

BUSITEMA UNIVERSITY

**Faculty of Natural Resources and Environmental Sciences
Department of Natural Resource Economics**

**Perception of the economic value and contribution of forest goods and ecosystem services to
the livelihood improvement of communities living nearby Kangombe forest reserve in
Kibaale District, Western region of Uganda**

BY

KUSHIMWA AGNES

(BU/UG/2012/2027)

Supervisor:

Théodore MUNYULI

**(B.Sc.-Eng., M.Sc.-Envir. & Nat. Resource, Ph.D.-Envir. Economics)
(Senior Lecturer and Research Scientist),**

**A RESEARCH DISSERTATION REPORT SUBMITTED TO THE FACULTY OF NATURAL
RESOURCES AND ENVIRONMENTAL SCIENCES IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR THE AWARD OF A DEGREE OF BACHELOR OF SCIENCE IN
NATURAL RESOURCE ECONOMICS OF BUSITEMA UNIVERSITY**

JUNE2015

DECLARATION

I **KUSIIMWA AGNES** declare that the interesting work in this research has been neither manipulated nor reproduced anywhere but attributed to the best of my knowledge, ability, research and academic experience.

Signed Kusiimwa Agnes.....

Date 26/06/2015.....

KUSIIMWA AGNES

BU/UG/2012/2027

APPROVAL

This serves to certify that-----KUSIMWA AGNES-----
did research that I had the pleasure to supervise. I confirm that this report is a true
representation of the findings in it.

I am therefore recommending that the report be submitted to the Faculty of Natural
Resources and Environmental Sciences of Busitema University.

.....

Date 26/06/2015.....

Théodore MUNYULI (B.Sc.-Eng., M.Sc., Ph.D.)

Senior Lecturer and Researcher

DEDICATION

I dedicate this work to my family for the sacrifice they made for me to complete this course. I would like in particular to mention my mother Nakibuuka Margret and my beautiful sister Bridget and handsome brother Brian. Their love, care, concern, support, encouragement and enthusiasm inspired me to complete this study.

ACKNOWLEDGEMENT

I take this opportunity to thank God for good health and for bringing me this far. I also want to extend special gratitude to my supervisor Dr.Theodore Muhyuli for his guidance, encouragement and patience in reading, correcting, re-reading and refining this work is commendable.

I wish to thank my family for all their support and patience during this course. To my fellow classmates; thanks for your encouragement.

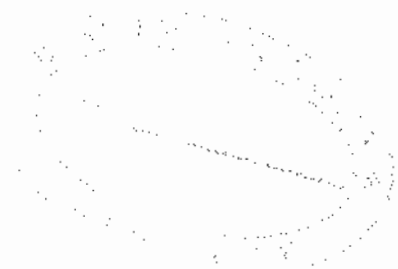
I would also like to extend my sincere gratitude to Wamala Bazirio and Atugumya Armstrong for the assistance, love and company given to me to complete this work.

To my fellow research students; Abias, Isma, Dan, Annah, Sulaj and Innocent, thank you for all the assistance and encouragement accorded to me may the good Lord reward you abundantly.

Finally to my fellow course mates and friends; Slovia, Aramanzan, Victoria, Collins, Josephine, Watela, Winnie, Hellen, Wyciff, Dorcus, Simon may the Lord bless you.

TABLE OF CONTENT

DECLARATION.....	i
APPROVAL.....	ii
DEDICATION.....	iii
ACKNOWLEDGEMENT.....	iv
TABLE OF CONTENT.....	v
ACRONYMS & ABBREVIATION.....	xi
LIST OF FIGURES.....	xii
LIST OF TABLES.....	xiii
ABSTRACT.....	xvii
CHAPTER ONE: GENERAL INTRODUCTION.....	1
1.1. Introduction.....	1
1.2. Background.....	2
1.3. Problem statement.....	3
1.4. Objectives of study.....	4
1.4.1. Main objective.....	4
1.4.2. Specific objectives.....	4
1.5. Hypotheses.....	5
1.6. Research questions.....	5
1.7. Scope of the study.....	5
1.8. Justification.....	5
1.9. Significance.....	6
1.10. Conceptual framework.....	7
CHAPTER TWO: LITERATURE REVIEW.....	8



2.1. Introduction	8
2.2. Definition of concepts.....	8
2.2.1. Forests	8
2.2.1.1 Benefits of forests.....	8
2.2.1.2. The extent and ownership of forests in Uganda	10
2.2.2. Livelihoods.....	11
2.2.2.1. Livelihood strategies.....	11
2.2.2.2. Sustainable livelihoods	12
2.2.3. Poverty	12
2.2.4. Non-timber forest products.....	13
2.2.5. Valuation of forests	15
2.2.6. Legal framework for forests.....	15
2.2.6.1. The Uganda Forestry Policy	15
2.2.6.2. The National Forestry policy of Uganda (2001) and the National forestry and Tree planting Act (2003).....	16
2.2.7. Forest conservation	17
2.2.8. Conflicts between local people and the protected areas.....	18
CHAPTER-III: MATERIALS and METHODS.....	20
3.1. Overview.....	20
3.2. Study area.....	20
3.3. Sample size	21
3.4. Data collection.....	21

3.5. Research design	21
3.6. Research instruments.....	22
3.7. Data collection methods.....	22
3.8. Data analysis and presentation.....	22
3.9. Ethical considerations.....	22
3.10. Research Limitations	23
CHAPTER-IV: RESULTS.....	24
4.1. Introduction.....	24
4.1.1. The socio-economic characteristics of respondents.....	25
4.1.1.1. The gender of respondents.....	26
4.1.1.2. Educational level of respondents.....	26
4.1.1.3. Marital status of respondents	26
4.1.1.4. Nature of employment of respondents.....	27
4.1.2. Socio-economic characteristics of respondents harvesting NTFPs from the forest reserve.....	27
4.1.2.1. Income sources of respondents	29
4.1.2.1.1. Primary income sources.....	29
4.1.2.1.2. Secondary income sources	30
4.1.2.1.3. Tertiary income sources	31
4.2. Contribution of the forest reserve to the communities living nearby.....	31
4.2.1. Activities done in the forest reserve	31
4.2.2. Economic value of crop productivity	32

4.2.2.1. Crops grown on land by respondents.....	32
4.2.2.2. Economic value of beans	34
4.2.2.3. Economic value of cassava	35
4.2.2.4. Economic value of maize	35
4.2.2.5. Economic value of matooke	36
4.2.2.6. Economic value of sweet potatoes.....	37
4.2.2.7. Economic value of coffee.....	38
4.2.2.8. The overall TEV of crops grown in and around Kangombe forest reserve by respondents from Kagadi, Muhoro and Nyamarunda sub counties	38
4.2.3. Economic value of livestock productivity	39
4.2.3.1. Animals reared by respondents.....	39
4.2.3.3. Economic value of goats.....	42
4.2.3.4. Economic value of pigs.....	42
4.2.3.5. Economic value of poultry.....	43
4.2.3.6. Economic value of sheep	43
4.2.3.7. The overall economic value of livestock productivity in Kagadi, Muhoro and Nyamarunda sub counties around Kangombe forest reserve	44
4.2.4. Economic value of NTFPs	44
4.2.4.1. Relative contribution of NTFPs to Annual household income.....	44
4.2.4.1. Types of NTFPs harvested by communities around the forest.....	46
4.2.4.3. Economic value of poles	48
4.2.4.4. Economic value of mushrooms	49

4.2.4.5. Economic value of medicinal plants.....	50
4.2.4.6. Economic value of grass for thatching.....	51
4.2.4.7. Economic value of indigenous fruits.....	52
4.2.4.9. Economic value of bush meat.....	54
4.2.4.10. The overall economic value of NTFPs in the three sub counties	55
4.2.5. Economic value of ecosystem services.....	55
4.2.5.1. Indirect Ecosystem services from the forest.....	57
4.2.5.2. Economic value of carbon sequestration.....	57
4.2.5.3. Economic value of soil fertility.....	58
4.2.5.4. Economic value of recreation.....	58
4.2.5.5. Economic value of shade.....	58
4.2.5.7. Economic value of cultural practices.....	59
4.2.5.8. The overall economic value of ecosystem services.....	59
4.3. Extent of access to the forest resources by the local community.....	61
4.3.1. Frequency of accessing the forest reserve by community.....	61
4.4. Alternative livelihood strategies.....	62
4.4.1. Other livelihood activities done by respondents.....	63
4.5. People's perception of the impact of NTFPs collection on forest conservation.....	65
4.5.1. Dependency of households on the forest.....	66
4.6.1. Threats to ecosystem services.....	66
4.6.2. Minimization of the threats by respondents.....	67
4.6.3. Challenges to peoples livelihood.....	68

4.6.4. Measures to overcome livelihood challenges in the three Sub counties	69
4.6. Econometric models identifying determinants of the contribution of forest harvest of NTFPs and degree of dependency of community to forest resources and ecosystem services	70
CHAPTER-V: DISCUSSION.....	79
5.0. Introduction	79
5.1. General Discussions	79
5.1.1. Socio-economic and demographic characteristics of the respondents.....	79
5.1.2 Food production in the study area	82
5.1.3. Animal productivity in the study area.....	83
5.1.4. NTFPs and forest conservation.....	83
5.1.5. Forest products and livelihoods.....	84
5.1.6. Valuation methods	87
5.1.6.2. Market price method.....	88
5.3. NTFP diversity and Household Dependency on NTFP collection	88
5.4. Conclusion.....	90
5.5. Recommendations.....	91
5.6. Areas of further study	92
REFERENCES.....	94
Appendix 1: Cross correlation matrices.	97
Appendix 2: Research Questionnaire.....	103
Appendix 3: Map of the study area	108
Appendix 4. Some plates about the forest reserves resources	109

ACRONYMS & ABBREVIATION

KFR :	Kangombe Forest Reserve
NTFPs :	Non-Timber Forest Products
NWFPS	Non-wood Forest Products
NFA	National Forestry Authority
GoU	Government of Uganda
SL	Sustainable livelihood
TEV	Total Economic Value
GDP	Gross Domestic Product
UWA	Uganda Wildlife Authority
CFRs	Central Forest Reserves
PFE	Permanent Forest Estate
FAO	Food and Agricultural Organization
NGOs	Non-Governmental Organizations
CBNRM	Community Based Natural Resources Management

LIST OF FIGURES

Figure 1: Conceptual framework	7
Figure 2: Map of Uganda showing Kibaale district.....	108

LIST OF TABLES

Table 1: The socio-economic characteristics of respondents	25
Table-2: Primary income sources by respondents	29
Table-3: Secondary income sources by respondents	30
Table-4: Tertiary income sources of respondents	31
Table 5: Activities done on land by respondents	32
Table-6: Major crops grown on land by respondents	33
Table 7: Monetary value of beans in Kagadi, Muhoro, Nyamarunda sub counties.....	34
Table 8: Monetary value of cassava in the three sub counties.....	35
Table 9: Monetary value of maize in the three sub counties	36
Table 10: Monetary value of matooke in the three sub counties.....	36
Table 11: Monetary value of sweet potatoes in the three sub counties.....	37
Table 12: Monetary value of coffee in the three sub counties	38
Table 13: The total economic value of food crops grown on the land of respondents	38
Table-14: Animals reared by household/respondents	39
Table 15: Animals reared by respondents in the three sub counties	40
Table 16: Monetary valuation of cattle productivity in the three sub counties	41
Table 17: Monetary value of goat productivity in the three sub counties	42
Table 18: Monetary value of pig productivity in the three sub counties.....	42
Table 19: Monetary value of poultry in the three sub counties	43
Table 20: Monetary value of sheep productivity in the three sub counties	43
Table-21: Total economic value of livestock productivity around Kangombe Forest reserve.....	44
Table-22: Distribution of income from sales of NTFPs in the three sub counties around Kangombe Forest reserve	45

Table-23: Relative contribution of NTFPs to Annual income of the sampled households of Kangombe Forest reserve.....	45
Table 24: Frequency of Forest products accessed from Kangombe Forest Reserve by households.....	46
Table 25: Respondents who collect firewood by gender.....	47
Table-26: Monetary value of firewood harvested by households around Kangombe forest reserve.....	48
Table-27: Monetary value for poles harvested by households.....	49
Table 28: Monetary value of mushrooms in the three sub counties.....	49
Table 29: Local herbs extracted from the forest by households.....	50
Table 30: Frequency of harvest of the various medicinal plants by households.....	51
Table 31: Monetary value of medicinal plants in the three sub counties.....	51
Table 32: Monetary value of grass for thatching in the three sub counties.....	52
Table-33: Indigenous fruit tree species.....	53
Table-34: Frequency of households that harvest different indigenous fruit types in the three sub counties.....	53
Table-35: Monetary value of indigenous fruits in the three sub counties.....	54
Table 36: Monetary value of honey harvested in the three sub counties.....	54
Table 37: Monetary value of bush meat in the three sub counties.....	55
Table 38: Total Economic Value of NTFPs.....	55
Table 39: Direct ecosystem services derived by households from the forest.....	56
Table 40: Indirect values of the forest.....	57
Table 41: Monetary value of carbon sequestration in the three sub counties.....	57
Table 42: Monetary value of soil fertility in the three sub counties.....	58
Table 43: Monetary value of recreation in the three sub counties.....	58
Table 44: Monetary value of shade in the three sub counties.....	58

Table 45: Monetary value of cool air in the three sub counties.....	59
Table 46: Monetary value of cultural practices	59
Table-47: Total Economic Value of Ecosystem services	60
Table 48: Total economic contribution of the forest reserve to the communities living nearby kangombe forest reserve	60
Table- 49: Frequency of visits to the forest by respondents.....	62
Table-50: Other activities that earn households a living in the three Sub counties.....	64
Table-51: Activities carried out in the forest reserve by households	64
Table- 52: Perception of amounts, impacts and risks of collection of various NTFPs.....	66
Table- 53: Degree of dependency on Kangombe forest reserve in various sub counties	66
Table 54: Threats of ecosystem services conservation in the three sub counties	67
Table 55: Recommendations by communities on how to protect ecosystem services and climate change effects.....	68
Table 56: Livelihood challenges as perceived by communities in the three Sub counties	69
Table 57: How to overcome livelihood challenges.....	70
Table-58: GLM (Generalized Linear Model) to test for the effect of independent factors on the perception of access (dependent factor) to Kangombe Forest.....	73
Table 59: GLM (Generalized Linear Model) to test for the effect of independent factors on the coping mechanisms in absence of forest products (dependent factor) to Kangombe Forest.....	74
Table 60: GLM (Generalized Linear Model) to test for the effect of independent factors on the coping mechanisms in absence of forest products (dependent factor) to Kangombe Forest.....	75

Table 61: GLM (Generalized Linear Model) to test for the effect of independent factors on the encroachment to the forest/dependency (dependent factor) to Kangombe Forest	76
Table 62: GLM (Generalized Linear Model) to test for the effect of independent factors on the importance of forest products (dependent factor) to Kangombe Forest	77
Table 63: GLM (Generalized Linear Model) to test for the effect of independent factors on the importance of forest products (dependent factor) to Kangombe Forest	78

ABSTRACT

In Sub-Saharan Africa, forest goods and services are extremely important for rural livelihoods, providing food, medicine, shelter, fuel and cash income. Properly managed forests can provide numerous renewable raw materials for development as well as ecosystem services, including clean water, soil conservation, and biodiversity. This study therefore aimed at capturing the perception of the economic value and contribution of forest ecosystem services and goods to the livelihood improvement of communities living nearby forest reserves. Using a semi-structured questionnaire (combine to various environmental economic valuation methods and techniques; market and non-market valuation methods such as contingent valuation methods with WTP), interview were conducted with the aim of collecting information from households in Kagadi, Muhoro and Nyamarunda sub counties nearby Kangombe reserve in Kibaale district, western Uganda. The findings of the study indicated that 94% of the respondents perceived that they had access rights to forest resources although 85% reported that they didn't use the rights legally. The reserve served as a source of livelihood for 95% of the respondents through a collection of a variety of NTFPs, growing crops nearby and rearing animals nearby the reserve. Respondents acknowledged receiving benefits from various ecosystem services delivered in and from the forest reserved. These included cultural values, recreation, and contribution to soil fertility and watershed services. The economic value direct and indirect benefits received from various ecosystem services by communities were estimated to be worth of US\$305612.65 in Kagadi, US\$ 270235.83 in Muhoro and US\$ 327270.57 in Nyamarunda. This research takes its place in this conversation about conserving natural resources and improving local people's livelihoods. It is therefore possible for policy makers to get a tradeoff or reconciling community livelihood with conservation aims in western region since it is well known how important are forest ecosystem services and goods for community in that region.

Keywords : Community perception, Economic value of ecosystem services, Forest Contribution, Livelihoods, Western region of Uganda

CHAPTER ONE: GENERAL INTRODUCTION

1.1. Introduction

A forest reserve is an area of land that is reserved by law for forestry purposes, including protection of ecologically important areas and production of forest goods and services. Forest reserves also include bush lands and grasslands within the reserved land. Forests cover almost 25% of the world's land and are critical in meeting human needs for water, food, shelter, medicine, fuel wood, fodder and timber. They also provide a wide range of environmental services which mainly include among others biodiversity conservation, watershed protection, and protection of soil and mitigation of global climate change (Hirakuri 2003, Landell-Mills & Porras 2002).

The biggest numbers of people are unaware of the ecosystem services that forests provide especially to enhance improvement of people's livelihood. The depletion of the forest resources has important implications for the livelihoods of a sizeable majority of the population, undermining the sustainability of the region's economy and posing a real threat to poverty reduction.

Forests are essential to the daily lives of everyone. The forest sector has continued to play a big role in provision of goods and services to the people. The forests provide over 98% of the total energy consumed in the district. Poverty reports tend to underestimate the contribution of forests and off-farm natural resources in general to livelihoods, while forestry reporting is typically in terms of the physical resource and its status and extent. Such reporting sheds no light on the contributions made by forests to the lives of the poor. Many forest products are important to the livelihoods of the rural poor, but are not well recognized in commodity markets.

REFERENCES

- Adnan S. (2004)** Migration, land alienation and ethnic conflict: Causes of poverty in the Chittagong Hill Tracts of Bangladesh. Research and Advisory Services, Dhaka.
- Akhter S, Faisal AM, Nath TK, Jashimuddin M (1997)**. Impact of forest based cottage industry on rural development of Bangladesh: The case of Fatickchhaari Thana under Chittagong District. Chittagong University Studies, Part II: *Science* **21**(1): 81-86.
- Alam MK (1990)**. Rattans of Bangladesh. Bulletin 7, Plant Taxonomy Series, Bangladesh forest Research Institute, Chittagong
- Alamgir M, Jashimuddin M, Bhuiyan MAR (2005)**. Employment generation and economics of cane based furniture enterprises of Chittagong, Bangladesh, *Journal of Bamboo and Rattan* **4**(3): 279-291.
- Alamgir M, Misbahuzzaman K, Hoque ATMR, Masum KM (2006)** Role of non wood forest products based cottage industry in the livelihood development of forest encroachers in Bangladesh. *International Journal of Forest Usufructs Management*, **7** (1):59- 66.
- Angelsen, A. & Wunder, S. (2003)**. Exploring the forest poverty link: Key concepts, issues and research implications. CIFOR Occasional Paper No. 40. CIFOR. Bogor, Indonesia
- Angelsen, A. (2007)**. Forest cover change in space and time: Combining the von Thune and Forest Transition Theories. Washington, D.C., World Bank.
- Arinaitwe, H. (2011, September 1)**. Interview with Kibaale NAADS coordinator. Kibaale Town, Conducted by Jakob Christensen and Stefan Steen Jensen.
- Anderson, K. and C. Gibson. (2006)**. Decentralized Governance and Environmental Change: Local Institutional Moderation of Deforestation in Bolivia. *Journal of Policy Analysis and Management* **26** (1):99–123.
- Angelsen, A. and S. Wunder. 2003**. Exploring the Forest—Poverty Link: Key Concepts, Issues and Research Implications. CIFOR Occasion Paper No. 40. Bogor, Indonesia: Center for International Forestry Research,
- Bardhan, P. 2002**. Decentralization of Governance and Development. *Journal of Economic Perspectives* **16** (4):185–205.

- Bush, G., S. Nampindo, C. Aguti, and A. Plumptre. 2004.** The Value of Uganda's Forests: A Livelihoods and Ecosystems Approach. Kampala, Uganda: Wildlife Conservation Society.
- Cavendish, W. 2002.** Quantitative Methods for Estimating the Economic Value of Resource Use to Rural Households In Uncovering the Hidden Harvest: Valuation Methods for Woodland and Forest Resources, Campbell, B. and M. Luckert, eds. London, UK: Earth scan Publications Ltd.
- Chileshe R. A. (2005)** Land tenure and rural livelihoods in Zambia: case studies of Kamena and St. Joseph. PhD thesis. Faculty of arts, University of Western Cape. South Africa.
- Clarke, J. W. Cavendish, and C. Coote (1996)** :Rural Household Management and Miombo Woodlands: Use, Value, and Management, pp. 101-36 in B. Campbell (ed.) The Miombo in Transition: Woodlands and Welfare in Africa, Bogor, CIFOR.
- Clauss B. (1992).** Bees and bee keeping in the North Western Province of Zambia. Report on beekeeping survey. German Volunteer Service IRDP Forestry Department. Kabompo.
- Emerton, L. (2005).** Making the economic links between biodiversity and poverty reduction: The case of Lao PDR. The World Conservation Union, Ecosystem and Livelihood Group Asia, Colombo.
- Foppes, J. & Ketphanh, S. (2004).** Non-timber forest products for poverty reduction and shifting stabilization in the uplands Lao PDR. FRC. (2008). Forest products market and trade in the Lao P.D.R.: A case study from Vientiane and Savannakhet provinces. Lao PDR: Forestry Research Center.
- Manivong, K. (2008).** Lao PDR's response to climate change and the role of forestry sector Paper presented at the conference Managing Forests in Mekong Countries for Carbon Sequestration and REDDS, Hanoi, Viet Nam.
- Manivong, V. & Cramb, R. A. (2007).** Economics of smallholder rubber production in northern Laos. Contributed Paper 51st Annual Conference, Australian Agricultural and Resource Economics Society, Queenstown, New Zealand.
- Chidumayo EN (2001)** CHAPOSA Charcoal Potential in Southern Africa. Final report for Zambia. International Cooperation with Developing Countries (INCO-DC).

Byron N and Anolds M (1999). What futures for the people of tropical forests. Working Paper 19. Bogor, Indonesia

Angelsen, A., and Wunder, S. 2003. Exploring the Forest-Poverty link: Key concepts, issues, and research implications. Occasional Paper No. 40. CIFOR, Bogor, Indonesia.58p.

Arnold, J.E.M. and Townson, I. 1998. Assessing the Potential of Forest Product Activities to Contribute to Rural Incomes in Africa. ODI Natural Resource Perspectives, No. 37, November.