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**74- Gender differentiated motivation for coastal forest conservation: the case
of Lower Tana River Forest**

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*Paper prepared for presentation at the 4th African Association of Agricultural
Economics, AAEA/ AEASA Conference at Hammamet, Tunis – Tunisia, September
23-25, 2013.*

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Abstract

Preserving, managing and improving the health of forest ecosystems worldwide will require equitable leadership and participation from both women and men. Understanding gendered motivations to conserve forest ecosystems may contribute to the design of programs that enable sustainable management and use of forest benefits. This study examines the motivations for willingness to participate in forest conservation activities in Lower Tana River forest. The study focuses on gender differentiated personal values for conserving the forest and uses the laddering technique. The study reveals that gender roles are important in choice of forest conservation practice. Women indicate that preserving the biodiversity is important as well as monitoring illegal harvesting of forest products. Easy access to fuel, agricultural production is of paramount important for women. On the other hand, men plant trees and control forest fires to increase their household income. However, tree planting is important for both women and men. The trees planted are for commercial purposes and less environment friendly. The study discusses policy implications. Although men and women have different roles and responsibilities, their desires or values are more or less similar. For instance, they both value security, comfortable and exciting life, good health, being helpful and happiness. Women are unique in the sense that they want to be independent in life while men want the sense of responsibility.

Key words: Forest conservation, gender, motivation, laddering, Kenya

1. Introduction

Gender inequalities in gaining access to and control over natural resources continue to undermine a sustainable and inclusive development in developing countries (World Bank et al. 2009, Meizen-Dick et al. 2011). Gender differences arise from the socially constructed association between men and women resulting in gender disparities in the distribution of productive resources. Such disparities are explained by evidence which suggests that households do not make decisions in allocating resources in a unitary manner and gender preferences need to be upheld (Alderman et al. 1995; Haddad, Hoddinott & Alderman 1997). Also, there is often exclusion of women from decision making at household, community, and national levels (Agarwal 2001). Therefore gender relations and power dynamics will determine how rural men and women are able to take up innovations from research and their access to and control over key assets¹.

In developing countries both men and women remain dependent on forest goods and services such as firewood, fodder, soil and water protection, and regulation of the climate which influences their agricultural activities. Women use these resources to ensure well-being of their families as they meet their role of food provision. Therefore, women need to be involved in decisions regarding the management of forest resources. It is increasingly evident that women living closer to the forest are taking up the role of co-managers² and co-protectors of forests, along with governments and other bodies (Mwangi et al. 2009; Aguilar et al. 2011). This is because women - who bear the responsibility for feeding families - have greater interactions with forest resources and are more inclined to conserve them in order to mitigate the burdens that may be associated with deteriorating forest condition in future (Acharya & Gentle 2006; Agarwal 2010). Furthermore, there is a vital need for more effective forest management since these resources are under threat because of increasing global trade, climate change, population rise, urbanization, and energy and food insecurity (CIFOR 2008; WB 2010).

The inclusion of women in forest conservancy, governance and decision-making could determine the ultimate success of such initiatives. Their inclusion could offer a prospective pathway for empowerment both within their private and public lives (Torri 2010). Women's inclusion in forest management also implies a possible pathway for sustainable use of natural resources as an alternative source of livelihood (Obare and Wangwe 2009; WB 2010; FAO 2011). Gender roles generate different benefits and values for men and women arising from the use of forest products. Miruka et al. (2012) study indicates that men trade in forest products such as honey, timber, building materials and charcoal while women on firewood and weaving materials. Therefore,

¹ Assets can be categorized into six groups namely human, physical, financial, natural, political and social (Meizen-Dick et al 1997).

² There is evidence that women's participation in decision making in forest management has been found to improve forest regeneration (Agarwal 2007, 2010), it reduces the incidence of illegal harvesting and other unsanctioned activities (Agarwal 2009, Agarwal *et al.* 2004), preserve biodiversity (Claudia 2008), and their presence in forest user groups enhances the capacity to manage and resolve conflicts (Westerman *et al.* 2005).

men and women might have different motives for conserving forest resources because of the different roles and obligations in the household or even at community level. As a result, incorporating gendered aspects into forest conservation could help improve the outcome of forest conservation initiatives.

This study examines men's and women's motivations for conserving forests in Kenya in the Lower Tana River (LTR). There are various methods to assess motivations for natural resource conservation. For instance Farmer et al. (2011) applied mixed methods to examine farmer's personal values for adopting conservation easements; Kotchen & Reiling (1999) used contingent valuation to examine motivations for conserving endangered species; and more recently Means End Chain (MEC) has been used to assess the need for conservation of natural parks and forests through assessing the benefits of visiting such parks (López-Mosquera & Sánchez 2011; GoldenbergGold et al. 2010). This study applies a means-end chain theory (MEC) approach to determine the relevant attribute-consequence-value relations through setting up gender differentiated hierarchical value maps (HVM) that can facilitate the understanding of motivations in the conservation of the LTR forest. Understanding gender differentiated motives is crucial in strategizing the appropriate measures for forest conservation considering the different needs for men and women. Gender motivations for forest conservation are also paramount in order to protect biodiversity, ecosystem services and habitat and reduce the impact of climate variability to forest communities.

2. Conceptual framework: The means-End Chain approach

This study uses the Means-End Chain (MEC) approach developed by Gutman (1982) and Olson and Reynolds (2001) based on the personal construct psychology earlier developed by Kelly (1955). The MEC approach has been used widely in the fields of marketing and psychology to study factors influencing choice or decision-making by individuals and consumers. Consumer-oriented applications of the MEC approach for fresh food are vast (see Santosa & Guinard 2011 for an overview of the existing literature). The MEC theory can be applied to analyze decision-making process in forest conservation. In the context of the forest conservation environment, the theory posits that the men and women utilize a certain production or conservation practice (means) to generate particular benefits that will ultimately serve to attain more abstract cognitive personal values (end) that the respondent associates with the benefits. Thus MEC approach can facilitate the understanding of gender and forest communities' motivations in their decisions regarding conservation practices. The MEC approach states that perceived self-relevant product attributes lead to consequences that contribute to certain personal values being fulfilled. Each consequence, in turn, supports one or more cultural values and/or existential/life goals. The consequences can be direct, indirect, physiological, psychological or sociological. Thus, farmers who make decisions about forest conservation measures and their attributes are expected to act so as to maximize the positive consequences and minimize the negative consequences of doing so (Gutman 1982). They then also learn the attributes that are instrumental for achieving their desired consequences. In addition, the more important the consequence is, the more significant

are the attributes and the consequences leading to their importance, namely, personal values (Gutman 1997).

Values are the end states of the MEC and are cognitive representations of abstract goals, being similar to needs that motivate action and conceptually different to personality traits. Values represent standards that guide thought and action. They are trans-situational and inherently desirable (Roccas et al. 2002). In terms of an individual's behavior, values play an important role because they are cognitive representations of gender needs and desires, on the one hand, and of societal demands, on the other. That is, values are translations of individual needs into a socially acceptable form that can be presented and defended publicly.

The inter-linked conservation practice-consequence-value chains forms an associative network of knowledge, which can function as a cognitive structure and/or as a motivational structure. When applied to the respondents' decision-making process concerning choices of conservation practices, the MEC approach assumes a hierarchy of goal levels guiding actual behavior. This means that in thinking about taking a conservation-related action, such as tree planting or the prevention of deforestation, a respondent may gather and analyze information from the environment by relating it to information stored in his/her memory based on past experiences. The behavior of the respondent is then directed towards the attainment of a goal in mind by using the structure of the means-end chain as a roadmap. On the other hand, the motivational perspective gives emphasis to the intensity between either the attributes or consequences and the values. The stronger this intensity is perceived, the more activated the decision-maker will be and the larger the probability that the respondent gets motivated to take action. Therefore examining the MEC related to use of conservation practices will determine the drivers of choice. Thorough understanding of such drivers is imperative for the development of measures to improve environmental sustainability.

3. Research methods

Means-End-Chains are elicited during the laddering-interviews. This interview technique was originally developed by Hinkle (1965) and subsequent work by Reynolds and Gutman (1988) and Gengler & Reynolds (1995) have helped develop a well-manifested protocol for this technique. Laddering has been widely used in personal construct research (Costigan et al. 2000), but has also been used in research on knowledge acquisition (Rugg & McGeorge 1995) and organizational research (Rugg et al. 2002). In marketing studies, the technique has been extensively applied to consumer research, food product design (e.g. Costa et al, 2004; Grunert & Grunert, 1995; Reynolds & Gutman 1988) and tourism research (López-Mosquera & Sánchez 2011; GoldenbergGold et al. 2010). However, the application of MEC paired with laddering to study the motivational structure of men and women in forest conservation is sparse and limited, to the best of our knowledge, except a study by Okello et al. (2012), Johnston & Healy (2006) and Salame (2004). Okello et al. (2012) examined Kenyan farmer's motivation for the use of crop protection measures. Johnston and Healy (2006) examined Australian farmers' choices of supply

chain channels while Salame (2004) studied Lebanese farmer's motivations for choice of organic versus conventional production methods. In environment management MEC has been used in waste management on choice of recycling choice (Bagozzi 1994). However none of the studies have considered the gender aspect, whether there are differences in HVM.

The laddering technique builds on either a face-to face or a pencil-and-paper format. It involves individual in-depth interviews in which subjects/interviewees are required to generate or verify associations between attributes-consequences-values (ACV). This can be done in two ways namely, in sequences utilizing an a priori list of ACV's (hard laddering) or situations in which subjects are more free in their associations and where ACV's are reconstructed during the interview (soft laddering). There is still a big debate about which type of laddering is most appropriate (Costa et al. 2004). Hard laddering entails the risk of discerning associations that were not there from the beginning thus generating restricted scope of motivations. Hard laddering also has the tendency of providing a mechanistic environment that potentially risks the predictive ability of the technique by reducing the active involvement of subjects during interviews (Jonas & Beckman, 1998). Soft laddering, on the other hand, is more often employed in studies with few respondents (< 50) and where the focus is more explanatory. It has the advantage, from the motivational viewpoint, of being more appropriate in revealing more complex underlying motivations for decisions taken by respondents (Reynolds & Gutman 2001).

Laddering interviews consist of two stages: first, respondents are asked to indicate the most salient attributes associated with the topic(s) under study, and second, through a series probing questions in the form of "why is that important to you?" respondents are led to reveal the importance of these attributes with respect to their consequences and values. This study uses a semi-structured laddering approach in which elements of hard and soft laddering are combined. At the initial point of each laddering interview, respondents were asked to list the forest conservation practices in order of preference. Specifically, the respondents were asked: "What are the various practices in which you conserve the LTR forest?" The responses given by the respondents formed the study association and generated the attributes. The attributes mentioned included the following; i) planting trees/agro-forestry (ii) campaign / lobbying to protect the forest (iii) prevent cutting of trees especially indigenous or rare trees species (iv) control burning of the forest land or grass (v) tree nursery establishment (vi) preserve biodiversity (vii) monitor illegal harvesting of forest products, and (viii) weeding the forest.

The interviewers used Dictaphone to record the responses of every respondent. Ladders were also documented during the interviews and reviewed after every interview session to ensure that all consequences were followed. The generated ladders were also used as a reference point during transcription of data. The ladders across the respondents were recorded on a separate coding form for the entire set of ladders. The inspection was done to ensure completeness. A set of summary codes was developed to ensure that all the attributes, consequences and values that were mentioned by the respondent were covered. This was done by classifying all responses into three

categories namely, attributes, consequences and values in forest conservation in order to produce consistency in content analysis.

The analysis of the laddering data was conducted in line with the recommendations by Reynolds & Gutman (1988). The values stated by the respondents were sorted according to the classification of values which is suggested in individual-level value structure. The "Mecanalyst Software" was used for the analysis of the data collected during the laddering interviews. After entering and encoding the data, the software constructs an implication matrix that indicates how often concepts have been mentioned and linked to each other, both directly and indirectly. The Mecanalyst Software furthermore enables an aggregation of the Means-End Chains (MEC) into a HVM. The attributes, consequences and values form chains that are put into a hierarchical value map (HVM), depicting the cognitive or motivational decision structure of the farmer (Grunert & Grunert 1995).

4. Description of study site

The LTRF complex is located in the Coastal Province of Kenya. It is a riverine type of forest in the upper part but it widens as the river enters the Indian Ocean. The region is flat to gently undulating with an average altitude of between 5-77 m above sea level. The LTR region receives low, bimodal and erratic rainfall with the mean rainfall ranging 300 to 1200mm per annum and lies in agro-climatic zone IV and V (source??). The average annual temperature is 30° centigrade. LTR forest hosts two highly endangered primates namely Tana River red colobus (*Colobus badius rufomitratus*) and Tana River mangabey (*Cercocebus galeritus galeritus*) and a diverse mix of pan-African species and biodiversity. Social, economic and institutional factors such as immigrants to the forest, poverty, lack of alternative livelihood and lack of property rights has resulted in massive forest destruction and a once continuous track of complex forest has been reduced to patches of small forest lands. The LTR forest cover has declined by 55% in the last 10 years (Kathumo et al. 2012). The forest use has been unsustainable, with charcoal burning, pole cutting, forest clearing for agricultural activities especially food production for food security or livelihood strategy (Okello 2011). In addition, over-grazing is a problem which also leads to soil erosion and flooding, thus the needs to conserve the remaining forest cover.

5. Data

The respondents were randomly sampled from a list of respondents who had earlier mentioned that they participate in forest conservation activities and they are willing to pay for forest conservation. Laddering interviews were carried out in four forest management regimes namely: Kenya forest service, community managed forest, private managed forest and Kenya wildlife service. This process yielded a total of 62 respondents; 39 male and 23 female. Thus the study used a sample size that is greater than those used in most laddering/MEC studies (Russell et al. 2004). Table 1 summarizes the gender characteristics of the forest communities interviewed during this study. It shows that the men interviewed were older than women. Women were also willing to pay a higher amount for forest conservation than their male counterparts. Surprisingly,

women had a higher entrepreneur experience while men had higher farming experience. As expected, men had high education though on average had not completed primary school. They also have higher income than women. In contrary, men are more affiliated to social groups than women.

Table 1: Summary statistics disaggregated by gender

Household characteristics	Male (n=39)	Std. Dev	Female (n=23)	Std. Dev.
WTP for forest conservation (Kshs)	214.63	512.377	473.88	872.770
Household size (count)	5.31	2.890	6.42	2.436
Age (years)	43.19	15.888	36.50	12.179
Number of years of schooling	6.29	3.697	5.67	3.408
Farming experience (years)	16.29	15.308	14.79	11.459
Entrepreneurial experience (years)	1.53	3.760	4.88	10.140
Actual duration of settlement (years)	16.50	1.156	16.50	1.557
Household monthly income ('000 Kshs)	7.04	11.548	6.82	10.998
Distance to the forest (Km)	2.70	2.072	2.61	3.096
Land size (acres)	7.00	4.811	7.20	4.543
Social association (%)	50.00	0.460	44.40	0.470

Source: Author's survey; * Ksh = Kenya Shillings. 1 US dollar was equal Ksh 100 at the time of this study.

6. Results and discussion

Women HVM for forest conservation practices

The hierarchical value map (HVM) in Figure 1 presents the synthesis of women's decision to participate in different forest conservation practices. The HVM enables researchers to have a better understanding of the results from the laddering study without having to study each ladder separately (Grunert et al. 2001). A cut-off level of 4 was chosen to develop HVM, meaning that a link is drawn between two concepts if at least 4 respondents have mentioned it as a direct or indirect link. Cut-off levels generate maps that include only the most significant links in the HVM (Grunert et al. 2001). The three consecutive levels of the map represent attributes (at the bottom), consequences (in the middle) and values (at the top). The arrows indicate MECs or the associations or the direction and strength of the relationships. The thicker the arrow the stronger is the connection. Hence, a very thick line between two concepts means that many respondents made this association during the interview. Ladders or codes with an incomplete chain or missing antecedent were excluded in the implication matrix from being represented graphically in the HVM.

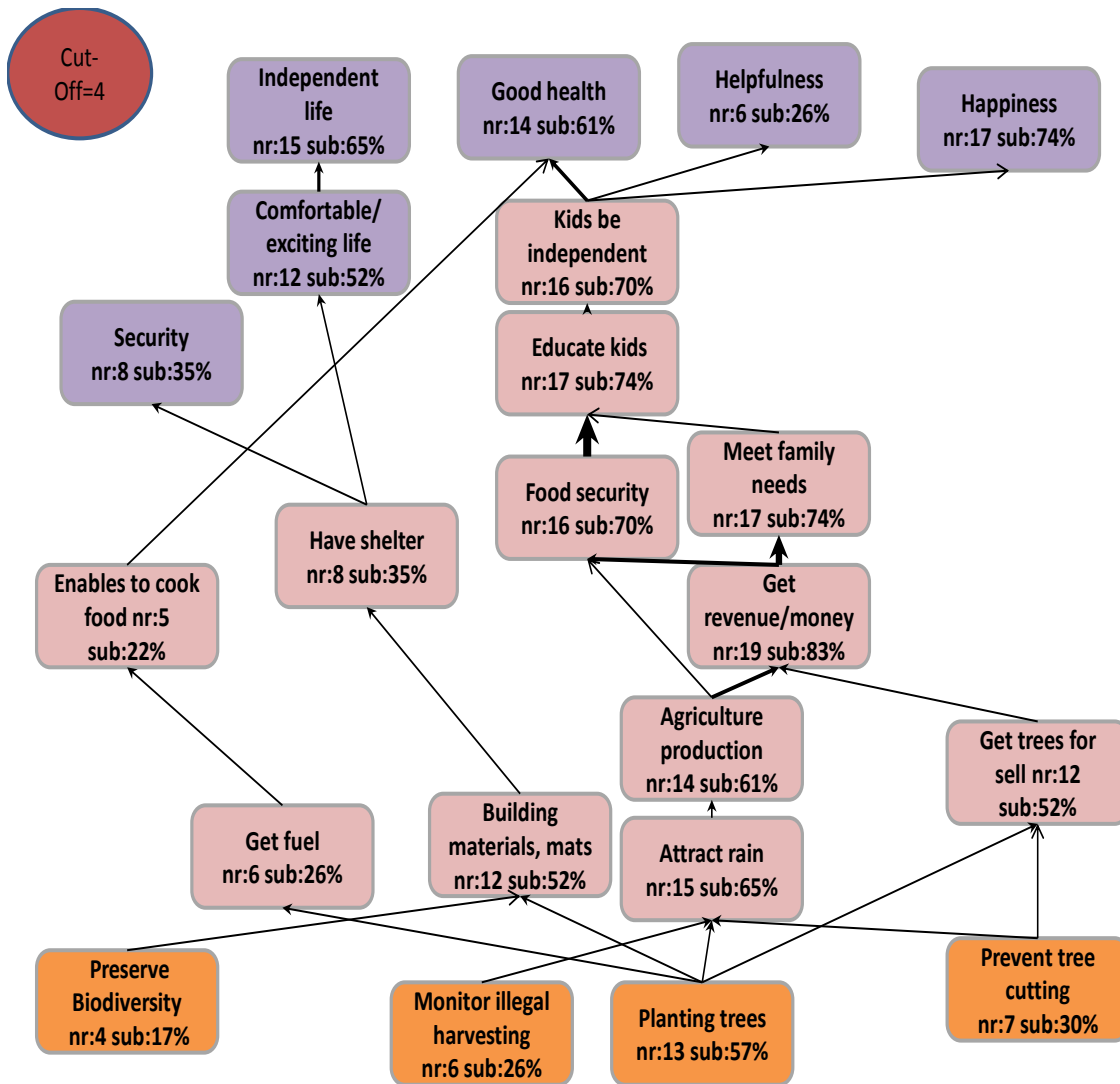


Figure 1: HVM for forest conservation practices filtered by female gender

The results presented in Figure 1 shows the HVM for females from our sample. It has four attributes namely plant trees, prevent cutting of trees, monitoring illegal harvesting of forest products and preserving biodiversity, especially that of unique plant species such as *mukindu* which is mainly used for weaving mats and baskets or sometime as wild food. It has 12 consequences and six end values. The HVM indicates six motivational structures of ladders (i.e., personal values) with respect to forest conservation activities namely, good health, helpful to others, happiness, independent, comfortable life or exciting life, and security.

The illustration shows that women plant trees as one way to conserve forests. The benefits of tree planting were identified as rain, enabling the availability of building and weaving materials like timber poles and have easy access to fuel. Women also prevent cutting trees in the forests so that they will have trees for sale. Women also monitor illegal forest harvesting activities so that forest

will attract rain. They also participate in conservation of biodiversity especially of unique trees species which they use for weaving mats or baskets. These kinds of trees are under threat of extinction. Consequence of rainfall is to increase agricultural production and in turn have food security and increase household revenue.

Revenue has a consequence of meeting family needs such as food, shelter and clothing. Food security and meeting family needs merges to children education the forest to get trees for sell and get revenue. This is supported by previous studies, in Benin and Cameroon, women increase their collection and sale of non-wood forest products (NWFPs) to increase income and pay children's school-fees, meet medical expenses and buy food (Schreckenberget al. 2002). The consequence associated with educating children is the hope that they will be independent and help their parents or others in future such as through remittances. As the HVM shows, the major value/benefit to the women's ability to meet family needs and educate children is happiness, increased assistance to others and independence. A consequence of fuel availability enables households to prepare food with the end value of good health. The consequence of access to building materials is having shelter and end value of security (human and properties) and comfortable life.

Men HVM for forest conservation practices

The results presented in Figure 2 shows the male HVM. The cut-off level of 7 was used to get important links. The HVM have three attributes namely plant trees, prevent cutting of trees, improve air quality or carbon sequestration and control forest fires. Tree-planting was the dominant conservation activity with 64% of men mentioning it. The male HVM has eight consequences and six end values. The HVM indicates six motivational structures of ladders (i.e., personal values) with respect to forest conservation activities namely good health, helpful to others, happiness, independent, comfortable or exciting life, and security.

The illustration shows that men plant trees as one way to conserve forests so that trees will attract rain; have building materials like timbers poles and have easy access of fuel. They prevent cutting trees in the forests to ensure availability of building materials mostly for sale. Men also plant trees so that air quality could improve. There is evidence that trees or bushes increases carbon sequestered both above and below ground, thereby contributing to mitigation of greenhouse gas (Verchot et al. 2007). Men prevent forest fires with a consequence of more money in future. These findings is corroborate with previous studies which show that fire control role is played by men (Miruka et al. 2012, Aguilar et al. 2011). The consequence of enough rainfall and access to building materials is to ensure household has enough revenue. This is because rain allows fast growth of trees or rejuvenation of trees and thus increases trees for sale. The consequence of building materials is to have shelter with the final value of security (of human and properties) and a comfortable life. Over the years LTR district has be under security threats from bandits (Okello 2011) that security is of paramount importance t in the study area. Revenue has a consequence of educating children and reduces stress in life. The end value

educating children have values of educating children included at the end value of comfortable life, good health, happiness and sense of responsibility. As the male HVM shows, the major value/benefit of a stress-free life and improved air quality is good health.

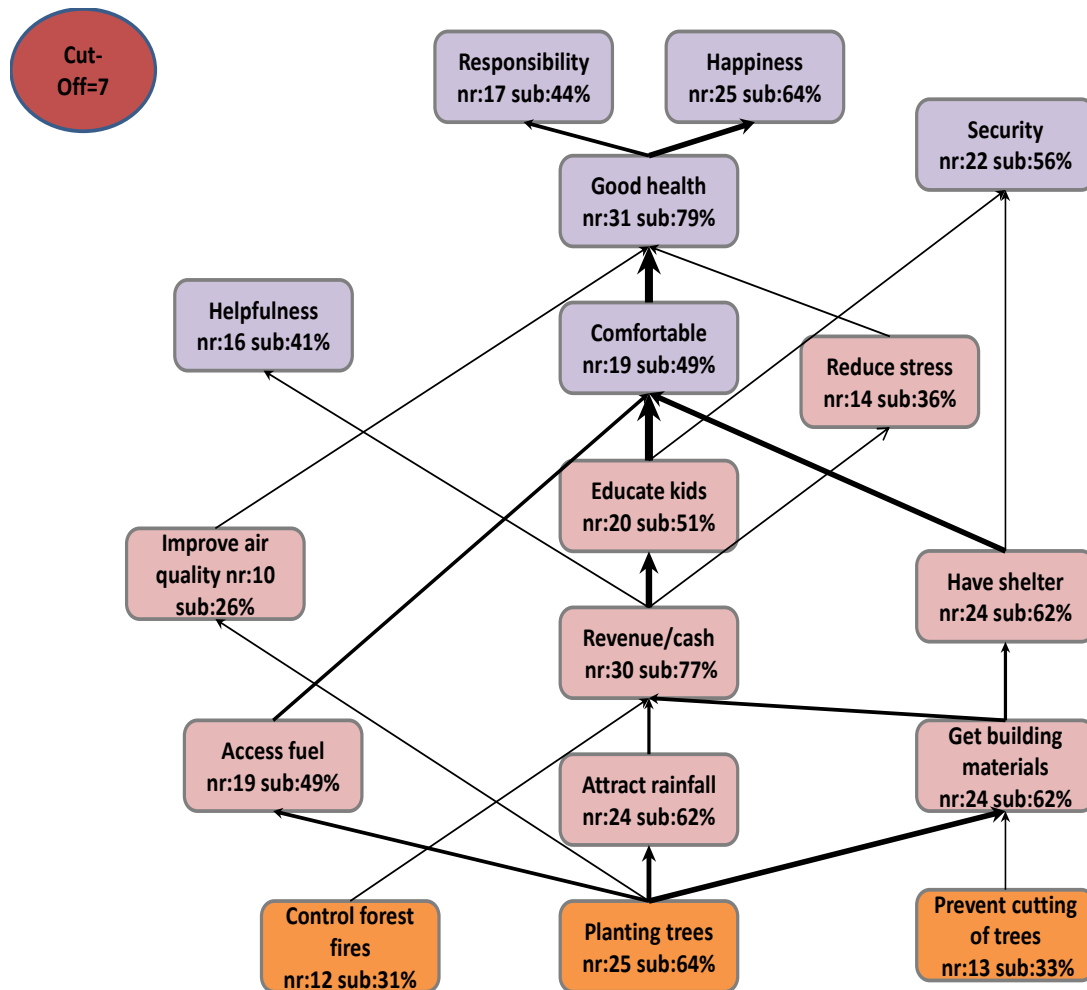


Figure 2: HVM of forest conversation filtered by male gender

A comparison of women and men HVM reveals that gender roles and responsibilities influence forest conservation practices. Females indicated the importance of biodiversity preservation. This study is in line with conforms to literature that women preserve biodiversity and biodiversity is the cornerstone of their work, their belief systems and their basic survival (Claudia 2008; Balakrishnan 1997; FAO 1996). They also conserve the forest to increase their household incomes. 83% of women's responses indicated revenue as important in comparison with 77% men. IUCN (2009) shows that for poor women forest income represents 50% of all their income and for poor men it represents 45%; for wealthy and middle-income women it represents 44% and for wealthy and middle-income men it represents 38%. Women are usually the main collectors of water and fuel, and most women farmers depend on rain-fed agriculture. In many

societies, they turn to forests both to diversify and add flavor to the range of subsistence foods they offer their families, as well as for cash (FAO 2011). Food security is also a key in female HVM. Women have a role to provide food in the household and farming is key source of food. With other roles of meeting family needs like clothing they work hard to provide this to their family and thus have a comfortable and independent life. Women also have a role or obligation to fetch firewood for cooking food. Therefore they plant trees to have easy access to fuel.

Male HVM on other hand reveals that men plant trees, prevent/control forest fire and cutting of trees to increase their income so that they educate kids, have stress free life and thus comfortable life. A point to note is that men also value quality of air so that they will have good health which will facilitate them to work hard and meet their responsibility as the household head. There is no difference in end values or benefits between male and female HVM. The gendered HVM elaborate roles specifications and these activities all incorporate livelihood strategies such as food, agricultural production which give rise to commercial exchanges. Although men and women have different roles and responsibilities, their desires or values are more or less similar. For instance, they both value security, comfortable and exciting life, good health, being helpful and happiness. Women are unique in the sense that they want to be independent in life while men want the sense of responsibility.

7. Summary, Conclusion and Policy Implications

At a time when forest ecosystems are diminishing at an unprecedented rate, forest loss has become one of the main development issues of this millennium. Preserving, managing and improving the health of forest ecosystems worldwide will require equitable participation from both women and men. Understanding the gendered motivations for conservation may lead to sustainable utilization of forest benefits. This study examines the motivations for willingness to participate in forest conservation activities in the LTR forest. The study focuses on gender differentiated personal values for conserving the forest and uses the laddering technique. The study reveals that gender roles are important in choice of forest conservation practice. Women indicate that preserving the biodiversity is important as well as monitoring illegal harvesting of forest products. The consequence of easy access to fuel and ability for agricultural production is of paramount importance in female HVM. Male HVM on other hand reveals that men plant trees, control forest fires and cutting of trees to increase their household income. Tree planting is important for both women and men. The trees planted are for commercial purposes that are less environmentally friendly. Ignoring the gender dimension in forest conservation and management is not an option. The loss of these ecosystems, or even small changes in their species composition, will have a gender-differentiated impact that could jeopardize the livelihoods of women and men around the LTR forest. This is particularly true of female-headed households, which are often poor and most vulnerable to disaster or shock such as climate change.

There is need for awareness creation and educational campaigns on the importance of environmental conservation in LTR forest. There is also a need for the promotion of the planting

of environmentally friendly trees, like indigenous trees to complement the commercial trees being planted. There is need for alternative sources of energy or energy-saving technologies such as fuel efficient cook stoves that would reduce firewood consumption, reduce carbon dioxide emissions, and improve health (and security) of women and their children as well as reduce time spent collecting fuel wood. In addition, alternative sources of livelihood for men like fishing and bee keeping need to be promoted to reduce over-reliance on forest and tree products. Hence, mainstreaming of gender should take such differences into account in order to minimize exclusion from forest governance mechanisms, capacity building and marketing opportunities due to a lack of the recognition of roles, responsibilities and rights of women and men in forest management.

Acknowledgments

Authors acknowledge the Lower Tana River communities and administration for agreeing to be part of this study. We also thank the workshop participants both at stakeholder and national feedback workshop for their contribution. The study was funded by IDRC, and led by LEAD Francophone Africa.

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