

**Impact of Agroforestry on Rural Development
A Case Study From Dhankuta, Nepal**

By

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RECOMMENDATION LETTER

This thesis entitled “Impact of Agroforestry on Rural Development A case study of Dhankuta,Nepal” is prepared, by Mr. Kiran Ghimire under my supervision in partial fulfillment of the requirements for the Degree of Master of Arts in Rural Development. I recommend the thesis for Committee examination and approval by the examination committee.

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APPROVAL SHEET

This thesis entitled “Impact of Agroforestry on Rural Development A case study of Dhankuta,Nepal” submitted by Mr. Kiran Ghimire to the central department of Rural Development, Faculty of the Humanities and Social Sciences, Tribhuvan University, in the prescribe format has been approved by the evaluation committee.

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Abstract

Agroforestry is a systems where forestry practices are combined with agriculture and related activities. The main objectives of agroforestry system in rural communities are to optimized production and economies return per unit area. Agriculture and forestry are closely related with the livelihood of rural households of Nepal. It has been estimated that for sustaining 1 ha, of agriculture land 2.8 to 18 ha of forested land are required for agriculture and forest resources for their subsistence. More than 76.3 percent of total energy source and 40 percents of fodder needs are met by forest. Unfortunately, the land area occupied by forest is decreasing by leap and bounds. Overall forest cover is reducing at an alarming rate of 1.7 percent each year. The principal problems of Nepalese agriculture are: declining productivity and increasing livestock population. When this situation combines with forest depletion it further ramifies the problems. Therefore, agroforestry is greatly needed because of its potentiality of generating form household income and reducing the pressure on community's forest, thereby assisting rural development in Nepal.

This study mainly focuses on impacts of agroforestry practices on farm household income and community forest management, thereby assisting rural development in Nepal. The objectives of the study are (i) to examine the benefits of the overall agroforestry systems (ii) to assess the impacts of agroforestry on local rural development (iii) to analyze the non timber forest products as of income generating activities (iv) to assess the impacts of revolving fond in community forestry of study area (v) to suggest suitable agroforestry systems that might be useful in study area.

Whatever the definitations agroforestry connotes using trees on farms. It is the ecologically best natural resources management system that sustains productions and benefits all those who use the land by integrating trees on farms and in the agriculture landscape. Rural development is a strategy to improve the economy and social life of specific group of people, the rural poor. The group includes small-scale farmers tenants and the landless. Agroforestry integrates trees with crop/or animals with the main objectives of reducing risk and increasing economy, Social and environmental productivity. Very little research, both at national and international level has been done regarding agroforestry systems and most are side specific. Thus they are less likely to applicable for there area. There are no legal aspects dealt with specifically in the context of agroforestry. Therefore they are often directed from general forestry sectors act and resolution.

The research was conducted in three VDCs (Rajarani, Ghorlikhraka, and Parewading) and one municipality of Dhankuta district, an eastern mid-hill district of Nepal. A total of 62 households from 12 FUGs were surveyed systemically. Household questionnaire survey, key informants, interviews, direct observation and informal interviews were carried out to obtain the data and related information. The secondary data and information were gathered from VDC, LFP, DFO, and other organizations. Descriptive statistical tools like frequencies, percentages and mean were used to present the general findings of the study. Mostly tables but graphical figures too, were used for describing the information.

The average households size was found to be slightly lower compared to the district and national average households sizes. The average percentage of below 15

populations it was slightly lower compared to the district. The average total percent of literacy was slightly higher than national average and lower near about 10-29 percent than district. In the entire Dhankuta district there production of livestock products like milk and meat is huge.

Ownership of land was found to be comparing primarily from the parents. Mast of he households had cultivated cereal crops in Khet land and wheat, maize and green vegetable in Bari land. The highest and the lowest food sufficiency was observed in Ghorlikhraka and Dhankuta municipality, respectively, for 9-12 months.

The major source of income was from agriculture agricultural crops followed by milk, contributed the highest percentage of household income. A substantial household income was generated directly or indirectly for NRM and CFM. A tremendous distance to be covered by the household to reach community forestry seemed to be reduced by the introduction of agroforestry development and community forest management. The majority of household reported that agroforestry controlled soil erosion by 20-30 percent. LFP has launched the IGA program in the study area to uplift the rural poor people through local NGOs, the majority of respondents had benefited from the program.

Table of Contents

Recommendation Letter	
Approval Letter	
Abstract	
Acknowledgements	
Glossary of Terms	
Acronyms and Abbreviations	
List of Tables	
List of Figures	
List of Photographs	

CHAPTER – ONE

INTRODUCTION

1.1	Background	1
	1.1.1 Concept of Agroforestry	1
1.2	Statement of the Problem	4
1.3	Importance of the Study	5
1.4	Objectives of the Study	6
1.5	Limitation of the Study	6

CHAPTER – TWO

LITERATURE REVIEW

2.1	Concept of agroforestry	8
2.2	The Concept of Rural Development	17
2.3	Importance of agroforestry Systems	18
2.4	Earlier Research on Agroforestry	21
	2.4.1 Research in Nepal	
	2.4.2 Research at the International Level.	24
2.5	Legal Aspects of Agroforestry	27
	2.5.1 Master plan for the forestry sector policy, Nepal	27
	2.5.2 Forest Act 1993 and Regulation 1995	28

CHAPTER – THREE

DESCRIPTION OF THE STUDY AREA	29
3.1 Table 1.Physical Setting According to Height	29
3.2 Table 2.Land Use Pattern	29
3.2 Table 3. Land Ownership Pattern	32
3.3 Climate	32
3.4 Rain-fall	32
3.5 The farming system	33
3.5.1 Table 5:Cereal Crops	34
3.5.2 Cash Crops	34
3.5.3 Pulses	34
3.6. Demography	35
3.7. Education	35
3.8 Forest Situation	36
3.8.1 Sub-tropical Forest.	36
3.8.2. Temperate Forest	36
3.8.3. Cool Temperate Forest.	37
3.9 Community Forest in Dhankuta	37
3.10. Development Activities	37

CHAPTER – FOUR

RESEARCH METHODOLOGY

4.1 Unit of the Analysis	38
4.2 Research Design	38
4.3 Research Instruments	39
4.4 Data Collection	39
4.4.1 Primary Data Collection	40
4.4.2 Secondary Data Collection	40
4.5 Data Analysis	41
4.6 Conceptual Framework	41

CHAPTER – FIVE
RESULTS AND DISCUSSION

5.1	General Household Information	42
5.2	Livestock Holding Size	43
5.3	Existing Agricultural System	45
	5.3.1 Distribution of farmland	45
	5.3.2. Association of Tree Species in Farmer’s Land	46
	5.3.3 Association of Food Crops in Farmer’s Land	47
	5.3.4 Sufficiency of Food From the Farmlands	49
5.4	Impacts of Agroforestry on Community Forestry Management.	50
	5.4.1. Allocating of Income for community forests management	
	5.4.2. Drudgery Removal and Utilization of the Spared Time.	51
	5.4.3. Control of Soil Erosion	53
5.5.	Income- generating Activities Program.	54
	5.5.1 Revolving Found Use Pattern in Different IGA.	55
	5.1.2 The Budget Allocation of LFP to Revolving Fund	55
	5.1.3 Opinion of the Respondent towards the Revolving Fund	55

CHAPTER – SIX

COST-BENEFIT ANALYSIS OF AGROFORESTRY SYSTEM IN DHANKUTA

6.1	Background	57
6.2	Identification of Costs and Benefits	57
	6.2.1 Benefits of the Agroforestry Systems	57
	6.2.1.1 Direct Benefits of the Agroforestry System.	57
	6.2.1.2 Secondary benefits of the agroforestry System:	57
	6.2.2 Cost of the Agroforestry Systems	60
	6.2.2.1 Direct Costs	60
	6.2.2.2 Secondary Costs	61
6.3	Valuation of Costs and Benefits in Crop-tree Oriented System	63
	6.3.1 Valuation of Inputs	63
6.4	Valuation of Outputs	

CHAPTER – SEVEN

ECONOMICS OF AGROFORESTRY SYSTEM IN DHANKUTA 68

7.1	Agroforestry Systems and Possibility of Timber Market Diversification	69
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7.2	Agroforestry and Control of Flood and Soil Erosion	71
7.3	Agroforestry Systems and Employment Potential in Dhankuta.	71
7.4	Agroforestry Systems and Problems of Ecology and Pollution Control	72
7.5	Fuelwood, Fodder and Timber Supply and Agroforestry	72
7.6	Agroforestry Systems and Improvement of Soil	73
7.7	Agroforestry and Wildlife Conservation	74

CHAPTER – EIGHT

SUMMARY, CONCLUSION AND RECOMMENDATIONS

8.1	Conclusion	75
8.2	Recommendations	77
	8.2.1 Recommendations for GOs	77
	8.2.2 Recommendations for NGOs	80
	8.2.3 Recommendations for Further Researchers	80

REFERENCES

APPENDIX

PHOTO FEATURE

LIST OF TABLES

Table 1.Physical Setting According to Height	29
Table 2.Land Use Pattern	29
Table 3. Land Ownership Pattern	32
Table 4: Data of temperature and Rain Fall in Dhankuta	33
Table 5: Cereal Crops	34
Table 6: Cash Crops	34
Table 7: Pulses	34
Table 8: Demography Characteristics of Dhankuta	35
Table 9: Number of School, Student & Teacher	36
Table 10: Number of Sampled by area, FUG and HH	39
Table 11: General Household Information	42
Table 12: Distribution of Household Population by Sex and Literacy level	43
Table 13: Average Livestock Size per Household and the Purpose of Rearing	44
Table 14: Livestock Base Production Export of Dhankuta District	45
Table 15: Land Distribution Patron	46
Table 16: Allocation of Land by Household for Forests, Fruit Trees and Vegetables	47
Table17: Modes of Cultivation of Various Crops and Trees in Bari Land	48
Table18: Modes of Cultivation of Various Crops & Vegetables According To Quantity in Bari Land	48
Table 19: Food Sufficiency of the Households From The Farmland	49
Table 20: Distances Between The Household And The Community Forests	51
Table21: Control of Soil Erosion	53
Table 22: Revolving Found Use Pattern	55

List of Figure

Figure 1	Intensive Homegarden Cultivation in Dhankuta.		
11			
Figure 2	Major Approaches to Classification of Agro-Forestry Systems and Practices	16	
Figure 3	Conceptual Framework of the Study	41	
Figure 4	Allocating Of Income of HH.		50
Figure5	Distance to Be Covered By the Households to Reach the Community Forests.		52
Figure 6	View Toward The Revolving Fund		56
Figure 7	Categorization of Possible Benefits of Agroforestry System.		59
Figure 8	Categorization of Possible Costs of Agroforestry System.		62

Glossary of Terms

Agrisilviculture:	A form of agroforestry consisting of tree (woody perennial) and crop components.
Agrosilvopasture:	A form of agroforestry consisting of tree (woody perennial) crop and pasture/ animal components.
Allelopathic effects:	Endogenous substances (kaolines) showing inhibitory effects on germination and growth of neighboring plants.
Alley cropping:	Synonymously used for hedgerow intercropping.
Bari:	Upper slope, out slopping and rainfed terrace land.
Biomass:	The weight of material produced by a living organism or collection of organisms. The term is usually applied to plants to include the entire plants, or it may be qualified to include only certain parts of the plant above ground or leafy biomass. Biomass is expressed as fresh weight or dry weight.
Bole:	The tree part, which is devoid of branches.
Boundary planting:	Conventional agroforestry practices, where trees are planted on farm boundaries to demarcate the boundary.
Cereal:	A grass that is grown primarily for its seeds which is used for feeder food.
Crown:	The upper branchy part of the tree.
Deforestation:	Disturbance, conversion, or wasteful destruction of forest lands.
Denitrification:	The biochemical reeducation of nitrate or nitrite to gaseous nitrogen, either as molecular nitrogen or as an oxide of nitrogen.
Discounting:	The process of determining the present worth of a future quantity of money.
Erosion :	(1) The wearing away of the land surface by running water, winds, ice, or other geological agents, including such processes as gravititational creep. (2) Detachment and movement of soil or rock by water, wind, ice, or gravity.
Extensive:	Lands use or management spread over a large area where land is plentiful (at leaser for those who control if). Opposite of intensive.

Farm forestry:	Tree planting on farms.
Gully erosion: channels.	The removal of soil by water concentrated in deep, narrow channels.
Gully:	A deep, narrow channel cut into the soil by erosion.
Herbaceous:	A plant that is not woody and does not persist above ground beyond one season.
Home garden:	Traditional cropping practice around the house; usually includes fruits and fuelwood trees, vegetables, roots crops, poultry and smaller livestock and sometimes a fish pond.
Humid:	A climate in which rain fall exceeds potential evaporation during at least nine months a year and usually more than 1500 mm annual rain fall.
Intensive:	Land use or management concentrated in a small area of land opposite of extensive.
Intercropping:	Agroforestry practices where arable crops are grown in the alleys between the rows of woody perennials.
Intercropping:	Growing two or more crops in the same field at the same time in a mixture.
Khet:	Lower slope, leveled and irrigated, terrace land.
Lalpurza:	Official document (certificate) of land ownership.
Land-use system:	The way in which land is used by a particular group of people with a specified area.
Mixed farming: trees.	Cropping system which involves the raising of crops animals or trees.
Monoculture: land.	The repetitive growing of the same single crops of the same land.
Multiple cropping:	Growing two or more crops in the same field in one year at the same time or one after another.
Net present value (NPV):	An indicator of project's long-term value as estimated at the time of implementation, it is calculated by summing all the annual net cost or benefits over the prescribed life span of project, discounted at a reselected rate.
Non-farm income:	Income from sources other than the agricultural activities.

Opportunity cost:	The economy value of a true sacrifice incurred by the choice of a given action.
Pakhobari:	Synonymously used for bari.
Perennial plant :	A plant that grows for more than one year in contrast to an annual, which grows for only one year (or seasons) before dying.
Reforestation:	Replanting of a forest which has been chopped down or destroyed by fire.
Rill erosion:	Erosion processing which numerous small channels of only several centimeters in depth is formed; occurs mainly on recently cultivated soils.
Seeding:	A young stage of a plant grow from a seed.
Semiarid:	Term applied to regions or climates where moisture is more plentiful than arid regions but still definitely limits the growth of most crop plants. Natural vegetation in uncultivated areas is short grasses shrubs and small trees.
Shelter belt:	Several rows of trees for protecting soil.
Shifting cultivation:	A form of agriculture in which soil fertility is maintained by rotating fields rather than crops. New plots are usually cleared by “slash and burn” and cropped until soil exhaustion. The is than left to regenerate naturally while cultivation is done elsewhere.
Silvopastoral system:	Form of agroforestry system consisting of trees (woody perennials) and pasture/ animal components.
Slash –and burn:	Cutting and burning of forest to clear the land and to provide ash ‘fertilizer’ or ‘lime’ for soil.
Small farm:	(Small hosing, farm household, small farmer) a farm that is at the same time a home and business enterprise so that farm-0 management decisions are made, based on household needs as well business interests.
Social forestry:	The practice of using trees and / or tree planting specifically to peruse social objectives, usually betterment of the poor, through delivery of the benefits to the local people.
Soil conservation:	A combination of all management and land use methods that safeguard the soil against depletion or deterioration caused by nature and/ or human.

Soil organic matter:	The organic fraction of the soil that includes plant and animal residues at various stages of decomposition, cells and tissues of soil organism and substances synthesized by soil organisms.
Strip hedgerow:	Agroforestry practice, where tree rows are alternated with agro crops.
Sub humid: Taungya:	In the tropics, a climate with annual rainfall of 900-1500 mm. Intercropping of agricultural crops during the first years of forest plantation establishment.
Tenure:	The right to property, granted by custom or law, which may includes land, trees, and other plants, animals and water.
Thinning:	An intermediate cutting aimed primarily at controlling the growth.
Topography:	The physical description of land changes in elevation due to hills, valleys, and other features.
Tree species:	Woody perennials which are grown to provide more than one product or service.
Wind break:	Single or double rows of trees maintained for protecting soil, plants and livestock.
Woodlots:	Strands of trees planted on farms, community lands or degraded land to provide wood for fuel, construction or pulp.
Woody:	Plants which consist in part of wood; not herbaceous.
Zero- grazing:	Livestock production systems in which the animals are fed in pens or other confined areas and are not permitted to graze.

Acronyms and Abbreviations

CEAPRED	Center for Environment and Agriculture Policy, Research, Extension and Development.
CFM	Community Forestry Management
DAB	District Agriculture Bank
DADO	District Agriculture Development Office
DDC	District Development Committee
DFO	District Forest Office
DLO	District Livestock Office
DOF	Department Of Forest
ECDO	Election Commission District Office
GDP	Gross Domestic Product
GOS	Government Organization
HA	Hectare
ICIMOD	International Center for Integrated Maintain Development
ICRAF	International Council for Research in Agroforestry
ICS	Improved Cooking Stoves
INGO _s	International Non Governmental Organizations
IOF	Institute of Forestry
IPM	Integrated Post Management
IRR	Internal Rate or Return
ISRSC	Informal Sector Research and Study Center
LFP	Livelihood forest program
MASL	Meters above Sea Level
MOFSC	Ministry Of Forest and Soil Conservation
MOPE	Ministry Of Population and Environment
MPFS	Master Plan for the Forestry Sector
NACRMP	Nepal – Australia Community Resources Management And Livelihood Project
NAF	Nepal Agroforestry Foundation

NARC	Nepal Agriculture Research Council
NGOs	Non governmental Organization
NRM	Natural Resource Management
NRs	Nepali Rupees
NTFP	Nontimber Forest Product
SLC	School Living Certificate
SN	Serial Number
TU	Tribhuvan University
VDCs	Village Development Committees
WB	World Bank