27	Preference Reasons for the Species	70
Table 28	Household Distribution in Different Resources	71
Table 29	Average Gross Margin and Total Gross Income of Household	72
Table 30	Household Perception About the Activities Performed	74
Table 31	Respondent Participation in Training	76
Table 32	Sampled Household Member in Farmers' Group	76
Table 33	Availability of Fodder Trees per lu of Household	82
Table 34	Measurement of Farm Adoption Index (FAI)	86
Table 35	Measurement of Adoption Activity Index (AAI)	87
Table 36	Impact on Farming System Response by Adopters	88
Table 37	Effect of Adoption Assessed by Adopters Number and Percentage of Changes Assessed in Livestock, Crop and Household Sub-Systems	89
Table 38	Descriptive Statistics of the Variables and their Relationship with Fodder Trees Adoption	92
Table 39	Quantitative Estimation of Coefficients ( $\beta$ ) for the Adoption of Fodder Trees on Farm Land	97
Table 40	Awareness About the Agencies (Gov and Ngos) Involved in Fodder Sappling Distribution Program	104
Table 41	Most Preferred Agencies and Reasons for Preferences	104
Table 42	Farmers' Perception About the Distribution Program	105

Table 43 Reasons for Liking of the Program	106
Table 44 Reasons for not Liking of the Program	107
Table 45 Sources of Inspirations for Adoption of Fodder Trees	107
Table 46 Farmers' Expectation about the Consequence of the Program	109
Table 47 Farmers' Number and Percentage for Reasons of Advantage	109
Table 48 Farmers' Reasons for Not Having Fodder Trees on Farm Land	111
Table 49 Farmers' Suggestions for Solving of the Fodder Problem	112
Table 50 Availability of Desired Species Mentioned by Farmers	113
Table 51 Farmers' Readiness to Pay for the Fodder Sapplings	114
Table 52 Alternatives to Overcome the Fodder Shortage Problem	115



ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่  
 Copyright© by Chiang Mai University  
 All rights reserved

## LIST OF FIGURES

	Page
Figure 1 Conceptual Model of Farming System Components	2
Figure 2 Conceptual Framework of Fodder Tree Adoption	16
Figure 3 Multistage Sampling Technique	20
Figure 4 Monthly Temperature and Rainfall	31
Figure 5 Dominant Cropping Pattern of the Study Sites	38
Figure 6 Quantity of Feed Fed per Livestock Unit per Annum	54
Figure 7 Dominant Feeding Pattern in the Study Sites	56
Figure 8 Lopping Seasons of Fodder Tree Species	6 3
Figure 9 Survival Rate of Fodder Tree Species	64
Figure 10 Reasons of Mortality of Fodder Trees Given by Adopters	65
Figure 11 Percentage of Respondent Received Training and Membership	77
Figure 12 Percentage of Farmers in Decision Making of Fodder Tree Production and Management	78
Figure 13 Integrated Farming System Components of the Study Sites	81
Figure 14 Probability of Adoption of Fodder Trees at Different Levels of Knowledge While Remaining the Others Variables at their mean	101
Figure 15 Probability of Adoption at Different Levels of Knowledge and Nursery Distances in km (Other Variables at their Mean)	102
Figure 16 Probability of Adoption at Different Levels of Knowledge and Fodder Dry Matter Supply (Fdmru) While Other Variable at their Mean	102

## LIST OF APPENDIX TABLES

	Page
Table 1 Scoring of Farmers' Knowledge or Understanding	137
Table 2 Biological Characteristics of Study Sites	138
Table 3 Scientific Name of Fodder Tree Species	139
Table 4 Fodder Tree Species on Farm Land	140
Table 5 Calculation of Fodder	141
Table 6 Mortality Rate of Fodder Tree Speies on Farm Land	142
Table 7 Farmers' Preference of Fodder Tree Species	143
Table 8 Fodder Tree Preference by Matrix Ranking Technique	144
Table 9 Comparision of Feed Supply per Livestock Unit by VDCs and Adopters and Non-adopters in the Research Sites	145
Table 10 Socio-Economic Characteristics of the Household	146
Table 11 Evaluation of Farmers' Knowledge	148
Table 13 Correlation Matrix	149
Table 14 Logit Analysis Using LIMDEP Soft Ware Program	150
Table 15 Simulation Test for Probability of Adoption	151

ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่  
Copyright© by Chiang Mai University  
All rights reserved



## ABBREVIATIONS AND SYMBOLS

AAI	:Activity Adoption Index
Adp	:Adopters
Avg	:Average
CBS	:Central Bureau of Statistics
Cof	:Coefficient
DFAMS	:Department of Food and Agricultural Marketing Services
DLS	:Department of Livestock Services
FAI	:Farm Adoption Index
GOs	:Government Organizations
ha	:hactare
hh	:Household
ICIMOD	:International Center for Integrated Mountain Development
kg	:kilogram
km	:kilometer
lts	:liters
lu	:Livestock Unit
ml	:Man load (20-30 kg) for fodder (dry and green)
msl	:mean sea level
NGOs	:Non-Government Organizations
no.	:Number
Non-adp	:Non-Adopters
NPC	:National Planning Commission
NR	:Not Response
PLBP(GTZ)	:Promotion of Livestock Breeding Project
Res.	:Respondent
Rs.	:Rupees (Nepali Currency)
T	:Total
VDC	:Village Development Committee
VDC M	:Mahadevsthan Village Development Committee
VDC F	:Fulbari Village Development Committee
VDC K	:Khopasi Village Development Committee
VDC R	:Rabi-Opi Village Development Committee
/	:per
<	:Less than
>	:Greater than
%	:Percentage
-	:to