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Understanding levels and motivations of rural women engaging in Forest Management Institutions: Evidence from developing countries

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Although studies emphasize that rural women are persistently being marginalized in forest governance in the Global South, some feminist scholars contend that women are still joining and engaging in forest management institutions. Drawing on the ‘Typology of Participation’ model and the ‘Gender Box’ framework, this article intends to widen our understanding of the levels and motivations of rural women participating in forest management institutions in developing countries. Published journal articles, theses, organizational reports, and conference papers were reviewed. The review demonstrates that some of the rural women who joined forest management institutions attended forest meetings, spoke during the meetings, performed some specific tasks, participated in various forest conservation initiatives, took leadership positions, and influenced forest use decision making. Existing literature further advances that the factors operating at micro-scale, meso-scale, and macro scale levels enabled, motivated and forced women to join and continue engaging in forest management institutions. This article proposes that forest policy makers, practitioners, and academicians should re-focus their interests on examining the influence of: rural men, women empowerment, adoption of information technology, and gendered sharing of roles and benefits on the continuity of women involvement in forest management institutions.

Key words: Forest governance, forest management institutions, ‘gender box’ framework, rural women, ‘typology of participation’ model.

INTRODUCTION

There is consensus within feminist literature that women are significant in the achievement of forest management institutions’ objectives mainly because women have diverse indigenous ecological knowledge, positive attitudes towards the environment and ability to persuade other women to support forest conservation initiatives (Abate, 2020; Hosseinnezhad, 2017; Kaeser et al., 2018;

Leone, 2013; Upadhyay et al., 2013). Forest management institutions comprise community based forest organizations, forest associations, forest user groups, and forest decision making committees that are involved in the management, protection, and conservation of forest resources (Agarwal, 2009a). Through the participation of women in these forest management institutions, some

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scholars point out that women are able to voice their concerns during meetings, bargain for access to forest resources, engage in decision-making, and minimize socio-cultural restrictions on access to forest resources (Abate, 2020; Giri, 2009).

Other social scientists observe that the incorporation of rural women in forest conservation groups increases the 'pool' of citizens monitoring forests and apprehending illegal forest users, enhances transfer of information about forest use rules and conservation programmes, promotes inculcation of conservation values to the future generations, curbs adverse forest conflicts and enhances forest regeneration (Abate, 2020; Agarwal, 2009b; Coleman and Mwangi, 2013; Giri, 2009; Ngigi et al., 2017). Within the forest user groups, other feminist researchers advance that rural women are allowed to collect forest products for household consumption as well as utilize the money obtained from forest organizational activities to promote their well-being and that of their households (Giri, 2009; Ongugo et al., 2017).

Drawing on the Bina Agarwal's model of 'Typology of Participation', women are involved in forest management institutions at six levels, namely: nominal, passive, consultative, activity-specific, active and interactive (Agarwal, 2001, 2010). Nominal participation is characterized by women being members of a forest management institution and paying the membership as well as the annual subscription fees (Agarwal, 2001, 2010). In line with the typology of participation framework, passive participation in forest management institutions is indicated by women attending forest based meetings but they remain silent during the meetings (Agarwal, 2001, 2010; Lewark et al., 2011). As a mechanism for involving women passively in forest management, Nhem and Lee (2019) recommend that women should be motivated to attend forest workshops or meetings that according to Samndong (2018) usually take place within the church compounds, village schools and residence of local leaders.

During the consultative participation, Agarwal (2001, 2010) emphasizes that the women members of forest management organizations express their opinions or voice their forest access concerns but they rarely influence the forest decisions made. As noted by Agarwal (2001, 2010) activity-specific participation is characterized by women performing specific roles. Agarwal (2001, 2010) advances that active involvement in forest management institutions is indicated by women not only expressing their opinions but also engaging in critical environmental actions. Finally, Agarwal (2001, 2010) proposes that during the interactive involvement in forest governance women were not only leaders of forest based organizations but also they influenced forest decisions and engaged in empowering activities.

However, some studies from developing countries argue that women are persistently being marginalized in

forest management institutions. In their 'Gender Box' framework, Colfer and Minarchek (2013) theorize that the factors influencing gendered involvement in forest management operate at three inter-connected scales, namely: micro-scale, meso scale and macro-scale. At the micro-scale level, Colfer and Minarchek (2013) advance that the engagement of women in forest management institutions is determined by domestic roles to be performed, women's ecological knowledge, and intra-household power dynamics. Documented evidence from developing nations show that due to performance of reproductive roles (e.g. child care, collecting firewood, fetching water and cooking) as well as productive roles (e.g. farming and other non-farm livelihood activities) women encountered time constraints that negatively influenced their attendance of forest meetings and seeking of leadership positions (Elias, 2017; Eneji et al., 2015; Mashapa, 2020; Ongugo et al., 2017; Samndong and Kjosavik, 2017; Stiem and Krause, 2016). Some authors affirm that unequal intra-household gender relations and domestic violence against women by their husbands, influenced when and why women should attend and speak during forest meetings (Eneji et al., 2015; Samndong, 2018; Samndong and Kjosavik, 2017; Stiem and Krause, 2016).

With regard to factors operating at the meso-scale level, Colfer and Minarchek (2013) contend that access to natural resources, forest meeting information, educational opportunities, and financial resources influenced women's involvement in forest management organizations. Existing forest governance studies advance that since some rural women had limited access to forest resources they were demotivated from attending forest meetings, voicing their opinions during meetings and making forest management decisions (Abate, 2020; Barrow et al., 2016; Mhache, 2018). More studies confirm that women's failure to get information about the time and venue of forest meetings and illiteracy among women restricted them from attending meetings and engaging in legal and financial management activities of forest institutions (Eneji et al., 2015; Samndong, 2018; Stiem and Krause, 2016). In addition, financial constraints hindered women from joining forest management institutions as well as bargaining for various forest resources (Egunyu and Reed, 2015; Eneji et al., 2015; Samndong, 2016).

At the macro-scale level, Colfer and Minarchek (2013) propose that socio-cultural norms, religious beliefs and contemporary issues influenced the involvement of women in forest management institutions. Due to restrictive socio-cultural norms and religious beliefs, some researchers reiterate that women were discouraged from attending forest meetings (Mhache, 2018; Samndong, 2018; Stiem and Krause, 2016), speaking during forest meetings (Humphries, 2013; Mhache, 2018; Mukoni et al., 2018), planting trees in deforested areas

(Agevi et al., 2014), seeking leadership positions (Coleman and Mwangi, 2013; Eneji et al., 2015; Mashapa, 2020; Ongugo et al., 2017), and making decisions within forest executive committees (FEC) (Bandiaky, 2008). Also, advanced in literature is the argument that restrictive forest laws and policies constrained the involvement of women in forest rehabilitation projects (Baral, 2014; Tesfaye, 2017).

Despite these restrictions, there is growing body of evidence within the feminist literature that women are still engaging in forest management institutions (Nkengla, 2014) and more so other women are joining forest management institutions in developing countries (Baral, 2014). The present study intends to widen our understanding of the level of women involvement in forest management institutions and factors motivating women to join and continue engaging in forest management institutions with a view of informing on forest policy, practices and research in developing countries.

RESEARCH METHODOLOGY

This article is contingent on desktop review of empirical studies published as journal articles, theses, conference papers and organizational reports. In this paper, existing scholarly work on rural women engagement in forest management institutions in developing countries (South Asia, South East Asia, Africa, Central America and South America) was reviewed. Bowen (2009) proposes four main analytical procedures that are used for document analysis, namely: finding, selecting, appraising and synthesizing the research documents. With regard to finding the research documents, the references were searched using google scholar, sage journals, African Journals Online and university repositories. The literature search was guided by key words such as: '*level of women participation in the forest management institutions in developing countries*' and '*factors that motivate women to continue participating in forest management institutions in developing nations*'.

In relation to selection (sampling) of relevant reference materials, there was skimming of research titles and abstracts as well as reading of the whole research documents of which 90 references were found to be substantially relevant for the review (Bowen, 2009). With regard to making sense (appraising) and synthesis of the existing published literature, the content included in this review was based on the concepts and themes advanced in the feminist literature as well as theoretical frameworks of 'Typology of Participation' and 'Gender Box' to achieve the specific objective of this study. However, the research materials that did not focus on the specified themes were excluded during the review process. In addition, all the reviewed literature was limited to materials published in English particularly between 2000 and 2020. Also, due to access restrictions on some relevant references, only those research references without restrictions were downloaded and used.

RESULTS AND DISCUSSION

This section presents the reviewed literature on the: levels of rural women engagement in forest institutions, motivations of rural women to join and continue engaging

in forest management institutions, and implications on forest policy, practice and research as indicated in the following.

Levels of rural women engagement

Using the Bina Agarwal's model of 'Typology of Participation', levels of rural women engagement demonstrates that women engage in forest management at nominal, passive, consultative, activity-specific, active and interactive levels.

Nominal level

Some scholars posit that women are members of community forest decision-making institutions. As rightly observed by Samndong and Kjosavik (2017), women were members of the village traditional councils that were concerned with making decisions about the use of village forest lands in the Democratic Republic of Congo (DRC). Studies from Ethiopia corroborates that women are members of 'Farm Africa' which is a local based organization that is mandated with re-demarcation of forest boundaries (Ayana et al., 2015). Research conducted in Senegal by Bandiaky (2008) confirms that women were members of 'a special reserve association' that included men as well as young people.

Many feminist studies from developing countries confirm that women are members of forest rehabilitation and conservation organizations. Guided by the concept of feminist institutionalism, Baral (2014) affirms that women were members of community based forest conservation organizations in Nepal. Research findings from Uganda support this argument by revealing that women were members of community Based Forest Organizations such as Rwoho Environment Conservation and Protection Association (RECPA) that dealt with planting of trees (Banana et al., 2009; Ruta, 2015). More research conducted in Kenya shows that women residing near forested areas engaged in forest rehabilitation through their involvement in Community Forest Associations (CFAs) (Agevi et al., 2014; Mutune et al., 2015; Ongugo et al., 2017).

Some feminist scholars advance that women were members of forest user groups in the global south. Contributing to this debate, Herawati et al. (2019) confirm that women just as men were members of Peat-land community group in Indonesia. Studies from Cameroon tend to concur with this argument by pointing out that women were not only members of Mount Cameroon *Prunus Africana* exploitation organization (Ngono and Munongo, 2014) but also belonged to forest marketing and saving associations (Awono et al., 2010). Similarly, existing literature from Uganda indicates that women were

members of mixed-gender and women-specific groups within the forested spaces that were concerned with the exploitation of forests resources (Egunyu and Reed, 2015). In their study based in Kenya, Chisika and Yeom (2020) observe that women were members of tree producer associations such as Kisii Tree Planters Association (KTPA).

Several scholars contend that women are members of forest management committees in developing countries. Confirming the involvement of rural women in forest committees in India and Nepal, feminist scholars observed that women were members of women-dominated forest protection committees such as Baghadevi Forest Protection Committee (BFPC) as well as Forest Executive Committee (FEC) (Agarwal, 2010; Das, 2011; Rout, 2018). In Africa, empirical evidence from Senegal demonstrate that women especially presidents of women associations were among the members of the village executive committees (VEC) that were mandated to make decisions over use of forest land at the village level (Bandiaky, 2008). Similar results were observed by Samndong and Kjosavik (2017) who found out that women were members of the FEC in some villages within Équateur province of the DRC. In his study on role of gender on forest management in Zanzibar, Mhache (2018) found out that a few women (4.7%) were members of forest committees.

Passive level

Feminist scholars argue that some women attended forest based meetings. Studies from Nepal confirm that women attended general assembly forest meetings (Lewark et al., 2011). Similarly, Rout (2018) indicates in a study carried out in India that some women were involved in general meetings of forest protection committees. Although women attended forest general assembly meetings in Nepal, Sanjay (2017) contends that women did not speak during these meetings but listened to what men were discussing and witnessed the decisions being made (confirms Bina Agarwal's model). Earlier studies from India and Nepal point out that a small proportion of women attended the General Body (GB) or Executive Committee (EC) meetings (Agarwal, 2001). Since not all women attended forest management meetings in Vietnam, Tuijnman and other (2020) advance that women organizations sent some female representatives to the community forest management meetings and these representatives were able to update other members of the organization during their occasional meetings.

More studies from South America indicate that some women attended forest meetings. For example, Espinosa (2010) in her study based in Peru found out that some women attended community wildlife meetings in cases where their husbands were absent more importantly

because absenteeism during meeting attracted a fine.

Stiem and Krause (2016) point out that women attended mixed gender meetings especially the traditional clan meetings where community forest governance issues are discussed in the DRC. Although more women attended forest based meetings in Zambia, Rukundo (2018) reveals that some of the women kept quiet during these meetings (supporting the Bina Agarwal's theory). In her doctoral study, Humphries (2013) found out that women were present during Community Based Natural Resource Management (CBNRM) meetings in Tanzania. In their study on women participation in forest management Kenya and Uganda, Coleman and Mwangi (2013) and Obonyo and Mogoi (2009) emphasize that some women attended Forest User Group meetings alongside their spouses.

Consultative level

There is consensus among the feminist scholars that some women had the confidence to speak when given opportunities to do so during forest management meetings. Studies from India and Nepal confirm that some women spoke during forest meetings (Agarwal, 2010; Sanjay, 2017). This revelation contradicts the earlier findings by Bina Agarwal (2001) who found out that some women only heard about the forest plans through their spouses while other women in seldom instances were consulted in India and Nepal. Although women were given opportunities to speak during meetings in Nepal, Lewark et al. (2011) contend that the opinions of the women were either disregarded or given less priority which is in line with Bina Agarwal's 'Typology of Participation' framework. Studies from South America affirm that women were vocal during forest based meetings (Shanley et al., 2011). Although men dominated the forest based meetings in Brazil, Shanley et al. (2011) posit that women were speaking during general meetings that dealt with political and organizational agenda in extractive reserves which support the assertions by Agarwal in her theory of 'Typology of Participation'.

A growing body of evidence from Africa supports the 'Typology of Participation' argument that women speak during forest meetings. Advancing this argument, Ngono and Munongo (2014) reveal that women gave their views about community projects dealing with the exploitation of the *Prunus Africana* in Cameroon. Other studies from Cameroon and Tanzania focusing on the role of women in Reducing Emissions from Deforestation and Forest Degradation (REDD+) demonstrated that 83% of the women actively participated in Cameroon and 93% of the women in Tanzania believed that they engaged actively during village decision making meetings (Larson et al., 2015). In the Democratic Republic of Congo, Samndong and Kjosavik (2017) and Stiem and Krause (2016)

advance that some women spoke during meetings even in the presence of men which is contrary to the propositions of 'Typology of Participation'. Empirical evidence from Tanzania show that women deliberated on the CBNRM issues mainly during women dominated meetings (Humphries, 2013). Bourne et al. (2015) reveal that there was consultation between the husbands and wives concerning making decisions about trees species and planting area in Uganda.

Activity-specific level

Documented evidence from developing countries demonstrated that women participated in forest protection by taking up roles as informal forest guards within the community managed forests. In India, this is witnessed in the engagement of both men and women in forest patrols to guard against violation of forest rules and apprehension of illegal forest users (Rout, 2018). With regard to sharing of forest patrol duties in Odisha (India), Siripurapu and Geores (2016) point out that women patrolled the forest during the day while the men did the patrol at night. Similarly, studies from Nepal and Thailand indicate that women engaged in patrolling the forest and reported cases of the forest intruders (Lewark et al., 2011; Upadhyay et al., 2013). In their study on the role of women in REDD+ implementation in Cameroon, Larson et al. (2015) found out that 65% of the women sampled engaged in monitoring the use of forest resources. In Zambia, Rukundo (2018) confirms that some women were involved in the forest patrol.

Apart from engaging in forest patrol, more studies reiterate that women were involved in curbing forest fires, enforcing the forest regulations, and working as forest support staffs. A study from Tanzania corroborates that women engaged reducing incidences of forest fires caused by honey gatherers (Larson et al., 2015; Mhache, 2018). In addition, Monterroso et al. (2019) found out that women also participated in the enforcement of local forest use rules in Indonesia, Peru, and Uganda. In relation to women working as forest support staff, empirical studies from Indonesia reveal that women worked as forest agency officers in the implementation of forest tenure reforms (Herawati et al., 2019). Similarly, Onyango (2013) pointed out that there were women working as the Station In-charge officers within the Kenya Forest Station offices in Embu County.

Several environmental feminists advance that women engaged in tree nursery management, planting trees, and managing the planted trees. Studies from Nicaragua confirm that women participated actively in the managing of tree nurseries and planting trees (Evans et al., 2017). In Indonesia, Manginsela (2017) and Mulyoutami et al. (2015) corroborate that women participated in the management of tree nursery and planting of trees and

tree crops within the forest. In Vietnam, Catacutan and Villamor (2016) indicate that both men and women participated in planting of trees. Similar findings were reported in Nepal in a study by Lewark et al. (2011) who observed that women engaged in community forest rehabilitation programmes through planting, weeding, thinning, pruning and harvesting. While applying the typology of participation in their studies in Thailand, Upadhyay et al. (2013) reveal that a high percentage of women (90%) performed specific forest tasks and duties. A study conducted in Mexico National Park by Pineda-López et al. (2015) confirm that through women groups, women participated in the pruning, collecting and pulling the branches of the Christmas Wreath tree out of the forest.

Also, Elias (2015) confirms that both men and women engaged in shea tree management practices such as digging, planting, weeding and pruning in the central-west of Burkina Faso. Gautier and van Santen (2014) and Nkengla (2014) indicate that some women participated in the transplanting of tree seedlings and planted trees within their compounds in Cameroon. In Zambia, Rukundo (2018) found out that women participated in tree planting. Studies from Ethiopia reveal that women lend a hand in farm preparation, ploughing, transplanting, and weeding (Abate, 2020). Scholars observe that women engaged more substantially in tree-seedlings management, tree planting and weeding in the tree plantations in Uganda (Bourne et al., 2015; Egunyu and Reed, 2015). In terms of women participation in tree management activities in Kenya, forest scholars advanced that women provided labour in tree nursery management, planted tree seedlings, and silvicultural activities that yielded firewood (Mutune et al., 2015; Mwatika, 2013; Obonyo and Mogoi, 2009). With regard to which tree species women were likely to plant, Kiptot (2015) argued that women had a higher probability of planting trees that could provide firewood, fruits, fodder and improve soil fertility.

Active level

A growing body of literature from global south indicates that women participate in forest rule and policy making. Despite regional asymmetries in the percentage of involvement, recent studies by Monterroso et al. (2019) show that women participated in the formulation of forest rules in Indonesia, Peru, and Uganda. In their studies based in Asia, Gautam (2009) and Rout (2018) found out that women participated in the decision-making on the rules that guide closure, access and use of forest resources in India and Nepal. Recent studies from Nepal reiterate that women were involved in the drafting of the constitution and operational plan of the forest groups

(Sanjay, 2017). Upadhyay et al. (2013) in their study carried out in Thailand reveal that women engaged in observing the traditional rules and practices as well as implementing the forest laws and regulations. In their study on role of women in REDD+ implementation, Larson et al. (2015) found out that 82% of the women sampled engaged actively in the formulation of village rules for forest resource utilization in Cameroon. Existing literature from Tanzania emphasized that women participated in forest use rule making (Larson et al., 2015; Mhache, 2018). In relation to women involvement in forest policy formulation in Kenya, Taylor (2013) reiterates that Professor Wangari Maathai (a woman and the Assistant Minister of Environment and Natural Resources in Kenya between 2002 and 2007) assisted in the formulation of the Kenya's Forest Act of 2005 that is regarded to be one of the progressive forest policies in developing countries.

More studies from developing countries advance that women are engaging in environmental movements and actions. In India, studies note that through involvement in environmental movements such as Chipko movement women fought against cutting of trees by timber contractors and advocated for the regeneration of forest resources within the Himalayas Mountain in India (Tyagi, 2020). In the case of women involvement in environmental movement in Kenya, Taylor (2013) argued that Wangari Maathai (a Kenyan woman) through the Green Belt Movement demanded for the stoppage on the privatization of public green spaces such as Uhuru National Park within the City of Nairobi in Kenya. With regard to women engagement in demanding for forest rights in Thailand, Upadhyay and other scholars (2013) contend that women protested and demanded for their rights during the conversion of the Ban Thung Yao community forest into a national park in Thailand.

Some feminist scholars advance that women play a critical role in advocating for accountability within forest management institutions. In the process of demanding for accountability within forest management institutions in Senegal, Bandiaky (2008) argues that women leaders expelled fellow corrupt women from the forest association and excluded other women from '*receiving food and seed donations*' (p70). Moreover, Bandiaky (2008) states that '*other women resigned from the reserve activities as a show of disagreement and frustration with their discrimination and marginalization*' (p70). Concerning promotion of accountability in the operations of forest conservation and protection association in Uganda, Ruta (2015) observes that both men and women issued threats, sabotaged activities, refused to attend meetings. Some women employed shunning techniques, demanding for per diems to attend project-related meetings, shamed the leaders, confronted the leaders in social places, made up stories and launched complains to higher level authorities (Ruta, 2015).

Interactive level

There is growing consensus among the feminist scholars that women occupied leadership positions within forest management organizations in developing countries. In their study in Odisha (India), Siripurapu and Geores (2016) indicate that women had established exclusive women executive committees (WEC) which had women as the chairperson and secretary who made decisions over the use of forest resources. Also, an empirical study in Nepal advances that women held half of the key position within the FEC (Devkota, 2019). In relation to leadership positions within forest conservation executive committees (FCEC) in Kenya and Uganda, contend that women occupied positions of secretary and treasurer (Agevi et al., 2014; Egunyu and Reed, 2015; Mogoi et al., 2012; Ongugo et al., 2017; Wamae, 2013).

Documented evidence from developing countries contradicts the assertion by Bina Agarwal in the 'Typology of Participation' model that women rarely influence decisions within forest management institutions. Contributing to this debate, Evans et al. (2017) observe that more than 60% of the women sampled in their study conducted in Nicaragua were engaging in forest decisions making within community groups, local council meetings and meetings with other stakeholders. An empirical study conducted in Burkina Faso confirms that women solely made decisions about shea tree selection for conservation in the fields owned by women (Elias, 2015). Brown (2011) argues that the involvement of both men and women in decision making in the Congo Basin forest (Cameroon, Central African Republic, and the DRC).

More studies from Cameroon and Tanzania reveal that more than 70% of the women believed that they were adequately represented in decision making about forest use and more than 50% of the women believed that they were able to influence village making decisions (Larson et al., 2015). Similarly, Egunyu and Reed (2015) affirm that both women and men engaged in making decisions on forest issues in Uganda. In her study based in Peru, Espinosa (2010) avers that women engaged in decisions related to wildlife such as how much game meat is consumed, how much is sold, and how the money obtained is used. Using the Typology of Participation model, Upadhyay et al. (2013) observe that women in Thailand engaged in empowering activities such as conflict resolution, taking personal initiatives, and organization and co-ordination of training within other organizations.

Motivations of rural women

Guided by the 'Gender Box' framework as proposed by Colfer and Minarchek (2013), this aspect of the study examines the factors motivating women to join and

continue engaging in forest management institutions at the micro-scale, meso-scale and macro-scale levels as elaborated subsequently.

Micro-scale level

Existing literature demonstrates that women are motivated by socio-economic factors operating at individual and household levels. As rightly observed by Agarwal (2010) women from low economic status households in India and Nepal were more vocal in social spaces than women from rich households, simply because they had a lot to benefit in case the decisions made go their way. In contrast, Sanjay (2017) indicates that women from elite households engaged in the forest discussions during meetings in Nepal. In the DRC, Samndong and Kjosavik (2017) and Stiem and Krause (2016) advance that some women (widows, married, and single) mainly those with external exposure, training, high level of education, and traditional ecological knowledge spoke during meetings even in the presence of men. Some scholars affirm that young and educated women were members of FEC especially as secretary and treasurer in Uganda and Cameroon (Egunyu and Reed, 2015; Ingram, 2014). Contrary findings were noted in Brazil since Meola (2013) observes that married women with old children are not restricted by gender relations to attend forest meetings since their children are old enough to take care of themselves.

Studies from developing nations demonstrate that absence of men (due to divorce, migration or death) within the household motivated women to engage in forest management institutions in developing regions. In Indonesia, Herawati et al. (2019) argue that women from female headed households were likely to join community peat-land groups and participate in community peat-land activities since men were absent due to either death or out migration. Meola (2013) points out that women only ascended to community forestry leadership positions only after the death of their spouses in Brazil. Although women were culturally restricted from accessing land based resources including forests in Ethiopia, Abate (2020) observes that women were only able to gain the rights to use the land when they became divorcees or widows.

In their studies on the effect of outmigration of men on women's participation in community forestry in Nepal, Giri (2009) and Giri and Darnhofer (2010) demonstrate that the left-behind women from nuclear households had a higher tendency of attending general assembly forest meetings, speaking up during meetings, and taking of CFUG executive positions since they could assume the roles and responsibilities of their husbands as well as increased their access to forest products with minimal cultural restrictions. Congruent results were reported in Morocco whereby de Haas and van Rooij (2010) found

out that women living in nuclear families gained temporal decision-making powers in relation to use of financial resources, crops to be cultivate and things to be bought. Consequently, due to public exposure compounded with better negotiation abilities, Giri (2009) affirms that women were able to speak up their forest related issues during meetings and influence decisions made. Furthermore, Ingram et al. (2014) reveal that women gained the power and control over some Non-Timber Forest Product by applying the informal bargaining power within the family and traditional control of subsistence practices in domestication and cultivation of food crops.

Meso-scale level

Colfer and Minarchek (2013) theorized in the 'Gender Box' framework that access to livelihood resources influenced gendered engagement in forest governance. Due to women's need to secure a stable supply of forest products in Nepal, Giri (2009) and Shrestha and Shrestha (2017) argue that women joined community forest user groups so that they could benefit from these forest products. This revelation resembles the existing literature from Kenya and Uganda which show that women were motivated to join forest management institutions in order to gain access to forest resources (e.g. firewood, herbal medicine, tree seedlings, etc.) and forest land (for cultivation and grazing) with minimal restrictions (Agevi et al., 2014; Egunyu and Reed, 2015; Mutune et al., 2015; Ruta, 2015). In Nepal, Giri (2009) supports the reasoning that women belonging to other social organizations were likely to join CFUG due to having experience and gained confidence to lead.

More studies from developing region confirm that access to livelihood assets positively influence women to attend forest meetings. Studies from India and Nepal confirm that women attended forest based meetings to gain access to forest products (such as firewood needs) as well as due to time availability and the presence of a substantial number of female members during the meetings (Agarwal, 2010; Baral, 2014; Giri and Darnhofer, 2010). Some scholars point out that women were present during general assemblies and committee meetings in Nepal since men played a critical role in passing information to their spouses concerning upcoming meetings and encouraging their spouses to attend the forest meetings (Giri and Darnhofer, 2010; Lewark et al., 2011). In Zambia, women attended forest related meetings mainly to gain access to benefits that were likely to be accrued in future (Rukundo, 2018).

There is growing evidence from developing countries that demonstrate that women are motivated to speak during forest meetings due to access to livelihood resources. Scholars have attributed an increased in women's expression of their opinion during forest related

meeting to the interaction between rural women and women activists of social groups in Brazil (Shanley et al., 2011). Since women are reluctant to speak up in public mixed gender meetings, Colfer et al. (2015) demonstrate that women influenced others outside formal gatherings through '*communicating ideas to others, negotiating, networking, and communicating in the national language*' (p.72) to an extent that it changed community decision-making within the meetings in Indonesia. However, Agarwal (2010) and Sanjay (2017) argue that giving opinions to some women depended on whether their opinion had already been expressed by another female member, the view required to be repeated, other women were present during the meetings (see critical mass hypothesis by Agarwal (2009b), the view was of interest to women, and there existed conflicts between the women and the forest guards. Due to marginalization of women in forest meetings in Nepal, Sanjay (2017) observes that women formed their group that enabled them discuss their concerns and challenges associated to forest management.

Documented evidence from developing countries shows that women were encouraged to engage in tree management activities due to access to livelihood assets. While accounting for the driving force for the involvement of women in forest conservation programmes in Belize (a country in Central America), Kaeser et al. (2018) argue that women were motivated by moral support, constant motivation, need to engage, obtain income and raw materials, availability of market for forest products and had knowledge about forest conservation. In Uganda, Nabanoga (2005) advances that women have the financial resources which they can use to buy land and plant trees on their land. Concerning performance of specific forest management activities in Kenya, Mutune et al. (2015) reiterate that women preferred to engage in tree seedling management and thinning activities that would yield firewood.

Studies from developing nations argue that women were positively influenced by access to livelihood assets to occupy leadership positions and make decisions in forest management institutions. Supporting this argument, Giri (2009) argues that women are increasingly engaging in decision making due to women's increased awareness of the significance of CFUG and gaining of confidence in their capacity to manage the CFUG in Nepal. Due to men's inability to curb high rate of forest destruction and increased confidence in women's capacity to lead, a growing body of knowledge from Nepal demonstrate that men motivated women to take part in forest protection, management and use (Giri, 2009). In Senegal, Bandiaky (2008) rightly observes that the inclusion of women in the reserve committee was based on kinship and friendship whereby women were co-opted by male leaders (mainly their parents, husbands or friends).

Macro-scale level

Feminist authors advance that external support encouraged women to participate in forest management institutions in developing nations. As Siripurapu and Geores (2016) clearly state that '*local civil society organizations and forest federations*' (p.11) are critical in '*motivating the local communities*' (p.11) to engage in forest conservation in India. In addition, some scholars argue that women attended forest based meetings in India and Nepal since they had received external support from Forest Department and the Non-Governmental Organizations (especially women groups) (Agarwal, 2010; Giri and Darnhofer, 2010). In their study in Vietnam, Tuijnman et al. (2020) contend that local forest institutions conducted a door to door initiative to educate the entire household members about the details of the Payment of Environmental Services. Also, Tuijnman et al. (2020) argue that local women's organization assisted in addressing local forest protection leaders and forest-associated concerns that required being resolved.

In Brazil, Meola (2013) opines that attendance of meetings and involvement in productive associations is determined by the women's ability to bring their children or get child care services. Meola (2013) further argues that the support from management agencies may enhance more equitable gender relations such that women and men relate with greater equality. Earlier studies from Brazil advance that women are increasingly participating in the National Council of Rubber Tappers in Brazil due to external support and increasing commitment on the side of the organization's directors (Shanley et al., 2011). In Mexico, Pineda-López et al. (2015) found out that since 2009 the federal government institutions began including Women Group members in the pruning of the Christmas wreaths branches in the Mexican National Park which was initially regarded a male task. While accounting for the reasons for women joining forest organizations in Burkina Faso, Elias and Arora-Jonsson (2017) point out that Non-Governmental Organizations aided in the establishment of the Shea Butter women associations. In the Democratic Republic of Congo (DRC), Samndong and Kjosavik (2017) observe that the inclusion of women in ECs of village level associations was engineered by the various organizations. Similarly, Ruta (2015) argues that external pressure engineered the presence of women in FEC.

Existing literature show that national forest policies and governance systems influenced the involvement of women in forest management institutions. While accounting for the rise in the number of women engaging in forest management in Nepal, Devkota (2019) points out that some women attended the Community Forest User Group (CFUG) meetings in Nepal since it was mandatory. This finding resembles the work by Lewark et al. (2011) who reveal that community forest regulations in

Nepal advocates for gender inclusivity in the forest committee key positions such as treasurer and chairperson. Furthermore, Siripurapu and Geores (2016) affirm that awareness of the power of Prevention of Atrocities Act (India) among women gave them the power to overcome the restrictions of local traditions and law with more courage and confidence.

Implications on forest policy, practice, and research

Based on the reviewed literature, this part of the study proposes four main fundamental implications on forest policy, practice and future research.

Men should be perceived as motivators and game changers in enhancing gender mainstreaming in forest management institutions

From the review, it is clear that men contributed greatly to the involvement of women in forest management institutions. For instance, husbands aided in the transmission of information about upcoming forest based meetings to their spouses and encouraged their spouses to attend forest meetings especially when these men were away performing other productive activities (Giri and Darnhofer, 2010; Lewark et al., 2011). There is also indication that men supported the inclusion of women in decision making process concerning forest protection, management and use matters (Giri, 2009). Based on this observation, it is recommended that forest departments and community based forest institutions within developing nations should encourage men to attend forest based meetings along with their spouses (Olunga, 2013). Furthermore, feminist researchers should carry out an in-depth empirical study to assess the extent to which men could motivate women to engage in forest management institutions now and in future not only as members but also as leaders.

Women should be academically, socially and economically empowered

The findings of this review confirm that empowered women are more likely to engage effectively in forest management institutions (Abate, 2020; Awono et al., 2010; Ingram et al., 2014; Stiem and Krause, 2016). Specifically, women with adequate academic credentials, financial resources, leadership competencies and exposure had a higher tendency to attend forest meetings, speak out during the meetings, take up leadership positions and participate in decision making within FEC. Building on this revelation, it is recommended that Forest Departments, community based forest organizations, non-governmental organizations, and local

leaders should support training of women in forest management and conservation issues and advocate for the enforcement of the one-third gender rule in the membership and leadership of forest management institutions (Chinangwa, 2014; Ruta, 2015; Upadhyay et al., 2013). Due to insufficient information about the impact of more women members and leaders in forest management institutions on forest sustainability in developing countries, feminist scholars should carry out an empirical study to assess the net effect of an increase in the proportion of rural women members and leaders within forest management institutions on forest conditions in African and South American nations.

Information technology should be adopted to break communication bottlenecks

Since existing literature show that insufficient information about the time and venue of the meetings hindered women from attending of forest meetings, it is therefore clear that the use of mobile phones and social media platforms can be used by forest management organization members and leaders to break this communicational barrier. Also, other information technologies such as television, radio, and newspapers can be adopted by forest departments and other forest organizations to educate public and change the negative social cultural norms and traditions that hinder the involvement of women in public arena (Herawati et al., 2019). With regard to research agenda, there is need to conduct an empirical research on the effectiveness of the use of information technologies on the intra-generational and inter-generational involvement of women in forest management institutions in developing nations to ascertain these observations.

There should be gender sharing of forest management roles and the benefits accrued from forest resources

The review demonstrates that women are motivated to join forest management institutions by the performance of roles and the benefits accrued. To ensure women are included in activities of forest management, the leaders of forest management institutions should ensure gender role sharing in tree planting, forest monitoring and apprehension of forest intruders, and harvesting of forest resources. Community forest executive (CFE) leaders should promote transparency and equity in the sharing of forest income and resources. It is recommended that an in-depth research should be carried out to examine whether gender role sharing would encourage intra-generational and inter-generational involvement of women in forest management institutions in developing regions.

More studies should be carried out to examine the extent to which forest benefits motivates women who are already members of FEC to continue being members and encourage other women to join the forest management institutions and participate actively and interactively within these institutions.

CONCLUSION

The review demonstrates that some rural women engaged nominally in forest management institutions through being members of forest rehabilitation and conservation organizations, forest user groups, forest management committees and forest protection committees. Passive involvement of women in forest management was indicated by; some women attending community forest management meetings, general assembly forest meetings, forest protection committee meetings, community wildlife meetings, traditional clan meetings, and Forest User Group (FUG) meetings. In relation to consultative participation in forest management, a few women voiced their forest concerns in a number of developing nations.

In some developing countries, women performed some specific activities such as patrolling the forest to guard against violation of forest rules and apprehension of illegal forest users especially during the day and engaged in tree planting and management. Also, as discussed above, some women participated actively in forest management through making local forest rules, formulation of forest policies and enforcement of local forest use rules. Through involvement in environmental movements such as Chipko movement in India and Green Belt movement in Kenya, women are involved in demanding for the accountability within forest management institutions. Furthermore, women engaged interactively in forest management through occupation of leadership positions (as secretaries and treasurers) and engaged in decision making within forest management institutions.

Factors operating at micro-scale, meso-scale, and macro-scale levels as proposed in the mainly through occupation of leadership positions as Chipko movement in India and Green Belt movement in Kenya, extension of illegal forest users especially during the day and engaged in tree planting and management things to gain access to forest resources. Household economic levels, external exposure, training, and considerable level of education enabled women to gain confidence to speak during the forest meetings. Due to absence of men in the households, women were encouraged to attend meetings, voice their concerns, and make decisions within the forest management institutions in developing regions. In relation to factors at the meso-scale levels, women were motivated by factors such as the need to secure access

to forest products and land, manage forest resource effectively, secure income from the labour services, and acquire forest knowledge and skills. At the macro-scale, enabling factors such as the support from forest departments and Non-Governmental Organizations, social and economic empowerment, and national and forest policies motivated women to engage in forest management institutions.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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