Octa Journal of Environmental Research
International Peer-Reviewed Journal
Oct. Jour. Env. Res. Vol. 3(2): 153-162
Available online http://www.sciencebeingjournal.com

Apr. – Jun., 2015
ISSN 2321 3655

Research Article



Octa Journal of Environmental Research
(Oct. Jour. Env. Res.) ISSN: 2321-3655
Journal Homepage: http://www.sciencebeingjournal.com

UNDERSTANDING WOMEN'S PERCEPTIONS ON AGROFORESTRY PRACTICES FOR ENVIRONMENTAL CONSERVATION: THE CASE OF COMMUNITIES ADJACENT TO KITULANG'HALO FOREST RESERVE IN MOROGORO RURAL DISTRICT, TANZANIA

A. J. Uisso[a], C. A. Masao[b] and A. S. Kauzeni[b]
a. Tanzania Forestry Research Institute (TAFORI), P.O. Box 1854, Morogoro, Tanzania
b. Institute of Resource Assessment (IRA), University of Dar es Salaam, P.O. Box 35079, Dar es salaam, Tanzania
Corresponding author`s Email: **uissoaj@yahoo.com**
Received: 24th Feb. 2015 **Revised**: 9th May 2015 **Accepted**: 25th Jun. 2015

Abstract: To better plan for future involvement of women in the management of the environment, it is crucial to understand their perceptions on agroforestry practices for environmental conservation. The study assessed women's perceptions on agroforestry for environmental conservation in Lubungo A and Maseyu villages which are adjacent to Kitulang'halo Forest Reserve in Morogoro Rural District. Secondary data reviews and Participatory Rural Appraisal (PRA) involving Focus Group Discussions (FGDs), Key Informant Interviews (KIIs), field observations and household interviews were used for data collection. The results of this study indicated that in both villages studied there were dominance of male headed households, married head of households, working group, small and medium household size, number of respondents completed primary education and farming activities. From the Likert scale analysis it was realized that, the perception of women on the contribution of agroforestry to environmental conservation was generally positive. However, women were highly positive (1st Rank) about the contribution of agroforestry to wind break. Furthermore, the chi-square (X^2) test results showed that there was a significant relationship between household head ($X^2 = 8.63$, $p = 0.013$), age ($X^2 = 11.227$, $p = 0.024$) and the level of rating of the contribution of agroforestry to environmental conservation. Conversely, X^2 test showed no association between marital status, education level and household size with respondent's level of rating. For a better future management of the environment in the agricultural landscapes women should equally recognise all the environmental benefits of the agroforestry activities. Furthermore, provision of agroforestry and environmental education, accessible loan for agroforestry, seedlings and modern agricultural equipments for enhancing agroforestry practices for environmental conservation is necessary.
Keywords: Agroforestry; Environment; Conservation; Perceptions; Women.
Postal Address: Tanzania Forestry Research Institute (TAFORI), P.O. Box 1854, Morogoro, Tanzania

INTRODUCTION

Agroforestry practice is dynamic, ecologically based natural resource management system that involves the integration of trees in agricultural landscape and rangeland, diversifies and sustains production for increased social, economic and environmental benefits (ICRAF, 2008; Kiptot and Franzel, 2011). In the last 40 years it has become a subject of concern for study and improvement (Zomer *et al.*, 2009) and accepted as an appropriate solution to rural development needs particularly in Africa by scientists and planners (Rocheleau *et al.*, 1988). Several studies have shown that agroforestry systems are important tool to rural livelihoods (Regmi, 2003; Zomer *et al.*, 2009), biodiversity conservation (Regmi 2003; Khanal, 2011) and environmental conservation (Stenchly *et al.*, 2011). In case of rural livelihoods the system increases crop yield, supply tree products such as fodder and firewood, and saved time on collecting them from the forest (Regmi, 2003). For example in Tanzania, the planting of woodlots and fodder banks, and the use of nitrogen fixing trees (*Leucaena leucocephala, Glicidia*

sepium, Caliandra spp) to increase crop yields and milk from dairy cows (Pye-Smith, 2010a). In biodiversity conservation the system can directly enhance plant diversity while reducing habitat loss and fragmentation (Noble and Dirzo, 1997). Again in Tanzania, when agroforestry systems are integrated into biodiversity corridors for a variety of uses, such as timber and Non-Timber Forest Products (NTFPs), minimize the exploitation of reserved areas thus enhance biodiversity (Huang *et al.,* 2002). Furthermore, agroforestry plays an important role in mitigating and adaptation to the impacts of climate changes (Neufeldt *et al*., 2009) and improves the surrounding forests (Regmi, 2003). It is predicted that continued development and investment in agroforestry over the next 50 years could result in 50 billion tons of additional carbon dioxide being removed from the atmosphere (Garrity and Verchot, 2008). With regards to environmental conservation agroforestry systems assist to ameliorate environmental problems by creating microclimates favourable for crop survival and controlling soil erosion and moderating extreme temperatures (Adedire, 2004). It has also been recognised to increase soil fertility (Regmi, 2003). For example in Cameroon, the practice of intercropping with nitrogen fixing species such as *Calliandra spp, Sesbania spp* and *Tephrosia spp* has significantly improved soil fertility (Pye-Smith, 2010b). In Malawi, the planting of *Leucaena spp* contour hedges have effectively controlled soil erosion on steep slopes and improves soil quality in the country (Banda *et al*., 1994). In Tanzania, growing of nitrogen fixing fodder crops has brought environmental benefit that the roots broke through the hardpan and the soil improved for planting crops (Pye-Smith, 2010a). Worldwide and in developing countries, women are important components with regards to agriculture production and they are estimated to constitute about 43% of the agricultural labour force. However, this estimate vary region to region and country to countries (Raney *et al*., 2011). For example in sub-Saharan Africa, they are responsible for about 50% of the agricultural labour force (*ibid*). In Asia, they contribute up to 90% of the labour force in agriculture particularly for rice production. In Egypt, they make up about 53% of the agricultural labour. In Nigeria, they contribute between 60 and 80% of the labour particularly in crops, livestock, fisheries and agroforestry production (World Bank, 2003). In Tanzania, they supply about 80% of the agricultural labour force including agroforestry (Tanzania Government, 2012). Despite the extent of their involvement in agriculture particularly agroforestry, it is not well documented on how they perceive the contribution of agroforestry to environmental conservation. Therefore, the present study addressed this gap by collecting data from Lubungo A and Maseyu villages, in order to generate information for better planning of future involvement of women in agroforestry for environmental conservation.

EXPERIMENTAL

Study site: The study was conducted in the Morogoro rural district in Morogoro region involving Lubungo A and Maseyu villages. The villages lie on the northern part of the district and are situated along the Dar es Salaam to Morogoro highway and adjacent to Kitulang'halo Forest Reserve.

Research design and Sampling procedure: The research design presents a framework for which data are collected and analysed (Bryman, 2012). In this study a cross sectional research design was used involving collection of data at a single point in time by considering different aspect of the question under study. The study villages were purposely selected to be included in the assessment. The reason for their selection was that being proximity to Kitulang`halo Forest Reserve and having women involved in agroforestry. A simple random sampling was employed in selecting sample of 108 individual women respondents participating in agroforestry for household interviews. The sample size was about 10% of the number of households with women involved in agroforestry practices. A total of six focused groups discussions (FGDs) were held through peer discussions (three groups from each village). These groups included a group of women, men and institutions. Key Informant Interviews (KIIs) involved a total of 12 persons (six from each village). Field observation through transect walks were also done with the selected six villagers (three from each village). The individuals to be involved in FGDs, KIIs and transect walks were selected with the help of the village leaders based on their experiences.

Data collection techniques: Quantitative data were collected from a random sample of 108

women farmers using structured questionnaire administered in the form of interview. In this interviews information on respondent's characteristics such as age, head of household, educational level, marital status, household size and economic activities were collected. Other information included respondent's perception on agroforestry for environmental conservation, level of rating on agroforestry for environmental conservation and their suggestions to improve agroforestry for environmental conservation. Qualitative data collection involved questionnaire (open ended questions), FGDs, KIIs and field observation through transect walks. The information collected through these techniques were on women's perception on agroforestry for environmental conservation, level of rating on agroforestry for environmental conservation and the suggestions to improve agroforestry for environmental conservation. Also, both qualitative and quantitative data from secondary sources were collected through documentary review of village records and previous related studies. The main information targeted was on agroforestry issues in the studied villages and in other areas.

Data analysis: The quantitative data were summarized and analysed using Statistical Package for Social Sciences (SPSS) version 20 and Microsoft excel 2007 program and descriptive statistics was developed involving frequencies, percentages and cross tabulations to compare relationships between variables. The opinions/attitudes of women regarding agroforestry in terms of environmental conservation was analysed using a Likert scale which is type of scale used to measure people's perceptions (Bryman, 2012). Using the scale, the perceptions of different level of respondents were measured by ordinal rankings ranging from strongly disagree to strongly agree (1-5). From the scales, Weighted Mean (WM) was calculated as follows, $WM = \sum wi*xi / \sum wi$, Where, WM = Weighted Mean; wi = Respondents Households (number of respondents); xi = Value of strongly agree to strongly disagree; $\sum$ = Summation. The Chi-square (X^2) which is a statistical test to assess association between categorical variables was also computed. This was done to explore the relationship between women's characteristics (age, head of household, educational level, marital status, household size and the level of rating of the contribution of agroforestry on environmental conservation. The qualitative data from questionnaire (open ended questions), FGDs, KIIs and Field observation were subjected into in-depth analysis using content analysis technique. Content analysis is a technique for compressing many words of texts into less content of meaningful units of information based on specific procedures of coding (Stemler, 2001).

RESULTS AND DISCUSSION

Socio-economic characteristics of Respondents

Results indicated that, in both villages there were dominance of male headed households. Most (73%) and (69%) of the interviewed respondents household were male headed in Maseyu and Lubungo A villages respectively. Few respondents (31%) and (27%) were female in Lubungo A and Maseyu villages respectively. This can have implication on decision making regarding agroforestry practices as reported by Maduka (2007) that households heads are decision makers, therefore involvement in agroforestry can be influenced by men than women. Regarding marital status composition, the majority (73%) of the interviewed respondents in Maseyu and (69%) in Lubungo A villages were married while quite few among these (4%) in Lubungo A and (3%) in Maseyu villages were single (Table 1). Again this have implication on decision making concerning involvement in agroforestry practices as women should ask permission from their husband to utilize the farms for agroforestry. This can be the case as reported by Salami *et al.*, (2002) that women has no decision and right over land in most of African societies.

Table 1. Marital Status of Respondents (%)

Marital Status	Lubungo A (N=48)	Maseyu (N=60)
Married	69	73
Widow	19	17
Divorced	8	7
Single	4	3
Total	100	100

It was noted that the majority (65%) of the interviewed respondents in Maseyu village were within the age group between 15 and 44 years while in Lubungo A village the majority (44%) each were observed in two age groups between 15 and 44 years and between 45 and 64 years (Table 2).

Comparatively, of the working and dependant groups in both villages, most of the respondents were within the working group (15 and 64 years) than in the dependant group (above 64 years) (Table 3). This result indicates that there is sufficient labour force (working group) in the study villages.

Table 2. Age category of Respondents (%)

Age category	Lubungo A (N=48)	Maseyu (N=60)
15-44	44	65
45-64	44	27
>64	12	8
Total	100	100

Source: Field Survey, March, 2013

From the interviews, it was further revealed that the majority (52%) and (48%) of the respondents household were of medium size (5 and 8 people) in Maseyu and Lubungo A villages respectively. It was followed by (46%) and (43%) of the respondents having people 1 and 4 (small size) in Lubungo A and Maseyu villages respectively. The least (6%) and (5%) was a larger size (>8 people) in Lubungo A and Maseyu villages respectively. Various discussions also noted that many families had extended families (parents, children, relatives) than nuclear families (parents and their children). Household size may influence labour supply for agricultural activities as some recent studies like Adekunle (2009) suggested that large families are favoured for labour supply. Therefore, large family size is important for progressive supply of labour force. Concerning educational status in the study villages, Maseyu village emerged to be more literate than Lubungo A village. Most (58%) of the women farmers interviewed had attended primary school while in Lubungo A village most (52%) had never attended primary education (Table 3). Despite these differences between the two villages, in general education status among women in the area is low. Studies conducted elsewhere in Tanzania had similar trends (Kikoti, 2009), which is an indication that in rural areas there is high illiterate rate among farmers particularly women. This might have been contributed by the fact that in many societies men are favoured to be sent to school than women. Ravinder *et al*., (2009) argued that in most African countries illiterate is still pronounced as parents keep on favouring sending boys to school than their counterpart girls. Education has influence on agriculture practices as noted by several studies that it enhances active participation in new innovations and knowledge (Rad *et al*., 2009). Education also enhances ability to analyse the useful information for agriculture production (Ani *et al*., 2004). For example, a study done in Zimbabwe revealed that one of the major reasons hindering women involvement in farming practices is illiteracy as it limit farmers to access agricultural information (Gundu, 2009).

Table 3. Educational level of Respondents (%)

Education Level	Lubungo A (N=48)	Maseyu (N=60)
Completed primary education	33	58
Never attended school	52	33
Incomplete primary education	15	3
Completed secondary education	0	3
Incomplete secondary education	0	3
Total	**100**	**100**

Source: Field Survey, March, 2013

The major economic activities of the people in the study area were farming, livestock keeping, small business and casual labour. However, farming was the most dominant economic activity in the study villages as all respondents revealed that they were involved in farming. Some respondents also declared to practice farming plus one or more activities. The majority (44%) of the respondents were engaged in both farming and livestock in Lubungo A village while in Maseyu village the majority (38%) were involved in farming only (Table 4). This scenario is very common in rural Tanzania that majority of the villagers practice agriculture.

Table 4. Distribution of Economic activities (%)

Economic activities	Lubungo A (N=48)	Maseyu (N=60)
Farming and livestock keeping	44	23
Farming only	19	38
Farming and small business	10	27
Farming, small business and livestock keeping	19	10
Farming and casual labour	4	2
Farming, casual labour and livestock keeping	4	0
Total	**100**	**100**

Source: Field Survey, March, 2013

Women's Perceptions on Contribution of Agroforestry to Environmental conservation

The opinions/attitudes of women regarding agroforestry in terms of environmental conservation was analysed in terms of its contribution to carbon sequestration, enhancing biodiversity, water conservation, soil erosion control, enhanced soil fertility and wind break. Most (61%) of the respondents agreed with the statement that agroforestry contribute to wind breaker and a small proportion (1%) strongly disagreed (Table 5). The result shows that respondents agreed in terms of agroforestry for wind breaker and it was ranked the first. This can be the case as various discussions and field observations recognized many trees planted to prevent wind. Being with the highest score among the other statements it implies that for agroforestry intervention many women farmers would be willing to plant more trees in favour of preventing wind. This result is consistent with that of Pye-Smith (2010b) who suggested that boundary planting act as a wind breaker to prevent soil erosion. Respondents' opinion regarding agroforestry for soil erosion control, the majority (60%) of the respondents agreed with the statement whereas a few respondents (1%) strongly disagreed (Table 5). This result shows that respondents agreed in terms of agroforestry for soil erosion control and it was a second priority to the women farmers among the other statements. Field observations also observed some banana trees, mango trees and grasses planted along the areas prone to soil erosion in the study area. This result reflects what has been reported by Kang and Akinnifesi (2000) that agroforestry plays a major role in reducing soil erosion. Along the same view farmers in Burkina Faso perceived positively that agroforestry can lead to soil erosion control (Ayuk, 1997). Agroforestry for water conservation was ranked 3rd among other contributions. Most (60%) of the respondents agreed with the statement that agroforestry contribute to water conservation while very few of them (1%) strongly disagreed (Table 5). Field observations further indicated that there were trees planted near water sources to protect the area. Furthermore, from the FGDs it was revealed that some farmers plant trees on their farms that they can retain water moisture in the soil for a long time. This result is likely to be compatible with a study by Regmi (2003), who revealed that the farmers strongly agree that agroforestry conserve water.

The majority (55%) of the respondents declared that agroforestry contribute to enhanced soil fertility, meanwhile a few (2%) strongly disagreed (Table 5). This contribution of agroforestry was ranked 4th among others. It shows that the respondents agreed in terms of contribution of agroforestry for enhancing soil fertility. Studies conducted elsewhere such as a study in Nepal reported similar result as farmers agreed that agroforestry helps in increasing soil fertility in their farms (Regmi, 2003). Likewise, a study in the tropics concurs with the finding as farmers agreed that agroforestry contribute to increasing soil fertility (Kang and Akinnifesi, 2000). Concerning women's opinion in terms of agroforestry for enhancing biodiversity, the statement was ranked 5th and the majority (54%) agreed while few of them 1% strongly disagreed (Table 5). Furthermore, the FGDs revealed that agroforestry had contributed towards introduction of some trees which were not planted in the area before like *Grevillea robusta*, *Eucalyptus spp*, *Gmelina arborea* and *Tectona grandis*. This result shows that the respondents agreed in terms of agroforestry for enhancing biodiversity. Similar results were also reported by Khanal (2011) that farmers have a general positive perception on agroforestry practices towards biodiversity conservation. Furthermore, the same idea had earlier expressed by Kalaba *et al*., (2010) that agroforestry especially the traditional agroforestry has the great potential for biodiversity conservation. Regarding women's opinion on the agroforestry for carbon sequestration, the statement was ranked 6th and the majority (38%) had a neutral perception on agroforestry for carbon sequestration while few respondents (9%) strongly disagreed (Table 5). In general, the respondents showed neutral perception regarding the agroforestry for carbon sequestration. This was the least preferred option among others. It is likely that the respondents were neutral about agroforestry for carbon sequestration as almost half of the respondents were illiterate. Therefore, it would have been difficult for them to be convinced that integrating trees on a farm can contribute to carbon sequestration. Also the other reason is that the benefit of carbon sequestration are not tangible (physical) and thus need scientific proof. Agroforestry for carbon sequestration has

also been addressed by Lebel (2010) that the practice is generally recognised for its potential to climate regulation as a result of carbon sequestration.

Women were also asked to provide their opinion regarding agroforestry being not for environmental conservation. Of the interviewed respondents quite a few (1%) strongly agreed with the statement while a good number (58%) disagreed (Table 5). This result indicates that the respondents disagreed in terms of agroforestry is not for environmental conservation. In general, it shows that the respondents had a positive attitude towards agroforestry for environmental conservation. It is likely that with agroforestry intervention for environmental conservation women farmers are willing to accept and participate. This finding has also been expressed by Schrot and Sinclair (2003) who noted that agroforestry is increasingly being recognised for its ecological function in the landscape.

Table 5. Women's opinions regarding Agroforestry in terms of Environmental conservation

Statements	Agreement (number of respondents)					WM	Rank
	SA - 5	A - 4	N - 3	D - 2	SD - 1		
Agroforestry for carbon sequestration	10(9)	32(30)	38(35)	14(13)	14(13)	3.09	6
Agroforestry for enhancing biodiversity	17(16)	58(54)	20(18)	12(11)	1(1)	3.72	5
Agroforestry for water conservation	21(19)	64(60)	13(12)	9(8)	1(1)	3.88	3
Agroforestry for enhancing soil fertility	18(17)	60(55)	19(18)	9(8)	2(2)	3.77	4
Agroforestry for soil erosion control	22(20)	64(60)	12(11)	9(8)	1(1)	3.90	2
Agroforestry for wind breaker	24(22)	65(61)	9(8)	9(8)	1(1)	3.94	1
Agroforestry not for environmental conservation	1(1)	2(2)	23(21)	63(58)	19(18)	2.10	7

Note: Figures out of brackets are percentages and figures in brackets are frequencies; SA = strongly agree, A = agree, N = neutral, D = disagree, SD = strongly disagree; 1-5 is weight; WM = weighted mean
Source: Field Survey, March, 2013

Women's rating on the Contribution of Agroforestry to Environmental conservation

In terms of women rating on the contribution of agroforestry to environmental conservation, it was observed that the majority (52%) of the respondents, rated as medium while 25% rated high and 23% rated low. This result suggests that the value of agroforestry to environmental conservation is positive but moderate. This emphasizes the need to promote agroforestry that can have more positive impact on environmental conservation. In this way the women farmers will recognize the high contribution of agroforestry in terms of environmental conservation. This is in support of Kariuki (2012) that agroforestry has a positive contribution to the conservation of environment through improving soil fertility and soil erosion control. The distribution of respondents by the association of the head of household and the rating level of the contribution of agroforestry to environmental conservation showed that most male headed household (37%) rated the contribution as medium. The male headed respondents had higher rate on the contribution of agroforestry to environmental conservation than female headed respondents (Table 6). Furthermore, the chi square (x^2) test result showed that there was a strong association between respondent's household heads and rating on the level of the contribution of agroforestry to environmental conservation (x^2 = 8.633, p = 0.013). This means that there is significance difference in rating between household headed by male and female and that male and female headed household could view the contribution of agroforestry to environmental conservation differently. It also suggests that male headed households are likely to accept agroforestry interventions than their counterpart female headed.

Table 6. Chi square Analysis showing Relationship between Head of household and Level of rating

Head of Household	Rate			Total
	High	Medium	Low	
Male	22 (24)	37 (40)	12 (13)	71 (77)
Female	3 (3)	15 (16)	11 (12)	29 (31)
Total	25 (27)	52 (56)	23 (25)	100 (108)

Note: Figures out of brackets are frequencies and figures in brackets are percentages; (x^2 = 8.633, p = 0.013, df = 2).

There was a strong association (x^2 = 11.227, p = 0.024) between age category and level of rating on the contribution of agroforestry to environmental

conservation (Table 7). This means that the proposion of respondents level of rating in each age category differ significantly. The young respondents had higher rate on the contribution of agroforestry to environmental conservation than middle and old aged respondents. It appears that the younger respondents are well informed on the contribution of agroforestry on environmental conservation than the older respondents.

Table 7. Chi square Analysis showing Relationship between Age category and Level of Rating

Head of Household	Rate			Total
	High	Medium	Low	
15 - 44	18 (19)	30 (32)	7 (8)	55 (59)
45 - 64	6 (7)	18 (19)	10 (11)	34 (37)
>64	1 (1)	4 (4)	6 (6)	11 (12)
Total	25 (27)	52 (56)	23 (25)	100 (108)

Note: Figures out of brackets are frequencies and figures in brackets are percentages; (x^2 = 11.227, p = 0.024, df = 4)

Furthermore, the chi square test results showed no significant relationship between marital status (p = 0.120), education level (p = 0.289), household size (p = 0.436) and the level of rating of the contribution of agroforestry to environmental conservation. This implies that level of rating of the contribution of agroforestry to environmental conservation does not depend or influenced by the respondents marital status, education level and household size.

Women's suggestions to enhance Agroforestry activities to Environmental Conservation

From the multiple response analysis it was indicated that the majority (41%) of the respondents suggested provision of agroforestry education in order to enhance agroforestry practices for environmental conservation in the study villages. The least proportion (1%) suggested planting trees in the farm boundary to avoid shade effects on crops (Table 8). Generally, the result indicates that the farmers were eager to learn more about agroforestry. This is because few women have access for agroforestry training and education (Thrupp, 1994). Therefore, they were ready to participate in education programs concerning agroforestry. This result ties with the observation from Quandt (2010) that most (97%) of respondent farmers in a Barjomot village in Hanang propose provision of agroforestry education to enhance the practice. The idea of farmers to take up loans was also supported by Khanal (2011) who suggested that farmers need to be provided with loan/credit to reduce their financial problems to participate in agroforestry.

Table 8. Suggestions to Enhance Agroforestry activities for Environmental Conservation

Suggestion	Percentage (%)*
Provision of agroforestry education	41
No suggestion	20
Provision of accessible loan for agroforestry	18
Provision of tree seedlings	14
Villagers to be sensitized to plant trees on their farms	12
Provision of modern agricultural equipments	12
Provision of quality crop seeds	4
Provision of agroforestry extension services	2
Provision of pesticides	2
Planting trees on the farm boundary to avoid shade effects on crops	1

*Multiple response; Source: Field Survey, March, 2013

CONCLUSION

The overall perception of women for the contribution of agroforestry to environmental conservation was generally positive. Thus, indicating the need utilize this opportunity to encourage more farmers to practice agroforestry for environmental conservation. However, to encourage more farmers to practice agroforestry for environmental conservation they also need to recognise the economic benefit of the practice. Women were highly positive about the contribution of agroforestry to wind break. Thus, for a better future management of the environment in the agricultural landscapes a need arise to make them highly positive about all environmental issues. This can be achieved by enhancing their information on the other benefits of agroforestry to environmental conservation. Furthermore, to enhance women involvement in agroforestry activities for environmental conservation they should also be encouraged and equipped to access loan for agroforestry, provided with affordable seedlings and modern agricultural equipments.

Acknowledgments: The authors would like to thanks Tanzania Forestry Research Institute (TAFORI) for their financial support during data

collection in the field. Further appreciation goes to the Policy Research for Development (REPOA) for enhancing the skills and knowledge on research report writing for the corresponding author through training at the time of writing the article. Finally, sincere thanks are extended to Lubungo A and Maseyu village officials and villagers for their cooperation during data collection.

REFERENCES

Adedire, M. O. (2004). Environmental Protection: The Agroforestry Options. *Nigerian Journal of Forestry*, 34 (1): 1-6.

Adekunle, V. J. (2009). Contribution of Agroforestry Practice in Ondo State, Nigeria, to Environmental Sustainability and Sustainable Agriculture Production, *Afrika Focus*, 22, (2): 27-40.

Akand, M. M. H. (2006). Role of Rural Women in Homestead Agroforestry in Kalihati Upazila Under Tangail District. MSc Thesis, Department of Agroforestry, Bangladesh Agricultural University, Mymenangh.

Ani, A. O., Ongunnika O. and Ifah S. S. (2010). Relationship between Socio-economies Characteristics of Rural Women Farmers and their Adoption of Farm Technologies in Southern Ebonyi State Nigeria. *International Journal of Agriculture and Biology,* 5: 802-805, Available at, http://www.ijab.org, retrieved on 15th June 2013.

Ayuk, E. T. (1997). Adoption of Agroforestry Technology: The Case of Live Hedges in the Central Plateau of Burkina Faso, *Agricultural Systems*, 54 (2): 189-206.

Banda, A. Z., Maghembe, J. A., Ngugi, D. N and Chome, V. A. (1994). Effect of Intercropping Maize and Closely Spaced *Leucaena* Hedgerows on Soil Conservation and Maize Yield on a Steep Slope at Ncheu, Malawi, *Agroforestry Systems,* 27 (2): 17-22.

Bryman, A . (2012). *Social Research Methods (4th Ed).* Oxford University Press, New York,

Garrity, D. and Verchot, L. (2008). Meeting the Challenges of Climate Change and Poverty through Agroforestry, World Agroforestry Centre, Nairobi.

Huang, W., Luukkanen, O., Johanson, S., Kaarakka, V., Raisanen, S and Vihemaki, H. (2002). Agroforestry for Biodiversity Conservation of Nature Reserves: Functional Group Identification and Analysis, *Agroforestry Systems,* 55: 65-72.

ICRAF. (2008). Transforming Lives and Landscapes: World Agroforestry Centre Strategy 2008-2015, World Agroforestry Centre, Nairobi.

ICRAF. (2009). Creating an Evergreen Agriculture in Africa for Food Security and Environmental Resilience, World Agroforestry Centre, Nairobi.

Kalaba, K. F., Chirwa, P., Syampungani, S and Ajayi, C. O. (2010). Contribution of Agroforestry to Biodiversity and Livelihoods Improvement in Rural Communities of Southern African Regions, *In*. T. Tscharntke *et al*., (eds.), *Tropical Rainforests and Agroforests Under Global Change, Environmental Science and Engineering,* Springer-Verlag Berlin Heidelberg, pp 461-476.

Kang, B. T and Akinnifesi, F. K. (2000). Agroforestry as Alternative Land use Production System for the Tropics, *Natural Resources Forum,* 24: 137-151.

Kariuki, P. W. (2012). The Influence of Agroforestry Practices on Environment, A Case of Maai Mahiu, Nakuru County, A Research Project Submitted in Partial Fulfilment of the Requirements for the Award of the Master of Arts Degree in Project Planning and Management of the University of Nairobi.

Khanal, S. (2011). Contribution of Agroforestry in Biodiversity Conservation and Rural Needs Fulfilment: A Case Study from Kaski District. A Thesis Submitted in Partial Fulfilment of the Requirement for the Degree of MSc in Watershed Management, Tribhuvan University Institute of Forestry, Pokhara, Nepal.

Kikoti, Z. (2009). Livelihoods and Ecosystem Services around Protected Areas. A Case Study from Ugalla Ecosystem, Tabora, Tanzania. A Master thesis submitted of the requirements for the degree of Master of Science (M.Sc.) in Management of

Protected Areas at the University of Klagenfurt, Austria.

Kiptot, E and Franzel, S. (2011). Gender and Agroforestry in Africa: Are Women Participating? *ICRAF Occasional Paper No. 13*, World Agroforestry Centre, Nairobi.

Lebel, L. (2010). Recognizing the Potential of Agroforestry in Climate Change Mitigation and Adaptation. *A Paper Presented at SEANAFE 2nd International Conference on Agroforestry Education 15-17 December, 2012*, Maejo University, Chiang Mai.

Maduka, S. M. (2007). Role of Agroforestry in Household Income and Poverty Alleviation in Semi Arid Areas of Misungwi District, Mwanza, Tanzania, A Dissertation Submitted in Partial Fulfilment of the MSc (Forestry) Requirement at Sokoine University of Agriculture, Morogoro, Tanzania.

Neufeldt, H., Wilkes, A., Zomer, R.J., Xu, J., Nang'ole, E., Munster, C and Place, F. (2009). Tree on Farms: Tackling the Triple Challenges of Mitigation, Adaptation and Food Security, *World Agroforestry Centre Policy Brief*, World Agroforestry Centre, Nairobi.

Noble, I. R and Dirzo, R. (1997). Forests as Human Dominated Ecosystems, *Science,* 277: 522-525.

Pandey, N. (2005). Multifunctional Agroforestry Systems in India for Livelihoods: Current Knowledge and Future Challenges, Centre for International Forestry Research (CIFOR), Bogor, Indonesia.

Pye-Smith, C. (2010a). A Rural Revival in Tanzania: How Agroforestry is Helping Farmers to Restore the Woodland in Shinyanga Region, *ICRAF Trees for Change No.7*, World Agroforestry Centre, Nairobi.

Pye-Smith, C. (2010b). A Window on a Better World: An Innovative Agroforestry Development Programme is Transforming Lives and Landscapes in Rural Cameroon, *ICRAF, Trees for Change No. 5*, World Agroforestry Centre, Nairobi.

Quandt, A. K. (2010). Agroforestry Potential on Household Lands Outside the Mt. Hanang National Forest Reserve, Tanzania: Forest Conservation and Livelihood Implications, A Professional Paper Presented in Partial Fulfilment of the Requirements for the Degree of Master of Science in Resource Conservation, International Conservation and Development, The University of Montana Missoula, MT.

Rad, S. Ates ,C. H. Delioglan, S. Polatoz, S. and Ozcomlekci, G. (2009). Participation of Rural Women in Sustainable Development: Demographic and Socio-economic Determinants. Sustainable Development. Turkey. John Wiley and sons Ltd and ERP Environment. Available from, www.interscience.wiley.com, Retrieved on 15th June 2013.

Raney, T., Anviquez, G., Croppenstedt, A., Gerosa, S., Lowder, S., Matuscke, I., Skoet, J and Doss, C. (2011).The Role of Women in Agriculture. ESA Working Paper No 11 (02). Agriculture Development Economic Division, The Food and Agriculture Division of the United Nations.

Ravinder, R. and Narayana, N. (2007). Gender Empowerment in Africa: An Analysis of Women Participation in Eritrean Economy. *International Journal of Women, Social Justice and Human Rights*, 2: 221-237. Available at http://ideas.repec.org/p/pra/mprapa/11081.html, retrieved on 15th June 2013.

Regmi, B. N. (2003). Contribution of Agroforestry for Rural Livelihoods: A Case of Dhading District, Nepal, *A Paper Presented at the International Conference on Rural Livelihoods, Forests and Biodiversity 19-23 May 2003*, Bonn, Germany.

Rocheleau, D., Weber, F and Field-Juma, A. (1988). Agroforestry in Dryland Africa, World Agroforestry Centre, Nairobi.

Salami, A. T., Ekanade, O and Usongo P. A. (2002). The Role of Women in An Environmentally Friendly Agro system: Case Study of Ngia Clan, Northwest Province Cameroon, *AJEAM/RAGEE*, 4(2):41-49.

Schrot, G and Sinclair, F. (2003).Trees Crops and Soil Fertility: Concepts and Research Methods, Wallingford UK, CABI.

Stemler, S. (2001). An Overview of Content Analysis. Practical Assessment, Research and Evaluation. Available at htpp://pareonline.net/getvn.asp?=7&n=17, retrieved on 25th November, 2013.

Stenchly, K., Clough, Y., Buchori, D and Tscharntke, T. (2011). Spider Web Guilds in Cacao Agroforestry: Comparing Tree, Plot and Landscape-scale, *Management, Diversity and Distributions,* 17 (4): 748-756.

Thrupp, L. A. (1994). Emerican Endangering Central American Forestry Management. The Integration of Women in Forestry. CIDE. 1-12pp.

World Bank. (2003). Nigeria: Women in Agriculture. In Sharing Experiences. Examples of Participatory Approaches. The World Bank Group. The World Bank Participatory Sourcebook, Washington D.C. Available at http:/www.worldbank.org/wbi/publications.html. Retrieved on 24th June 2014.

Zomer, R., Trabucco, A., Coe, R and Place, F. (2009). Trees on Farm: Analysis of Global Extent and Geographical Patterns of Agroforestry, *Working Paper*, World Agroforestry Centre, Nairobi.

Source of Financial Support: Tanzania Forestry Research Institute (TAFORI).
Conflict of Interest: None. Declared.