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Forests, food security and gender: linkages, disparities and priorities for action



Background paper for the International Conference on Forests for Food Security and Nutrition

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Key points

- Forestry and agroforestry systems are not gender-neutral. Compared with men, women are frequently disadvantaged, for a range of interrelated cultural, socio-economic and institutional reasons, in their access to and control over forest resources and in the availability of economic opportunities.
- Women often have highly specialized knowledge of trees and forests in terms of their species diversity, management and uses for various purposes, and conservation practices. Compared with men, women's knowledge tends to be linked more directly to household food consumption and health, which is particularly important during food crises.
- Women tend to play specific roles in forestry and agroforestry value chains. These are important for their incomes, and in turn for the well-being and food security of their households. However, women's roles in forestry value chains are generally poorly supported by policy-makers and service providers. The persistent lack of gender-disaggregated data further compounds this problem.
- Empowering women in the forest sector can create significant development opportunities for them and generate important spill-over benefits for their households and communities. Efforts to enhance women's participation in forest-related institutions should be strengthened because women can help to maximize synergies between the forest sector and food security for the benefit of all.

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1. Introduction

Forests and trees on farms are a direct source of food, cash income and a range of subsistence benefits for millions of people worldwide, but there are major differences in the benefits that accrue to men and women. Compared with men, women are frequently disadvantaged in their access to forest resources and economic opportunities in the forest sector due to the following interrelated factors:

- gender-differentiated behavioural norms and social perception of women's roles;
- discrimination in conventional forest/tree and tree product ownership and tenure regimes;
- low levels of literacy, education, physical abilities and technical skills;
- less access for to services such as extension and credit;
- the burden of domestic and child care responsibilities;
- time and mobility constraints;
- limited access to markets and market-related information;
- lower participation by women in rural institutions, for example forest user groups;
- the implicit association of women with the domestic sphere, which is widespread in many societies, both agrarian and industrialized.

The differences between men and women in access to and use of forest products and services result in gender disparities in, for example, access to and use of forest foods, fuelwood, and fodder for livestock; forest management; the marketing of forest and tree products; and participation in forest user groups. Some of these dimensions are expanded on in this paper. The information available to analyze gender differences in the forest sector is largely anecdotal (often from case studies), although several initiatives – including the FAO-Finland Forestry Programme and FAO's National Forest Monitoring and Assessment Programme – are under way to develop rigorous gender-specific indicators to support forest policies and programmes.

2. Gender dimensions of the forest–food security nexus

Food from the forest

The most direct way in which forests and trees contribute to food security is through contributions to diets and nutrition (FAO, 1992). Forest foods – wild leaves, fruits, roots, tubers, seeds, nuts, mushrooms, saps, gums, and forest animals and their products, such as eggs and honey – supplement the foods produced by agriculture and obtained from other sources. Forest foods can assist in coping with seasonal food shortages and shortages due to extreme weather events, natural disasters, human-made conflicts and other shocks (Arnold *et al.*, 2011).

Wan, Colfer and Powell (2011) demonstrated that the gendered division of agricultural labour and food production, combined with the fact that women often have fewer alternative income-earning opportunities than men, means that women tend to collect forest foods to supplement the nutrition of their households. Women play a particularly important role in collecting and processing edible wild plants from forests, as well as in the preparation of household meals by using forest foods to cook (for example) soups, stews and relishes (Vinceti, Eyzaguirre and Johns, 2008; FAO, 2012a). Women often have substantial knowledge on the identification, collection and preparation of highly nutritious forest foods that can complement and add flavour to the staples of family meals. In addition, income generated from these activities by women adds to the purchasing power of households and therefore their food security.

Box 1: Women and forest vegetables in Tanzania

Across Africa, vegetable consumption is lower than recommended dietary intakes. In the East Usambara Mountains in northeast Tanzania, the consumption of traditional leafy vegetables is the best predictor of children’s overall micronutrient intake. The majority of leafy vegetables consumed in the area are wild, collected by women from fields, field margins, fallows and agroforests. Survey data show that, in the wet season, 46 percent of children aged 2–5 years consume vegetables on a daily basis, while in the dry season only 22 percent of children are able to do so. Proximity to the forest is a key determinant of vegetable consumption, particularly in the dry season. Local women reported that those who are poor and live far from the forest must spend a significant amount of time collecting vegetables. In addition, even though they have legal access rights, many women were hesitant to enter reserved forests to collect vegetables for fear of being suspected of illegal activities or of encountering others engaging in such activities (e.g. pit-sawing, mining or hunting). In this setting, having areas with tree cover on the family farm and near to the home supports year-round access to vegetables, with the potential to decrease women’s workloads and improve the nutrition of their families.

Source: Powell, Hall and Johns 2012.

Honey, wild animals, fish and insects are also collected from forests. These collection and hunting activities tend to be more the role of men, and in some places (such as in forest reserves of the Congo Basin and parts of the Peruvian Amazon) they provide the primary sources of animal protein for rural people (FAO, 1992). Men are also more likely than women to be responsible for hanging and smoking wild bee hives and for hunting bush meat such as birds and collecting their eggs (Shackleton *et al.*, 2011; IFAD, 2008).

Agroforestry

Agroforestry, farm forests and home gardens contribute to food security both directly and indirectly by providing a range of products and services. In addition, the protection of natural regeneration and the maintenance and planting of trees on farms provide valuable ecosystem services that increase and sustain agricultural production (Scherr and McNeely, 2008).

There is evidence that agroforestry activities are often gender-differentiated: while men are usually interested in trees for commercial purposes, women are more inclined to favour multipurpose tree species for subsistence use, such as those that provide food, fuelwood and fodder and help improve soil fertility. A

review of 104 studies of gender and agroforestry in Africa (Kiptot and Franzel, 2011) confirmed that women's participation is very high in enterprises such as the production and processing of indigenous fruit and vegetable products, apparently because indigenous species require fewer labour inputs. The review also showed that, in Africa, the extent of women's involvement relative to men in activities such as soil fertility management, fodder production and woodlots is fairly high in terms of the participation of female-headed households but low when measured by the area such households allocate to these activities and the number of trees they plant. In cases where women have low involvement, this is mostly due to a scarcity of resources like land and labour (partly because women tend to do much more household and care work than men) and possibly to women's greater aversion to risk. Some studies have also noted that, compared with men's fields, women's plots tend to have greater number of trees as well as species' richness, possibly because women prefer to have more trees near the homestead, as well as a diversity of species to maintain the health of their children and to broaden the household food supply (FAO, 1999).

Tree tenure – the ownership and use rights of trees – is often differentiated along gender lines, and men usually have overall authority over high-value tree products. However, the gendered nature of access to and control of trees, tree products and related resources is often highly complex, depending on social and ecological conditions and factors such as space, time, specific species, products and uses (Rocheleau and Edmunds, 1997). In many settings, women's rights are actually substantial due to the informal (and often negotiable) nature of customary laws and, in certain cases, the complementarity of women's and men's productive roles. Women's rights, however, may easily become marginalized or may not be recognized, especially in the context of efforts to introduce statutory laws and formal administrative procedures (Quisumbing *et al.*, 2001).

Although women often make significant labour contributions to agroforestry (e.g. by planting, weeding and watering trees), their opportunities in the sector are often limited to low-return activities that are of little or no interest to men, while men tend to control the production and marketing of higher-value products as well as the use of the income so generated (Rocheleau and Edmunds, 1997). Tree products such as charcoal, logs, timber, large branches and poles are typically considered male domains. Thus, in the Luo and Luhya communities in western Kenya, women have the right to collect and use fruits but are restricted from harvesting high-value timber trees. On the other hand, species such as *Sesbania sesban*, which is good for fuelwood and soil fertility improvement, is considered a women's tree, and therefore women have the right to plant, manage and use it as they please (Franzel and Kiptot, 2012). Rocheleau and Edmunds (1997) reported that, among the Akamba community of eastern Kenya, tree-planting and felling were primarily the domains of men, while women enjoyed use and access rights to fodder, fuelwood, fruits and mulch. Gender-differentiated rights and responsibilities in agroforestry are also an important determinant of the adoption of agroforestry technologies and the use of related services, which (if other things remain the same) may further perpetuate existing gender inequalities.

Fuelwood and household energy

Nearly three billion people worldwide rely primarily on wood for cooking, home heating and hot water (Rehfuess, 2006). Limited fuelwood access – due to environmental degradation, local forest regulations – can cause many households to change what they eat, often leading to malnutrition. Similarly, boiling water insufficiently to save fuelwood can contribute to the consumption of contaminated water and poorly prepared food, with potentially life-threatening consequences for pregnant women, the malnourished and sick.

In many agrarian settings, women and girls have the primary responsibility for collecting household fuelwood and may have to walk for several hours, frequently under insecure conditions, to do so. In refugee and conflict situations, women are particularly vulnerable to gender-based violence while collecting fuelwood (WFP, 2012) (Box 2).

Box 2: Supporting women's safe access to fuelwood

Refugees and women living in drought conditions often need to go deep into the bush to collect fuelwood and may need to fell trees or uproot grasses, thereby harming fragile ecosystems. They may need to venture into unsafe areas and are vulnerable to rape and other attacks. Researchers at the World Food Programme (WFP) found that, in conflict zones such as North Darfur and Karamoja region of Uganda, some women spent a full day's wages on fuelwood alone, while others sold food rations to purchase it. The SAFE project supported the distribution of fuel-efficient stoves with the aims of reducing the quantity of fuelwood required for cooking and improving the cooking environment by reducing wood smoke. Women who used improved stoves used less fuelwood and were less exposed to the physical dangers involved in collecting fuelwood.

Source: WFP, 2012.

Shrinking access to fuelwood near the home – which is becoming a pressing reality in many developing countries – and the time taken to collect fuelwood often mean that women have less time for other activities (Wan, Colfer and Powell, 2011). Gbetnkom (2007) concluded that constraints placed on women's income-earning potential by fuelwood scarcity may have a significant impact on household food security. The increased time spent gathering fuelwood leaves less time for cash-earning activities and for tasks to support the food security and health of family members, while increasingly expensive purchased fuelwood leaves less money for buying food.

Women are not always the main fuelwood collectors (Sunderland *et al.*, 2012). For example, when the distances become too great for fuelwood collection on foot, or where there are naturally low densities of fuelwood (e.g. in the Kalahari), men tend to assume the role of fuelwood collection, making use of transportation such as donkey carts and small trucks. Men are also the main collectors of fuelwood for sale (P. Shackleton, personal communication, 2013). In Latin America, men are overwhelmingly responsible for fuelwood collection.

With regard to the cooking environment, the combustion of biomass (including fuelwood) releases significant quantities of pollutants that damage the health of those who do the cooking, the vast majority of whom are women. Poor ventilation in kitchens is common in many parts of the world and increases the health risk associated with cooking. Exposure to indoor smoke has been found to be responsible for 39 percent of deaths due to chronic pulmonary disease in women, compared with 12 percent in men (Wan, Colfer and Powell, 2011; Rehfuess, 2006). Disease and nutrition are cyclically linked: infections associated with wood-smoke exposure significantly increase women's nutrient requirements (e.g. Vitamin A), and those who are micronutrient-deficient are more likely to develop infections after exposure to wood smoke.

Fodder for livestock

Many tree species found in forests, woodlands and parklands and on farms are used for animal feed; they may be browsed directly by roaming livestock or collected and fed to livestock in stalls. It has been estimated, for example, that 75 percent of tree species in tropical Africa are used as browse by domestic livestock, such as sheep, goats, cattle, camels and donkeys (FAO, 1991). Women (and children) play crucial roles in providing livestock with fodder, and women generally perform activities such as collecting grass and forage (including fodder tree forage), feeding and grazing animals, cleaning animal sheds, and composting animal waste. These activities contribute significantly to domestic livestock production, which in turn influences milk and meat supply and contributes to household income. Tree-based fodder is also used to sustain draught animals for ploughing and in the production of manure that increases soil fertility and facilitates cooking (especially when fuelwood is in short supply) and may be used as a material in house construction and household compound maintenance.

Data from the East African highlands illustrate the role of women in relation to fodder for dairy cows. According to Franzel and Wambugu (2007), throughout the region there has been considerable adoption of the use of fodder shrubs such as *Calliandra calothyrsus* to provide dairy cows with protein. By 2005, over 200 000 farmers in East Africa had planted fodder shrubs, of whom the majority (about

60 percent) were women. In Kenya, Franzel and Wambugu (2007) showed that most dairy-related activities were undertaken by women, and that women did tend to have control of the income derived from those activities. Cash income from dairy cow units was found to contribute significantly to household budgets, helping to pay school fees and buy food and clothing.

Forests and climate change adaptation

The projected adverse effects of climate change (e.g. increased landslides, floods, hurricanes, droughts and other extreme weather events, and the resultant degradation of the environment) are likely to have generally negative impacts on agriculture and food security. Women may be more vulnerable than men to the effects of climate change because they are more likely to be poor and dependent on natural ecosystems threatened by climate change (IPCC, 2007; Lambrou and Nelson, 2010). However, some studies suggest that the impacts of climate change on forest-dependent groups will also depend on wealth, class, age and other socio-economic characteristics (Djouidi and Brockhaus, 2012; Sun, Mwangi and Meinzen-Dick, 2010).

Women are not only vulnerable to climate change, they are also effective actors and change agents for climate change mitigation and adaptation (Peach Brown, 2011). Women often have a strong body of knowledge and expertise that can be used in climate change mitigation, disaster reduction and adaptation strategies. Moreover, women's responsibility in households and communities as stewards of forest foods and other forest-related or tree-related resources positions them well to develop livelihood strategies adapted to changing environmental conditions. As natural resource managers, women influence the total amount of genetic diversity conserved and used, often working to counter decreases in biodiversity caused in part by men favouring cash-oriented monocultures (World Bank, FAO and IFAD, 2008). It follows that forest policies and programmes that aim to be socially responsive should explicitly take into account the gendered dimensions of resource use, needs, access, knowledge and strategies for coping with climate change.

Box 3: Mainstreaming gender in REDD+

Reducing Emissions from Deforestation and forest Degradation (REDD+) is a financial mechanism designed to compensate developing countries for reductions in emissions from specific forestry activities. It has been estimated that REDD+ could lead to financial flows from developed to developing countries in the tropics of up to US\$30 billion per year (UN-REDD, 2010). However, a compilation of studies in a number of Asian countries (Gurung *at al.*, 2011) found that women have not systematically been identified as stakeholders in REDD+ initiatives and, consequently, have not been involved in related discussions and activities. Similarly, studies in three countries in the Congo Basin (Peach Brown, 2011) found that initial REDD+ documents did not address gender equality concerns and that government departments with gender mandates were not included in REDD+ processes. Such "gender blindness" in REDD+ programming could widen the gender gap in economic opportunities. It could also increase women's vulnerability or place a heavier burden on men to offset women's reduced contributions to household livelihoods. In some cases, therefore, gender blindness could reverse the potential gains of REDD+ initiatives (for example, if women are not sufficiently compensated for loss of income due to forest access restrictions, they may resort to intensified illegal harvesting of forest products). Thus, REDD+ programmes must be designed in a gender-sensitive manner, which requires recognizing women as primary users of forests with valuable knowledge and experience; clearly communicating the potential benefits to women; and developing enforceable measures that ensure those benefits are both protected and delivered (FAO, UNDP and UNEP, 2011).

3. Gender differences in forest-related knowledge

Women and men often have highly specialized knowledge of forest flora and fauna in terms of species diversity, location, harvesting and hunting patterns, seasonal availability, uses for various purposes, and conservation practices. Generally, both women and men derive their knowledge from their specialized roles and the gender-specific ways in which they access forests and trees, which products they harvest and how they use them, what markets they access, and how they rely on forest products for their livelihoods (Shanley and Gaia, 2001; Howard, 2003; Colfer, 2005).

Much of the existing literature, typically based on case studies, paints a stylized picture in which women derive their knowledge from their specialized roles in the collection and processing of forest products for direct household use and some access to local markets, while men tend to specialize in the harvesting of timber products and bush meat for cash income and marketing. However, the extent to which such findings can be generalized is often unclear. Data from 36 long-term studies of forest-proximate communities in 25 countries in Africa, Asia and Latin America, representing more than 8 000 households, confirm that men and women tend to collect different forest products (Sunderland, 2011). However, contrary to conventional wisdom, the data show that both women and men collect non-wood forest products (NWFPs) primarily for subsistence and that men's sale share is generally higher than women's, except in Africa where the share is roughly equal (Sunderland, 2011). This indicates that while gender differences in forest-relevant knowledge exist (particularly on processing and marketing), they may not be as clear-cut as previously thought, and that other factors (e.g. marital status, age, wealth and formal education) co-determine how people use the forest, rather than gender alone.

Nevertheless, women's knowledge tends to be linked more directly to household food and nutrition needs, as well as to health and culture, compared with men's knowledge (Daniggelis, 2003). A study in Amazonia (Shanley and Gaia, 2001) found that, compared with men, women were able to identify a broader range of plant species (i.e. trees, vegetables, vines, bushes and herbs) and usable plant parts (i.e. fruit, bark, leaf, seed and root). Such knowledge is particularly important in times of natural disasters and food crises when the collection and sale of forest products by women often become critical for household survival. In many places, women's familiarity with tree products such as fruits and nuts, medicinal materials and fuelwood plays a crucial role in coping with food shortages. Moreover, the nutritive value of wild foods is often substantial and at times of food crises can be used as a substitute for purchased food items.

Traditionally, women have been the primary domesticators of forest-based food and medicinal plants that are now found in home gardens around the world (Kumar and Nair, 2004; Eyzaguirre and Linares, 2004). Rural women play a particularly important role in the cultivation of indigenous fruit trees in humid western and southern Africa (e.g. *Irvingia gabonensis*, *Dacryodes edulis* and *Sclerocarya birrea*) (Campbell, 1987). While men may be the nominal owners of trees, women are often responsible for the marketing of fruits and, importantly, are often able to decide how the income is used. Poulton and Poole (2001) proposed that the domestication of indigenous fruits may be more advantageous to household food and income security than the introduction of exotic fruit trees, which tend to be the domain of men. Nevertheless, women's participation in tree domestication has been hindered by limited access to and control over land and trees, insufficient information on the requirements and advantages of tree domestication, and substantial periods of production inactivity due to the childbearing and childrearing roles of women and their heavy workloads in the household (Degrande *et al.*, 2007; Degrande, 2009). The available literature (Degrande, 2012b) also suggests that, compared with single women and widows, married women are generally more knowledgeable about tree domestication because they tend to have easier access to land and labour via their husbands.

Men's knowledge is often regarded as knowledge that "counts", but the knowledge held by women is not always properly recognized in forest management plans and forest use. If communities recognize the value for future generations of the "hidden" knowledge held by rural women of forest trees and plants for food and medicine, and if that knowledge is sought out in development learning and programming, it is likely to be retained and to contribute directly to conserving forest biodiversity. Thus, there is a need to

support women's knowledge on forestry matters to improve rural livelihoods, foster knowledge transmission between generations and user groups, conserve forest and agroforestry biodiversity, support local-level climate change adaptation, and strengthen the resilience of vulnerable households.

4. Gender differences in forestry value chains

Forestry value chains are crucial for the incomes and livelihoods of many small producers, particularly with respect to the marketing of (NWFPs such as essential oils, medicinal plants, gum arabic, rattan, bamboo, natural honey, edible nuts, mushrooms, various types of fibre, shea, wild nuts and seeds, wild fruits and other types of forest product used for cooking, skin care and other purposes (IFAD, 2008). Although official production and trade statistics, as well as research, have neglected the sector, it is clear that there is a sizeable and growing global trade in NWFPs. There are more than 150 NWFPs of major significance in international trade. The related value chains involve millions of workers and producers, including many indigenous women and men in remote areas of developing countries (Marshall, Schreckenberg and Newton, 2006).

As they are for most primary products originating in developing countries, NWFP value chains are highly gender-specific. In many settings, women deal primarily with lower-value products, engage in less lucrative informal activities, and do not have the same access to technology, credit, training and decision-making as men. Unsurprisingly, interactions between men and women and the division of labour between them at each stage of a value chain depend heavily on the environment in which they live, their preferences, and the available technologies. In general, women tend to prefer flexible working conditions that do not clash with their day-to-day household responsibilities (CIFOR, 2012; IFAD, 2008).

Engagement in forestry value chains is often crucial for rural women's livelihoods and the well-being of their households. In Ethiopia, for example, sorting and cleaning gum and resins is the primary source of income for 96 percent of the women involved in the activity; in Burkina Faso, women engaged in sorting gum arabic reported that it was the most important source of their income for 3–4 months per year (Shackleton *et al.*, 2011). Many researchers have also noted that increases in women's incomes have greater impacts on food, health and education expenditure and therefore on overall household well-being than increases in men's incomes (Blumberg, 1988; Engle, 1993; Hoddinott and Haddad, 1991; Kabeer, 2003). Moreover, because the harvesting of many forest products in which women specialize – e.g. shea in Benin, *Dacryodes edulis* in Cameroon, *Garcinia kola* in southern Nigeria and *Sclerocarya birrea* in southern Africa – tends to coincide with periods in which people have few income-earning alternatives, women's contributions to the respective value chains help households to cover important expenses (e.g. school fees) during seasonal financial shortfalls and to generate capital to start up new activities (Schreckenberg, 2004; Wynberg *et al.*, 2003).

Box 4: Strengthening women's role in forestry value chains

Shea nut butter: Burkina Faso

In Burkina Faso, UNIFEM and the Centre Canadien d'Étude et de Coopération Internationale worked with 400 000 rural women to improve the processing and marketing of shea nuts. UNIFEM linked these women to a French cosmetics company, l'Occitane, which started buying shea butter directly from a network of more than 100 women's groups, increasing the share of revenue that went to women producers (at the expense of middlemen). L'Occitane also started providing training in quality control and making advance payments for the shea butter (Harsch, 2001).

Gum karaya: India

While gum karaya is a valuable product and a major source of India's export revenue, the rural women and men involved in its collection earn very little for their long hours of work. State governments control the collection, sale and marketing of the gum, issue collection licences and buy the gum from licensees' collectors. In Gujarat, thousands of very poor women rely on gum collection for their incomes. Most do not have collection licences and are forced to sell to local licensed contractors at very low prices. The Gujarat State Forest Development Corporation has allowed prices to vary according to changes in conditions and has no market linkages or plans. An intervention by the Self-Employed Women's Association (SEWA), a women's union, helped female gum collectors organize into groups. These groups secured collection licences for their members and were able to negotiate higher selling prices with the Gujarat State Forest Development Corporation. Eventually, the women also won the right to sell on the open market, where prices are higher (Carr, Chen and Jhabvala, 1994; SEWA Academy, 2000).

The gender roles in forestry value chains are generally poorly understood and not well supported by policy-makers and service providers, especially those who focus on hi-tech operations or pay less attention to local markets. The minimal formal attention paid to NWFPs by forestry commissions, departments and ministries is also related partly to the paucity of data and analytical work on gender roles in forestry value chains. Yet a gender-sensitive value chain analysis can identify less visible gender-sensitive components at various stages of the value chains. These might include processing at home; informal trading in neighbourhood markets; and the collection, by men, of supposedly “female” products like gums and honey if it requires physically taxing work or is carried out in remote areas. Thus, analysing value chains from a gender perspective can be useful in identifying practical opportunities for improving the livelihoods of the rural poor. FAO (2011a), IFAD (2008), Shackleton *et al.* (2011) and CIFOR (2012) all proposed various practical interventions to increase the benefits obtained by women and men from the trade of NWFPs, including understanding gender roles along the entire value chain; supporting those activities performed by women (often in the household); assessing the gender impacts of interventions to increase production profits and efficiency; working with existing processing and marketing groups; and, where appropriate, assisting women to organize into groups and federations for effective collective action (Awono *et al.*, 2010).

5. Empowering women through forest user groups

The need to empower women economically and socially in order to strengthen gender equality in rural societies is generally recognized as a necessary prerequisite for increasing agricultural productivity, reducing poverty and hunger, and promoting economic growth (FAO, 2011b, 2012b). As explained by Duflo (2012), there are two rationales for fostering gender equality:

“The first is that equity is valuable in and of itself: women are currently worse-off than men, and this inequality between genders is repulsive in its own right. ... The second, a central argument in the discourse of policymakers, is that women play a fundamental role in development. The gender gap in education, political participation, and employment opportunities should therefore be reduced not only because it is equitable to do so, but also because it will have beneficial consequences on many other society-wide outcomes. It should be done, in other words, to increase efficiency.”

The forest sector provides a broad range of opportunities to empower rural women. Here, we discuss in greater depth two of these options, namely enhancing the participation of women in forest user groups and in forest-oriented rural resource centres. This focus seems justified given the growing consensus among development actors that participatory rural organizations can play strategic roles in overcoming the social and economic obstacles that female small producers face in rural settings (FAO and IFAD, forthcoming).

A sizeable body of literature provides evidence that women are generally underrepresented in forest user groups such as village forest committees and community forest associations (Agarwal, 2001, 2010; Coleman and Mwangi, 2012). In many settings, rules allowing only one person per household to participate in such groups tend to exclude women, thus adding to the host of other barriers to women’s engagement (e.g. the gender division of labour and access rights, gender-differentiated behavioural norms, gender segregation in public spaces, social perceptions of women’s roles, women’s lack of bargaining power, and men’s entrenched claims and control over community structures). Often, women are enlisted for decision-making only when forest and tree resources are degraded. As a result, community forest groups sometimes enforce rules and regulations that do not fully reflect women’s strategic interests and needs. For example, of the 87 community forest groups in India visited by Agarwal (2001), 60 still had a ban on fuelwood collection, 21 did not open the forest at all, and 24 only opened it for a few days for dry wood collection.

On the other hand, gender-balanced groups and female-only groups tend to sanction less and exclude less because of their inherent characteristics and modes of operation. Female-dominated groups also tend to have more property rights to trees and bushes and to collect more fuelwood and less timber than do male-dominated or gender-balanced groups (Sun, Mwangi and Meinzen-Dick, 2011). Gender-balanced groups, on the other hand, perform consistently better in all forestry functions (e.g. the protection of plantings, forest regeneration, biodiversity and watersheds and the allocation of forest-use permits). Pandolfelli *et al.* (2009) suggested that gender-balanced groups capitalize on the complementary roles of men and women, mobilize people for collective action, and enable better access to information and services from external agents. Greater involvement of women in forest governance may thus help ensure that forest policy and planning is more sensitive to the food security needs of communities.

An unresolved issue is whether there is a “critical threshold” of women’s proportional participation in mixed-gender groups that may be associated with higher levels of cooperation and joint decision-making. Sun, Mwangi and Meinzen-Dick (2011) found that the relationship between the gender composition of groups and collective outcomes was not linear. Evidence compiled by Agarwal (2001, 2010), Sun, Mwangi and Meinzen-Dick (2011) and Coleman and Mwangi (2012) suggests that when women constitute one-quarter to one-third of the membership of local forest management institutions, the dynamic changes in favour not only of the consideration of women’s use of and access to forest resources but also towards more effective community forest management decision-making and management as a whole.

Box 5: Enhancing women's participation in community based forest management in Kyrgyzstan

More than 30 percent of the rural population of Kyrgyzstan live in areas managed by the State Forest Fund or owned by the forestry enterprises "leskhozy". Women's participation in forest-sector institutions is extremely low. For example, of the 54 local-level "leskhozy" directors, only one is a woman. Although the proportion of female-headed households is increasing in rural areas (mainly due to high rates of male migration to cities or abroad), there is no corresponding increase in women's involvement in forest management because of traditional patriarchal social norms, beliefs and practices. The Association of Land and Forest Users of Kyrgyzstan (KALFU), with support from Norway, works to establish village-level forest user groups ("jaamats") to increase participation of local women in forest management processes, thereby facilitating gender-equitable rural development.

Source: E. Joldosheva (KALFU), E. Batjargal and A. Jamangulova (Mountain Partnership Secretariat, Bishkek), personal communication, 2013.

However, the active and effective participation of women in forest institutions is governed by a number of factors in addition to the proportion in which they are represented. Agarwal (2010) and Coleman and Mwangi (2012) found that, in Honduras, India, Nepal and Uganda, the gender composition of forest councils and the age and education levels of the women on those councils significantly affected women's attendance at meetings and the likelihood that they would speak up on critical issues. Agarwal (2010) and Coleman and Mwangi (2012) found that literacy, education and practical skills related to income generation or employment increased women's social status and self-confidence, thereby increasing the effectiveness of their participation in community forest user groups.

There is evidence that women's participation in the decision-making of forest institutions reduces the level of gender-based conflict because it leads to new rules of access that take into account women's particular needs and their activities are less likely to be criminalized or viewed as infringements. Agarwal (2001) suggested that the greater inclusion of women in rule-making in forest user groups could reduce the tendency to break rules by those not previously engaged in formulating the rules. Similarly, Coleman and Mwangi (2012) concluded that if women were able to become members of existing formal forest user groups, their participation was likely to reduce disruptive conflict over forest access and use. Women's active participation in community forest user groups may strengthen the ability of such groups to contribute to the goals of promoting the ecological health of the forest and supporting socially equitable decision-making within communities.

An important function of forest user groups and similar village-level organizations is that they can greatly increase farmers' capacity to adopt innovative techniques and practices. To accelerate the uptake of new techniques, particularly in contexts where public agricultural extension services are weak, some development agents have used the rural resource centre concept (Degrande *et al.*, 2012a). Rural resource centres are an innovative participatory approach, used, for example, in tree domestication, that focuses on building capacity to generate innovations at all stages of the agroforestry value chain. The emphasis is on access to knowledge, learning and networking. An important feature of rural resource centres is the philosophy of building rural development from the grassroots using technologies that are simple, practical and cheap to implement (Pye-Smith, 2010; Leakey *et al.*, 2005; Leakey, 2011). Services that rural resource centres and their satellite nurseries can provide include skills development in areas such as nursery practice, group dynamics and marketing; information about new technologies and innovations; market information and links with market actors, particularly from the private sector; forums for the exchange of information among farmers and between farmers and other stakeholders; and seeds, seedlings and other inputs.

Box 6: Increasing women's access to rural resource centres

Experience has shown that rural resource centres can reach large numbers of women and young people who may be overlooked in traditional extension systems. For example, following the rural resource centre concept, a total of 315 small-scale nurseries producing improved germplasm of 83 agroforestry species in Cameroon, the Democratic Republic of the Congo and Nigeria, had been supported by the World Agroforestry Centre and partners by the end of 2012. The total number of farm households actively involved was 5 331, and 38 percent of participants were women and 30 percent were younger than 35 years. Of the 1 927 farmers trained by the rural resource centres initiative in Cameroon between 2010 and 2011, 41 percent were women and 43 percent were younger than 35 years (ICRAF-WCA/HT, 2013). An assessment showed that the small-scale nurseries programme had assisted farmers to become more professional, productive, ecologically aware and client-oriented (Degrande *et al.*, 2012b). Research at other locations has shown that rural resource centres can significantly increase knowledge, capacity and entrepreneurship within communities (Tchoundjeu *et al.*, 2010), as well as reduce the drudgery of women's work (e.g. by reducing the need to travel long distances to collect fuelwood) and improve their incomes.

5. Conclusion

Forestry and agroforestry systems are not gender-neutral. Compared with men, women are frequently disadvantaged, for a range of interrelated cultural, socio-economic and institutional reasons, in their access to and control over forest resources and in the availability of economic opportunities. As a result, there are differences between men and women in their access to and use of forest products and services, resulting in gender disparities observable in many dimensions of the forestry–food security nexus.

Forestry activities are typically gender-differentiated: while men are usually interested in trees for commercial purposes, women are more inclined to favour tree products for subsistence such as for food, fuelwood, fodder and soil fertility improvement. Women often have highly specialized knowledge of trees and forests in terms of their species diversity, management and uses for various purposes, and good understanding of conservation practices. Compared with men, women’s knowledge tends to be linked more directly to household food consumption and health, which can be particularly important during food crises, when the collection and sale of forest products by women may be critical for household survival. However, women’s knowledge is rarely recognized in forest management plans, and there is a need to support women’s knowledge on forestry matters to improve rural livelihoods and strengthen household resilience.

Women tend to play specific roles in forestry and agroforestry value chains, sometimes complementing and benefiting the roles of men. Women’s forest-related activities are important for their incomes, and in turn for the well-being and food security of their households. However, in many settings women deal primarily with lower-value products, engage in less-lucrative activities, and do not have the same access to technology, credit, training and decision-making as men. In addition, the roles played by women in forestry value chains are generally poorly supported by policy-makers and service providers, especially those that focus on hi-tech operations and/or pay less attention to local markets.

Empowering women in the forest sector can create significant development opportunities for women (e.g. in terms of income, livelihood diversification, business skills, independence and self-esteem) and can have important spill-over benefits for their households and communities (e.g. in terms of food security, health and education). Increasing women’s participation in community forest management groups and in rural resource centres are feasible avenues for empowering women in the forest sector. But participation itself is not enough. Women need to be sufficiently represented in relevant institutions, accepted as stakeholders with specific views and interests, and empowered (e.g. through formal education, training and support for income generation) to have a say in transformative decisions. Efforts to promote women’s inclusion in forest-related institutions should be strengthened because women can help to maximize synergies between the forest sector and food security for the benefit of all.

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