Women and men in tropical dry forests: a preliminary review

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SUMMARY

From a broad review of 670 publications on gender and forests, ~130 were found to address the world's dry forests. These were examined with the intent to extract gendered social, cultural, political and economic patterns of relevance in such forests. Seven interrelated themes recurred in this literature: 1) population pressure, 2) migration, 3) intra-familial and inter-group conflict, 4) hierarchy and significant power differences, 5) strict gender differentiation, 6) commercialization of crops and NTFPs, and 7) fuelwood collection. Based upon these themes, the uniqueness of each situation and the importance of finetuning any approach to local realities to generate outcomes that can benefit women, we propose four promising ways to enhance the prospects for gender equity in dry forest areas: 1) a strengthening of groups and collective action, 2) explicit challenges to traditional gender norms, 3) a focus on products and spaces that interest women, and 4) addressing migration and population issues.

Keywords: dry forests, gender, population, migration, conflict, gender stereotype, fuelwood, collective action

Hommes et femmes dans les forêts sèches tropicales: une analyse préliminaire

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Parmi 670 publications portant sur le genre et les forêts, nous en avons identifié ~ 130 se concentrant sur les forêts sèches du monde. Nous y avons analysé les principaux enjeux par rapport aux relations de genre dans les sphères socio-culturelle, politique et économique. Sept thèmes communs et interreliés se sont dégagés de cette analyse : 1) la pression démographique, 2) la migration, 3) les conflits inter-familiaux et inter-groupes, 4) la hiérarchie et la différence de pouvoir, 5) une différenciation prononcée selon le sexe, 6) la commercialisation des récoltes et des PFNL et 7) la collecte de bois de chauffe. Basé sur ces analyses et tenant compte de l'importance du contexte local dans tout enjeu par rapport au genre, nous proposons quatre voies prometteuses pour favoriser l'égalité des sexes dans les zones de forêts sèches : 1) un renforcement des groupes locaux et des actions collectives, 2) une volonté explicite de remettre en question les normes traditionnelles liées aux genre, 3) un accent sur les produits et espaces d'importance pour les femmes et 4) une approche qui aborde les questions de migration et de population.

Mujeres y hombres en los bosques secos tropicales: una revisión preliminar

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A partir de una amplia revisión de 670 publicaciones sobre género y bosques, se encontró que ~130 tratan los bosques secos del mundo. Éstas se examinaron con la intención de extraer patrones de género sociales, culturales, políticos y económicos relevantes en dichos bosques. En esta literatura son recurrentes siete temas relacionados entre sí: 1) presión poblacional, 2) migración, 3) conflictos intrafamiliares y entre grupos, 4) jerarquía y diferencias significativas de poder, 5) diferenciación estricta entre géneros, 6) comercialización de cultivos y productos forestales no maderables, y 7) recolección de leña. Tomando estos temas como punto de partida, la singularidad de cada situación y la importancia de afinar cualquier acercamiento a las realidades locales con el que generar resultados que puedan beneficiar a las mujeres, proponemos cuatro formas prometedoras de mejorar las perspectivas de equidad de género en las áreas de bosque seco: 1) el fortalecimiento de los grupos y la acción colectiva, 2) cuestionar de manera explícita las normas tradicionales de género, 3) un enfoque en productos y espacios de interés para las mujeres, y 4) tratar las cuestiones de migración y población.

INTRODUCTION

Recent years have brought increasing global awareness of two, usually disconnected issues: the significance of gender concerns for development processes generally and the special characteristics and needs of communities living in or near dry forests. Analyses that examine men's and women's lives usually begin with human characteristics. In this case, following many biophysical scientists, we, atypically, begin with the ecological *context* to define our unit of study: dry forests, with special reference to gender.[1] Framed within this context, our analysis considers the gendered social, cultural, political and economic patterns that appear to be more common in such environments.[2]

The goals of this analysis are a) to render forestry and agroforestry research priorities more attentive to social patterns encountered in dry forest areas and b) to anticipate likely problems and opportunities for collaborative work with men and women in rural communities living in and around such areas. Given the direction of climate change in many regions, we also anticipate that drier areas will become more common, and we wonder if the patterns currently seen in such environments will expand. It is important to note that no environmental determinism is suggested here.[3] Rather than *causes* of gender differentiation, we seek *patterns* that recur in dry forest regions. We examine patterns encountered in these areas, all the while recognizing that the causes of human difference are multiple, interacting and that while biophysical factors surely affect these differences, they certainly do not determine them.

From a biophysical standpoint, dry forests are exposed to relatively unfavorable climate with frequent droughts and floods often resulting in humanitarian crises related to poverty and food insecurity. Gautier *et al.* (this volume), consider such environments 'unforgiving', with greater likelihood of crises than in more humid environments; Olsson *et al.* (2005) and Mortimore and Turner (2005) both report more encouraging findings: that the Sahel may be 'greening'. Such lands' natural biological productivity, combined with the ingenuity and mobility of its users, have yielded a certain amount of resilience. Longstanding patterns of migration have contributed to this resilience through diversified livelihood strategies. In many areas, both the land and the people have regularly recovered from recurrent climate-induced pressures. Whereas many see high human population growth rates and increasing drought frequencies and intensities in recent years undermining the resilience of both people and land, others see such issues as much more complex (e.g., Gausset *et al.* 2005, or see Fairhead and Leach 1996).

In some cases, eroded resilience can result in a vicious cycle of land users driven to over-use. This in turn can reduce the capacity of the land, and adversely affect human well-being. These already limited natural resources can face serious environmental constraints—likely to worsen as a result of climate change. The history of relief aid rather than development in many areas has led to a recent interest among many in building resilience through still more diversified livelihood strategies—further recognizing that dry forests also contribute to national economies. Our focus on gender can contribute to better understanding and thereby increase the effectiveness of development interventions; dry forest systems involve human components (crops, livestock, trees, fibers, fish, fruits and vegetables with many human uses). As many have noted, men's and women's roles vary greatly. To enhance the prospects of gender equity, sustainable resource management, and enhanced productivity, a good understanding of conditions and factors affecting gender in these areas is needed.

The definition of gender we use in this paper fits with global usage. Norms, practices, ideals and hopes for the future that contribute respectively to the social and ideational structures and conduct of women's and men's lives were of special interest.

METHODS AND ORGANIZATION

Gender-responsive studies carried out in dry forest areas or in dry areas where trees are useful to people's lives were included in this review. Although we have not had a strict dividing line between humid and dry forests—a topic that can elicit great disagreement—for the purpose of this paper we have considered areas with <~1 000mm of rainfall per year as "dry". As many papers on gender do not specify anything about ecological conditions, in some cases, published national or sub-national rainfall averages served as partial guides. These data were supplemented by other indications in the paper, such as the highlighting of drought (as in Uttar Pradesh) and/or our own general knowledge of the regions.[4] A preponderance of this dry forest, gender-relevant literature focuses on a wide if spotty, equatorial and sub-tropical band of northern and central Africa and South Asia (Fig. 1). Hence, our emphasis is on the tropics, but we have included other materials where available and relevant.

From a corpus of about 670 publications on gender and forests reviewed for various purposes (Colfer 2011, Colfer *et al.* 2011, Colfer and Minarchek 2012, Mai *et al.* 2011), ~130 publications included significant material on gender in dry forests (in contrast over 200 publications included

[1] This is partially motivated by such observations as that of Meinzen-Dick *et al.* (2012), who note that participants in Ghana, in an attempt to map gendered farming systems in Africa, "…raised agroecological zones as a more important variable than ethnicity to explain differences in the gendered organization of cropping." (p. 20).

[2] Although we recognize the importance of history, both local and in many cases colonial, in affecting the ways gender plays out in these contexts, we cannot do this topic justice in this review of recent literature, which mainly focuses on the contemporary.

[3] Thanks to Shelley Feldman at Cornell University for alerting us to this possible interpretation.

[4] Jamnadass' primary experience is in tropical East and southern Africa; Elias' is in West Africa and more recently, in Southeast Asia; and Colfer's is in Southeast Asia, the Middle East, and North America, as well as (more superficially) the global belt of tropical forests.

FIGURE 1 *Map of Areas Addressed in this Review*

material on gender in humid forests).[5] The vast majority of the 130 studies were reported in English, with a very few in French—one reason for calling this a 'preliminary review'. Most studies were published since the year 2000, with a few from the 1980s and '90s. Based on these materials, gendered social, cultural, political and economic patterns in dry forests were identified. Not all reviewed studies appear in this article's bibliography; rather we selected citations that supported the conclusions we report about gender and dry forests. Books and journals were our most common sources, though there were also a number of reports, theses and conference proceedings, all in decreasing order of magnitude. We were fortunate in having, besides the online sources, easy access to books from Cornell University's excellent library system, including the option to 'borrow direct' from libraries all over the world. Our approach has been an iterative one; we have supplemented the 130 original studies, as our understanding evolved with additional sources—some suggested by our anonymous reviewers.

An attempt was made initially to conduct the review in a strictly systematic way, with specific, pre-defined key words and a focus on materials after 2000, but this was abandoned—partly because we realized we were missing key references, particularly in books and book chapters (sources in which many gender analyses occur). We continued to seek recent materials, but widened our net to include publications we found less systematically (suggestions from experts, past experience of useful materials, and serendipitous finds in the literature). We are confident that the gain from this wider net exceeded any loss.

The 130 gender-responsive studies on dry forests were reviewed again, with the seven themes discussed below in mind, and evidence was compiled regarding the apparent dry forest patterns. Where similar patterns have been reported in humid forests, these have been pointed out as systematically as possible. But the available literature (and probably also the reality on the ground) allows for presentation only of broad trends, rather than discrete, mutually exclusive characteristics.[6]

We structure the remainder of this paper into two main sections. The first outlines seven interrelated themes that emerged as particularly important in dry forest areas. These include 1) population pressure, 2) migration, 3) interpersonal and inter-group conflict, 4) significant hierarchies of power, 5) strict gender differentiation, 6) commercialization of crops and non-timber forest products (NTFPs), and 7) fuelwood

[5] The other 340 or so included material that was global in scope, from urban areas, purely theoretical in nature, or unrelated to natural resource issues.

[6] As a purely suggestive supplementary mini-test of our preliminary analysis, we did word counts in 20 articles in our data sets on dry and humid forests (in every 5th publication for which we had an electronic copy, sorted by date beginning with most recent, until we reached 10 for each forest type). Our reading led us to expect the following to be more closely associated with dry forests: *conflict, hierarch*, violen*, population, field*, and *agroforest*. For humid forests we included *swidden, shifting cultivation, equal*, equit*, and forest*. Chi square tests showed them to be significantly different and consistent with our expectation. We thank Ramadhani Achdiawan, a CIFOR statistician, for his assistance.

collection. The second, concluding section, also emerging from the literature and building on the issues and opportunities identified in dry forest regions, looks at four ways forward to enhance the prospects for gender equity in dry forest areas: 1) a focus on groups, 2) explicit challenges to traditional gender norms, 3) a focus on products and spaces that women traditionally manage, and 4) addressing migration and population issues.

RESULTS

Part I: Themes

This section outlines the seven topics listed above, with illustrative examples[7] from the literature.

Population pressure (Theme 1)
Concerns about population growth are not, of course, unique to dry forests, but the frequency with which such issues are raised in the literature surveyed has been higher in these contexts. This may be because such areas typically also have fewer resources, putting more pressure on what resources *are* available than in humid tropical forests. Examples of the numerous authors who highlight the worrying significance of population density and growth rates in dry forest areas are provided in Table 1.

Some of these authors link population trends to migration (Theme 2).[8] For instance, Chambers and Momsen (2007) worry about both population growth (involving and affecting women directly, on the micro-scale) and significant rates of out-migration (mostly of men) from Bajío, Mexico—with significant effects on both genders. Torri (2010) makes this same connection for Sariska, in Rajasthan, India, where a rising population has led to land shortage and out-migration of men. In turn, Oumer (2007) complains of the influxes of refugees in Somaliland, Ethiopia. Aregu and Belete (2007) note the same concern in Ethiopia's Borana rangelands, along with other factors increasing pastoral vulnerability, as Colfer also saw in northern, dry areas of Côte d'Ivoire (in 1995). Land grabbing and the expansion of agribusinesses that push newly landless farmers to migrate in search of arable lands further exacerbate the pressure on scarce resources (Koopman and Faye 2012).

Others make explicit links between population pressure and conflict (Theme 3), especially in East and southern Africa. For instance, Sommers (2006), whose focus is Rwanda, notes that most present day wars in sub-Saharan Africa have rural roots and are linked to a scarcity of land for the growing population—perhaps an over-Malthusian interpretation (see e.g., Wardell 2005). Sommers' evidence suggests that population-related conflict exacerbated the well known violence in Rwanda—to the detriment of both young men and young women. Mutimukuru-Maravanyika (2010) notes the relevance of population for the violent and long-lasting land conflict in rural Zimbabwe; and Mwangi (2005) links population to growing conflict and uncertainty among the Maasai of Kenya.

Population growth is also associated with changes in farming systems (e.g., Bryceson's 1995 collection) and land ownership. Oumer (2007) links population to privatization of rangelands among Ethiopian pastoral groups, whereas Padmanabhan (2007) describes both agricultural and culinary impacts of "severe population pressure" among the Kusasis of northern Ghana—with differing impacts on men and women.[9]

TABLE 1 *Population Concerns*

Zambia (rural)	high population densities in rural Zambia, near the copper mines, since colonial times	Whitehead 1999
Malawi (Chimaliro)	the population density in Chimaliro, Malawi was 74 persons/km^2	Shackleton *et al*. 2001
Malawi (Chimaliro)	45% of population is <5. Inter-censal population increase of 37.3%. High HIV/AIDS rates [meaning additional childcare responsibilities, probably women's role]	Kamoto 2005
India (Behroonguda in Andhra Pradesh)	48% of the population is below 18 years of age.	D'Silva & Nagnath 2002
India (Maharastra, Rajasthan)	compares the 1997 fertility rate in wetter Maharashtra (2.7) to that in drier Rajasthan (4.2). Rajasthan has a lower female literacy rate, lower age at marriage, and higher infant mortality rate, typical indicators of gender inequality	Gupte 2004
India (Uttar Pradesh)	expresses concern, as population density was 422 persons/km^2 in 1991	Dhanagare 2000

[7] A definitive listing of all examples would exceed IFR's word limits.

[8] Although not emphasized in most of the reviewed literature, the colonial history of many tropical forest countries is clearly relevant for issues like migration (which was often forced) and conflict (which often has a basis in colonial land policies). See Gautier *et al*. 2014, for a useful discussion of colonial forestry history; or Linebaugh 2008, for an account of the roots of European forestry, with particular emphasis on those elements that made women's use of the forest difficult (e.g., *the Great Charter of the Forest*, a document that was created along with the more famous *Magna Carta*, but has received very little press).

[9] Within the health field, population growth and fertility are linked to the health of women particularly (e.g., Bantje 1995), but also of other family members (Colfer *et al*. 2008).

In Pakistan's Northwest Frontier Province, Southwold-Llewellyn (2006) considers population pressure to be an important factor in changing the agro-pastoral system—a system that once involved equal rights (among men, not women) to use pasture and forest and now involves government-initiated timber royalties, which are preferentially available to some men over others.

Of special interest to forestry is the link between population and deforestation. Whereas Goebel (2003) notes a positive association between population growth and deforestation in Zimbabwe's communal areas (those less desirable regions historically assigned to the black population), other studies demonstrate that this correlation does not always hold. For example, Klooster (2002) compares two communities in Michoacán, Mexico, in the Lake Pitzcuaro Basin, with an overall 2.7% rate of population increase for most of the 20th century. In one community, Santa Fé, the population doubled between 1950 and 1999, whereas in another, San Jerónimo, the population remained stable. In both villages, there have been improvements in forest management, allowing the forest to increase in quantity but with decreasing quality, as young men continue to harvest the most locally valued species, pine. Finally, some authors report people being sometimes responsible for afforestation or reforestation, rather than deforesting (e.g., the collection by Leach and Mearns 1996; also suggested by van Beek and Banga 1992, among the Dogon of Mali; or Kelly 2009 on rural El Salvador, who specifically emphasizes women's roles in reforestation).

Migration (Theme 2)

The issue of human movement, which is linked to the above discussion on population density, emerged as unusually important in our review of the gender and dry forests literature. Although migration is common in humid forests as well, the literature does not highlight its problematic relation to gender to the degree found in the dry forest literature. Some migration, even in the current era, is forced[10] as, for instance, in some resettlement (e.g., Goebel 2003, or Moore 1993, in Zimbabwe; McMillan 1995, in Burkina Faso, Kurian 2000, on India), and its effects on gender relations are varied. For instance, the Zimbabwe resettlement experience appeared to provide some benefits to women, whereas the Indian experience did not.

More migration, however, is economically motivated, and occurs in response to push factors (a lack of livelihood opportunities) or pull factors (appealing opportunities elsewhere). NAFTA (the North American Free Trade Agreement), for instance, spurred out-migration from Bajío, Mexico, a process which Chambers and Momsen (2007) argue has been bad for biodiversity, as well as having adverse effects on women, children and the elderly. In contrast, Klooster (2002) sees male out-migration from Michoacán, Mexico as an effective (and implicitly forest-conserving) survival strategy in an adversely changing agricultural context. Sanders (2000) notes the common migration of Ihanzu men during famine years from northern Tanzania; and Whitehead (1999) discusses the ubiquity and longstanding nature of male migration in Zambia, connected with copper mining; similarly men leave rural Swaziland seeking wage labour in urban centres, placing serious agricultural burdens—for subsistence crops, and the (mostly) men's cash crops—on the women left behind (Malaza 2003). In the Northwest Frontier Province of Pakistan, male out-migration has been a common response to the changing agro-pastoral system (due at least in part to population increase; Southwold-Llewellyn 2006). D'Silva and Nagnath (2002) note the reverse situation in Andhra Pradesh (India), where successful forest management efforts by a Gond community led to a reduction in out-migration, due to the availability of work nearby. More than half of the locally employed workers were female.

Male migration, the most common migratory pattern, has led to a rise in female-headed households in many regions of sub-Saharan Africa (Booth and Protais 2000) and shifted previously male-dominated activities to women. In addition to increasing women's labour burdens, migration can spell trouble for both women and men: Bujra (2002) describes the freedom of northeast Tanzanian men in Lushoto "…to be absent for months or years in towns (and while there to engage in extra-marital sex)" (p. 224)—thus potentially exposing themselves and their wives to HIV/AIDS.

Amid drops in the rural male population (due to outmigration but also to war, sickness and death related to HIV/AIDS), cropping patterns and farming systems are experiencing profound changes (FAO 2004 cited in Deda and Rubian 2008, FAO 2005). Interestingly, the 'feminization of agriculture'—which places economic, labour and other pressures on women—can also provide women with enhanced opportunities. As women shoulder a greater share of farm work, they are expanding their roles as managers of biodiversity and are accordingly acquiring, controlling, developing, and transmitting a vaster repertoire of ecological knowledge to compensate for their husbands' absence from the fields (Rocheleau 1995; Zimmerer 1996). Working in Kenya, Shipton (2007) mentions the added burdens on Luo women when their husbands migrate, but also their strengthened voice in decision-making (both also noted by Flintan 2007, for Ethiopian pastoralists). Wardell and Fold (2013, p. 26), writing about northern Ghana conclude that "Male labour migration, inadvertently, heightened the importance to women of value-added processing of shea kernels, and the marketing of

[10] During colonial times, forced migration was common, for the building of infrastructure (e.g., Ghana, Tanzania) or to render populations more accessible for administrative, extractive and control purposes (e.g., Cameroon, Indonesia)—such forced movement was typically male, leaving women to 'mind the farm'. The same patterns can be seen today, as men (usually) leave for wage labour in a variety of industries far from home. See Cordell *et al.* 1996, for an overview of migration in West Africa (Burkina Faso as the focal point), including a chapter on women's migration, roughly half that of men in this region.

kernels and shea butter, all of which they managed themselves";[11] Goebel (2003) also noted some advantages for women in terms of increased autonomy when their men left, in Zimbabwe.

Intra-household and inter-group conflicts (Theme 3)
While migration can bring with it new economic opportunities, it can also be at the root of many conflicts. Conflicts occur in both humid and dry forests, of course, but in the literature surveyed the *scale* at which conflicts were discussed was generally smaller, closer to home, in dry forests. Whereas many conflicts in humid forests occur between communities and more powerful operators at a higher scale (like national governments, timber companies, oil palm plantations or conservation projects),[12] the ubiquity of very local level conflict is striking in the dry forests literature. Conflicts may involve cattle theft, rain-witchcraft, warfare, and other village matters, as noted by Sanders (2000) in Tanzania, as well as other forms of crime or ethnic clashes, as discussed in an African context by Jacobsen (2006) and Barker and Ricardo (2006). Domestic and other violence against women, conflicting intra-household gendered needs/wishes, and generalized conflicts over local resources predominate.

The most directly gender-relevant conflicts include violence and abuse toward women, much of which occurs within the household. Yépez del Castillo (2003) ties such domestic violence to a "male identity crisis" resulting from new economic roles for women and from men's inability to satisfy the household's financial needs in contexts of dire poverty. Similarly, Amuyunzu-Nyamongo and Francis (2006) write of the frustrated and drunk young men in Kiambu District of Kenya who come home and behave violently towards their mothers, thereby demonstrating their masculinity (domestic violence transcended all social and demographic characteristics in a pan-Kenya survey). These authors see male violence as a reassertion of the ideal masculine role in a context where economic realities have made performing these roles impossible (also noted for Namibia by Kandirikirira 2002, who also emphasizes the colonial roots of these problems). Aregu and Belete (2007) further describe intra-household conflicts arising when Ethiopian women in Borana were given food aid, which then made them the family's "sole provider", thereby threatening men's roles. This concern is reiterated throughout Bannon and Correia's (2006) global collection and among other authors writing about domestic violence against women and child abuse in dry forest areas (Kukreja and Khan 2001 in Uttar Pradesh (India) and Nussbaum *et al.* 2003). Bujra's (2002) analysis of efforts to combat HIV/AIDS in Tanzania and Zambia suggests that many of the messages, though often effective in AIDS prevention, can actually exacerbate gender conflict, reinforcing traditional inequitable masculine gender stereotypes.

Violence against women also occurs outside the home, as women perform their forest product and water collection duties,[13] and can be particularly acute when occurring within the context of larger conflicts. Aregu and Belete (2007) mention the danger for women in Borana, Ethiopia, when they have to travel far for forage and water, and Oumer (2007) specifies the danger of rape, in similar situations in Ethiopian Somaliland (see Theme 7). Goebel (2003) reports fears of rape, violence, or theft among women who had to walk alone in the "bush" near their resettlement village in Zimbabwe. Such fears occur in the Middle East as well: Ertug (2003) mentions Turkish women's unwillingness to venture out of their Central Anatolian village alone, fearing attack. Bujra (2002), though recognizing the "brutalization of women in African societies ravaged by war" (p. 214), calls for greater nuance, recognizing intra-Africa differences among men (class, ethnicity, period). She complains of increasing inter-gender conflict, encouraged for instance by sexist messages to soldiers that implicitly value sexual aggression.

Many conflicts in East and southern Africa relate to land and tree tenure: Mutimukuru-Maravanyika (2010) emphases Zimbabwe's history of land conflicts, with recent related increases. Mwangi (2005) describes the recent conflicts that emerged among the Maasai (Kenya) as a result of the unsuccessful "group ranches" that were later inequitably divided. Elite capture at various levels, from the community to the judiciary, made the problems difficult to resolve.[14] Another analysis of these group ranches notes women's perceptions that conflicts had increased along with water and fuelwood shortages, and that formalization of land tenure had led to disproportionate losses among the poor and marginalized (Meinzen-Dick and Mwangi 2007).

Women employ various strategies to challenge norms that deny them access to important resources, such as land or trees. For instance, Goebel (2003) describes the common use of "husband-taming herbs"—and men's fears of such practices—in a resettlement area in Zimbabwe, relating this practice to women's extreme dependence on their husbands

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[11] One anonymous reviewer noted that men's absence allowed "women to spread their labour demand to supply the 3-day periodic markets for shea [products]" (reducing their dependence on men), as well as "harnessing a new opportunity (in terms of price differentials)" that resulted from a new Francophone – Anglophone territorial boundary.

[12] The research reported in Colfer (2005a), which derives from long term work in 30 sites in 11 countries (18 in humid forests; 3 in dry forests), included attention to conflict from the start, as one of its pre-defined variables. The book includes a chapter on "conflict and social capital" as well as site-by-site discussions of both in an appendix—for comparison with the conclusions presented here.

[13] Although water issues only emerged in a few of the materials we examined (given our emphasis on forests) and are therefore only occasionally mentioned here, we realize that there is a significant body of literature, particularly related to health, about women and water. Such issues are particularly important for women in dry forests, because of the greater difficulty of securing water in such environments.

[14] Hughes' (2006) history of the Maasai colonial experience documents the important role of women in resolving conflicts between groups: women of each group would suckle the children of the other. Another option was for men of each group to become blood brothers.

based on lack of own rights to land. She further notes a significant and positive change from Zimbabwe's communal areas, where widows are often "chased away from their homesteads and lose access to tree products and other resources as well as most property" (p. 120), on the one hand; and the Sengezi resettlement area, where they are likely only to lose access to tree crops. The most frequent conflicts there, with the most serious consequences for women, involve widows' claims on their dead husband's land and his patrilineal relatives disputing these claims, sometimes violently.[15] Extra passion is induced by the conceptual links among land, ancestors, required rituals and patrilineality. Moore (1993) analyzes the conflicting claims to land in the Kaerezi Resettlement Scheme in eastern Zimbabwe, emphasizing the active roles and strategies of women (past and present). Nemarundwe (2005) describes an unusual Zimbabwean case in which local women joined together, with the encouragement of an NGO, and successfully confronted the traditional male authority, the *sabuku*, who had closed off a dam that provided water to the women's garden project, in preference for the men's livestock.

Conflicts also often involve forest resources: Oumer (2007) writes about the Somalis on the Ethiopian border, noting that charcoal production (which often directly involves women with little voice in public decisionmaking) and cross border marketing thereof, exacerbate conflicts, sometimes armed, between pastoralists and farmers, business people, and others. Aregu and Belete (2007) stress the increasing conflicts over resources between the Oromo and Somali in Borana (Ethiopia) during droughts and in recent times (or see Shipton 2007, on Luo cattle raiding). Kamoto (2005) discusses the strained relations and power struggles among levels of government (primarily male) as devolution was implemented in Ntonya Hills, Malawi. She found, in her attempts to implement co-management between the men and women of Chimaliro and a long-despised forestry department that "… backbiting, fear of the unknown, resentment and mistrust engulfed the local level actors" (p. 295). Southwold-Llewellyn (2006), in turn, discusses the likelihood of armed violence between sometimes armed men seeking fuelwood in the Northwest Frontier Province of Pakistan and forest guards who are mandated to prevent such traditional use. Fears on both sides abound, as do conflicts.

Klooster (2002) describes the fears of the indigenous people of Santa Fé (Michoacán, Mexico) when armed Mestizo outsiders (Quirogan men) began cutting the trees in their forests; these conflicts escalated to include killings. In India, D'Silva and Nagnath (2002) report the experience of Behroongud, Andhra Pradesh: the community opted to form its own forest protection committee in 1990, and found itself literally at war with its neighbours who disapproved of this action. Kurian (2000, p. 215) describes the "…history of conflict between tribal and non-tribal peoples over mastery over resources", as well as the total disregard for women's needs and goals at all levels in the World Bank's planning of the Sardar Sarovan dam project in dry areas of India. Heltberg *et al*. (2000) refer to past violence between local people and guards at the Sariska Tiger Reserve in Rajasthan, India (resulting in one guard's death), related to women's and girls' fuelwood collection; Torri (2010) describes the conflicts between men who value timber and women who value firewood in this same area. Van Beek and Banga (1992) also describe a conflict among the Dogon of Mali (bordering on Burkina Faso) between men and women over the women's use for firewood of a tree, the *puro*, which is ritually important to men.

In general, the differences in gender-related conflict portrayed in the literature between dry and humid forests decrease as we move up in scale. In humid forests, we've found concerns about intra-familial and intra- and inter-community violence and conflict to be comparatively rare; but a considerable amount is portrayed at larger scales, particularly between communities and outside actors like timber concessionaires, oil palm plantations, transmigration/resettlement programs.

Hierarchy and significant power differences (Theme 4)

There are power differences in all societies; and these permeate all aspects of social organization, livelihoods and resource management in dry forest areas. In fact, clear hierarchies are a prominent theme in the literature on dry forest regions. In some areas, power differences and hierarchy are closely linked with age (Colfer 2011; or van Beek and Banga 1992, on the Dogon of Mali, Shipton 2007, on the Luo of Kenya).[16] For instance, Barker and Ricardo (2006) emphasize social stratification based on age in many parts of sub-Saharan Africa, with young men having little power or access to women: women were more available to older men with control of family wealth—particularly in groups requiring the payment of bridewealth. Wooten (2003) describes the more general pattern that the elders dominate younger folks and men have more power than women among the Bamana of rural Mali. Brukum (2001) documents the history of inter-ethnic conflicts among groups of differing power in northern Ghana; and Padmanabhan (2007) notes the age hierarchy there, with implications for agriculture, including hierarchical relations among older and younger women.

An ethnographic atlas (http://lucy.ukc.ac.uk/EthnoAtlas/Hmar/Cult_dir/Culture.7831) describes the Bemba of Zambia as highly centralized and hierarchical with an authoritarian political system. Jumbe and Angelsen (2006) stress extremes of respect and obedience with which community members in

[15] One early reviewer of this article (anthropologist Michelle Roberts) worried that such examples might inappropriately strengthen notions of environmental determinism, in which scarcity is seen to lead inevitably to gender conflicts. She reminded us of the San, a group living in the extremely resource-scarce environment of the Kalahari Desert, who have one of the most gender-equitable systems in the world. Culture has strong effects on people's responses to their own environments.

[16] Shipton reproduces a Luo saying "that 'a powerful old woman' is a redundancy, since age *is* power" (pp. 41–42).

Chimaliro and Liwonde, Malawi view their chiefs. Alemu and Flintan (2007) describe a complex clan and tribal structure in the Afar region of Ethiopia, with elders in charge of many important issues. Sanders (2000), on the other hand, acknowledges that "there is a dominant discourse which stresses male-dominance" among the Ihanzu of northern Tanzania, but still argues that "[g]ender symmetry, not gender hierarchy, structures all transformative processes" (like rain-making or reproduction) in this group. He makes his point partly by explaining the positive local connotations of terms applied to women (wet, soft, fat, fertile) as opposed to men (dry, lean, hot) and the need of their combined qualities to make babies and rain.

Moving to South Asia, famous for its hierarchical social relations, Southwold-Llewellyn (2006) writes of the dominant lineages, patron-client relations, and inequitable power relations in the Northwest Frontier Province of Pakistan. There, local political alliances are linked with national politics; and segmentary opposition[17] within patrilineal kin groups continues to function politically. Gupte (2004) notes the rigid hierarchical social structures in Rajasthan and Maharashtra, India and their adverse effects on individuals marginalized by their gender, age or caste (also noted for Sariska, in Rajasthan, by Torri 2010; and Jassal 2012 in north India generally). Kurian (2000) discusses the differential "power relations that are gendered and class, caste, or race based" (p. 191) and how they adversely affect the Indian tribal peoples resettled due to Sardar Sarovan dam construction. She notes the reductions in tribal women's status as the displaced attempt to assimilate to the more hierarchical Hindu society into which they have been resettled (a process also noted by Bose 2011, for tribals in Rajasthan).[18] Dhanagare (2000) emphasizes the oppression and exploitation of the "scheduled castes/tribes" (formally marginalized groups) in Uttar Pradesh by the upper castes, and the inability of these "dependents" to oppose their "dominant" employers on management of local forests. In Indonesia, Fowler's (2013) work in the dry, eastern island of Sumba notes the importance of both matriclans and patriclans in providing hierarchical structure to human life, as well as, for women, the order of marriage in polygynous households (the latter also noted for the Mende of Sierra Leone, Leach 1994).

Power imbalances in Latin America are more likely to be discussed in terms of patron-client relations. Klooster (2002), for instance, notes the ownership in Santa Fé (Michoacán, Mexico) of a disproportionate amount of land by a few indigenous families who relied for labour on sharecroppers, many of whom were from outside the community; such patterns can also be found in humid forest areas (e.g., Porro and Stone 2005, on the female Babaçu palm collectors and processers of Ludovico, Maranhào, Brazil; or Millar 1983 on the Bugis of South Sulawesi)—but are discussed less frequently as serious problems in the surveyed literature.

Strict gender differentiation (Theme 5)

The notion of strict gender differentiation has already emerged in our discussions of violence and conflict particularly. Some of the strongest examples of strict gender differentiation come from the gender literature focused on men: e.g., Correia and Bannon (2006), who stress the idea that "a woman performs her part by merely *being*; for the man, it requires *doing* something, accomplishing something or performing something…" (p. 247; an idea also implied by Fowler 2013) for the Indonesian island of Sumba—though she also stresses egalitarian and complementary elements in daily gender relations).

Such gender differentiation underlies the gender division of labour. Lopez-Alzina (2007) focuses on the division of labour in the Yucatán (Mexico), noting men's exclusive responsibility for cultivating crops in the fields (or *milpas*). This expectation is reinforced by prohibition of women traveling to the fields (typically only occurring when labour is in short supply) or working there without their men present. Whereas Meinzen-Dick *et al.* (2012) point out that the notion of men's and women's crops in Africa has been over-generalized and treated simplistically, much literature has emphasized such patterns, often associated with ideal gender roles (e.g., Dolan 2001, in Kenya; Goebel 2003, in Zimbabwe). In fact, agriculture is often gendered by crop and by task in cooperatively farmed household fields, where male and female as well as individual and group tasks are intertwined in the process of crop cultivation (Bryceson 1995, Guyer 1984, Rau 1991). Padmanabhan (2007) found, among the Kusasi of northern Ghana, that women were prohibited from even looking into their husbands' stores of millet (their male-controlled staple) until he died, when she was allowed a peek.

Mabsout and Van Staveren (2010) use the concept of "doing gender" in Ethiopia—or manifesting gender norms in behaviour: They identified a tendency for

> "…doing gender by balancing their [working women's] deviation from social norms such as the male breadwinner or the male household head, by submissive behavior vis-à-vis their male partner, who in his doing gender seeks to compensate his perceived loss of masculinity precisely by exercising power over his partner in other spheres of life" (p. 784).

Bujra (2002) notes northeast Tanzanian men (from Lushoto) seeing themselves as the "government" [i.e., the authority and power] within the home (p. 219). "The sexes, in Luoland [Kenya], are superficially about as uneven in status

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[17] Segmentary opposition can be summed up by the expression "I against my brother; my brother and me against our cousin; my lineage against a related lineage; my tribe against a neighbouring tribe" and so on up the hierarchy.

[18] A less extreme version of this process—of a dominant and more hierarchical group imposing their world view and norms on a more egalitarian but marginalized group—occurs in humid forests as well, e.g., Elmhirst (2011) in Lampung, Sumatra, Indonesia or Lin (2008) on the Orang Asli of Malaysia.

as one can find in the world—in this too, Luo country is very African," (p. 41) says Shipton (2007). He goes on to discuss many informal avenues that women have to influence events. Sithole (2005) comes to a similar conclusion about gender relations among the Shona of Mafungautsi Forest in Zimbabwe. She makes clear some of the disadvantages of overt womanly power (e.g., accusations of promiscuity or witchcraft) and concludes that there, "most marginalized groups and women prefer influence to power" (p. 184).

Purdah represents another striking example of strict gender differentiation in South Asia. Gupte (2004) complains of ongoing "feudalism, patriarchy, gender segregation and enforced seclusion of women in purdah" (p. 371) in Rajasthan. The gender-segregating implications of the Sardar Sarovan dam were discussed above. Southwold-Llewellyn (2006) tells of a case in the Northwest Frontier Province in Pakistan, where a woman was elected to participate in a governing body. The lack of provision for *purdah*, however, precluded her involvement: her husband represented her (p. 651).

Although the locales of the following observations are not totally clear, the association of women with dangerous powers was more often cited in dry forest areas—particularly within cultures where witchcraft and magic are key elements of local belief systems.[19] Federici (2008) raises this issue, as a danger for women, in a pan-African context, though many of her examples are from dry areas. Diabate (2012), herself a Malinke woman (from Mali), emphasizes public nudity as a last-ditch source of potent symbolic power for the women of West Africa (see also Diabate 2011). Moore (1993) recounts women's bare-breasted march in 1972, to protest their evictions in Zimbabwe's Eastern Highlands. Sanders (2000) analyzes the behavior of Ihanzu women of Tanzania, who dance wildly, nude in public, expressing aggression and sexuality usually reserved for men. He sees their behavior as a way to combine the strengths of both men and women in their bodies and thereby appeal to the spirits to bring rain. Acknowledging the publicly extreme differentiation between men and women, Sanders considers their day to day behavior to reflect ideals of complementarity and mutual interdependence. Like Sithole (2005) for Zimbabwe, Padmanabhan (2007) sees dangers, particularly for older, experienced or successful Dagomba women (northern Ghana) who may be accused of witchcraft.

We found egalitarian and flexible gender relations considerably more likely to be emphasized in the literature on humid *vis à vis* dry forests (see e.g., Du 2000 on southwest China; Noss & Hewlitt 2001 on the Aka pygmies of the Central African Republic; Sutlive's 1991 collection on Borneo).

Commercialization of crops and forest products (Theme 6)
Commercialization of crops and forest products is occurring all over the world, and seems destined to increase as large scale land acquisitions increase in frequency. Although there are cases where women benefit from this commercialization of natural resources, the literature on gender and dry forests emphasizes the reverse (e.g., Bassett 2002; Dolan 2001; Ridgewell 2007; Schroeder 1999; Wooten 2003). Market integration and the development of market infrastructure, which have created agricultural systems dependent on external inputs, have typically by-passed women and displaced their agricultural activities. The most striking examples in dry forests are from Africa: Padmanabhan's (2007) careful analysis of the complex adaptations in northern Ghana among the Kusasis and Dagombas,[20] as soybeans and onions entered their agricultural system, provide unique insights into gendered change processes that vary importantly from place to place as rural communities are drawn into new markets.

Traditionally both Kusasi and Dagomba men were responsible for the staple food, and women were in charge of soup production. The Kusasi have stable post-marital patrilineal residence, which has allowed their women to become more involved in agriculture than their more mobile Dagomba counterparts. Kusasi women cropped rice, beans and okra for cash and consumption, while Kusasi men focused on millet; Dagomba men grew maize. As millet and maize yields decreased, these men have switched to cash crops: cowpea for the Dagomba; onions for the Kusasi. The use of insecticides in cowpea production moved the Dagomba toward considering the cowpea a staple and thus a male crop. Insecticides are linked conceptually with medicines—items considered distinctly male in this group (indeed, spelling dangers of witchcraft accusations for women who might use them). Among the Kusasi, women's cultural incompatibility with manure and the onion's requirement for fertilizer inhibited their involvement in this crop. Young men used to be more 'under the thumb' of their elders but can now grow and sell their own onions. The onion has thus had a liberating influence on young men, but it has solidified the unequal relations between the sexes. Padmanabhan states that "Onion cultivation highlights the distinction between male 'money' and female 'food' for the Kusasis" (p. 69), and concludes "On the 'battlefields of knowledge' (Long & Long, 1992), agricultural crops turn into elements for the construction of gender" (2007: 69).

The replacement of local crops produced for household consumption by introduced crops cultivated for commercial purposes also affects gendered roles in production and the

[19] Thanks to Michelle Roberts for reminding us of this fact.

[20] "The Kusasis and Dagombas are distinct cultural groups and reside in different vegetation zones…The Dagombas live in the administrative Northern Region in the Guinea savanna, dominated by drought-resistant baobab and acacia along with thorny bushes and grasses. The Kusasis inhabit the Sudan savanna area bordering Burkina Faso and Togo in the administrative Upper East Region. This area is more densely populated, with 87 persons/km^2, as compared to only 17 persons/km^2 in the Northern Region where the Dagomba live. The high population density in the Sudan savanna has resulted in the survival of relatively few trees… With annual precipitation of less than 1000 mm, the major cereal is millet" (Padmanabhan 2007: 58).

spatial division of labour. Wooten (2003) describes a Bamana (or Bambara) community (Mali) in which gardening was traditionally a female enterprise associated with cultivation of a wide assortment of plants for the food economy. It is gradually becoming a male-controlled commercial venture centred on the cultivation and sale of exotic produce. In their economic pursuits, men usurped "unused areas", which in fact women had been using to grow traditional vegetables and maintain baobab (*Adansonia digitata*), shea trees (*Vitellaria paradoxa*) and other bush species (see works by Rocheleau for East African examples of women's uses of marginal spaces; or Nemarundwe 2005, on such practices in Chivi, Zimbabwe). Wooten notes that women are now even having difficulty finding the trees they need to produce charcoal, and he predicts future problems with fuelwood access.

Schroeder (1999) describes a similar situation in the Gambia, where outside actors first encouraged women's gardening, which resulted in women gaining status as well as usufruct rights and economic benefits. Later, agroforestry became popular within the development world. The results of the ensuing projects included local erasure of women's recently acquired access rights and other gains, and increased benefits to men from tree crops with market value.

Bassett (2002) provides a longitudinal look at cotton growing among the Senufo and Jula of Côte d'Ivoire, as women's involvement in growing this cash crop rose and fell between 1981 and 1997. He documents a variety of factors, one of the most important of which was the antagonism of husbands and extension agents to women's involvement, as men feared loss of their intra-household dominance. Women's adaptation strategies (which eventually were insufficient) involved transcending the household, "jumping scale" to involve collaborative work groups and paid labour.

Similar patterns are reported with respect to non-timber forest products in dry forests. For instance, Elias and Carney (2007) report that as shea nuts become increasingly profitable on local and international markets, men are retaining a portion of women's shea revenues or becoming involved themselves in marketing this traditionally female product. In fact, such trends are not new. Martin (1984) explains that in Nigeria men became involved in palm oil production—traditionally a woman's domain—at the beginning of the 20th century, when the product gained economic value:

> "The entry of men into palm production made a difference to women mainly in that it deprived them of their right to initiate and control the production process and to control the use of the resulting oil. By the early twentieth century men were well established as the owners of palm fruit and of palm oil. Women were rewarded for their role in oil production by being allowed to keep some oil for cooking as well as the by-products of oil processing . . . which had no major local use" (p. 419).

Malaza (2003) emphasizes the adverse effects commercialization can also have on biodiversity and on local people's diets in Swaziland (also noted by Michelle Roberts for Malawi, pers. comm., 29 July 2013). Women's labour constraints, related to male outmigration, and/or the need to plant men's crops (especially maize; a "symbol of status and power", p. 250) first,[21] interfered with the maintenance of agricultural and dietary diversity. Several authors have emphasized men's greater interest in prices and cash crops than women (e.g., Lopez-Alzina 2007, in Bajío, Mexico, Malaza or Roberts). On the one hand, Flintan's (2007) analysis notes the potential dangers for women of men's increasing commercial interests among Ethiopian pastoralists. On the other hand, Oumer (2007) notes Somali men's reluctance to engage in commercial ventures (except selling large livestock), leaving "…women [to] sell the majority of shoats as well as *khat* and [to] control a significant proportion of the charcoal trade…" (p. 36).

Why this pattern is more evident in literature on dry forests is not entirely clear to us. One possibility is that humid forests are often inhabited by shifting cultivators. In this farming system there tend to be too few surpluses to justify the extensive commercialization that is possible with the permanent agriculture possibly more common in dry forests—so there is less humid forest experience of small scale commercialization. Where commercialization occurs in humid forests, much has focused on timber, the quintessentially male product and one usually dominated by actors on a larger scale. There is a small amount of gender-relevant literature on NTFP commercialization in both kinds of forests (see below), with the tendency being for larger scale markets to be in the hands of men, and the smaller scale in the hands of women (e.g., Ruiz-Peréz *et al*. 2002, on humid forests in Cameroon).

Fuelwood collection (Theme 7)

Whereas in analyses of humid forests the issue of swidden agriculture is a dominant theme, in dry forests—despite its widespread existence—it scarcely appears in the literature (though we know it exists in the real world; see e.g., Bryceson's 1995 collection); fuelwood, however, is ubiquitous. Non timber forest products in general are often presented as more central elements in dry forest women's survival strategies than in men's (e.g. Arnold and Ruiz Pérez 1998 in Niger, Chalfin 2004 and Elias and Carney 2005 in dry West Africa, Shackleton *et al*. (2011) in Burkina Faso, Ethiopia and Zambia).[22] But far and away the most commonly discussed

[21] Malaza also anticipates more extreme labour constraints in the future in Swaziland, given the high incidence of HIV/AIDS, which particularly strikes people of working age.

[22] The subsistence uses of NTFPs in humid forests probably actually makes them just as important—but much of the literature ignores subsistence uses; and dry forest communities seem likely to be more dependent on the cash economy.

forest product in dry forests is fuelwood, which is used for cooking[23] and which also represents an important source of income in these areas (e.g. Arnold and Ruiz Pérez 1998). Given the long history of attention to women and firewood and the relatively straightforward nature of the issues, we summarize them in Table 2.

Authors stress three key issues related to firewood collection, which have clear gender dimensions: 1) the gender defining features of firewood collection (which differ by location); 2) people's dependence on fuelwood and its contribution to their way of life; and 3) time constraints related to fuelwood collection and efforts to address these constraints.

Padmanabhan (2007), for instance, exemplifies a common time constraint and its local implications:

> "[introduced] Soybean *kpalago* can be prepared much faster, a firewood saving characteristic which is also an important reason for the replacement of the original dawadawa (African locust bean; *Parkia biglobosa*) by soybean as a base for *kpalago* [an important female gender-defining soup among the Kusasi of northern Ghana]." (p. 67).

Fuelwood provides a key link between rural and urban areas as well. Oumer (2007) identifies urban population growth as an important impetus to the resulting gendered increase in charcoal production in Somaliland, Ethiopia. Kamoto (2005) describes the unsuccessful Blantyre City Fuelwood Project, designed to supply fuelwood for the urban populations of Blantyre and Zomba (Malawi). Plagued by community resistance to the use of local Miombo woodlands for the eucalyptus plantation, and by political power plays between traditional chiefs (male) and a Forestry Department resistant to devolving authority, women's roles appeared to be completely ignored.

Fuelwood has received much more attention in dry forests, simply because, given its greater availability in humid forests, obtaining it has been less of a problem there.

Part III: Ways Forward

The above discussion has highlighted some of the pervasive gender inequalities that affect women and men living in dry forest areas. Producing or stimulating desirable change has proven to be far more difficult than generally anticipated. Change can be disruptive; indeed even when ultimate changes prove positive, disruption and conflict may come first. Change also often involves winners and losers. Although win-win scenarios do exist, they are not ubiquitous. We recognize the difficulties that have marred attempts to produce transformative social change that can enhance gender equity, but there are also clear problems with 'doing nothing'. What follows is a summary of four approaches encountered in the literature that we find promising: 1) a focus on groups and collective action; 2) explicit challenges to traditional gender norms; 3) supporting products and fields of interest to women; and 4) addressing migration and population issues. No single approach is sufficient, and all carry risks. For instance, women's economic success can exacerbate violence against women, at least temporarily, as Amuyunzu-Nyamongo and Francis (2006) found in Kenya; and would-be change agents often have to cope with initial reluctance or backlash before final acceptance.

Group focus and collective action[24]

The most commonly proposed approach to redress gender inequalities within rural communities is to encourage the formation or strengthening of existing women's groups. Mabsout and Van Staveren (2010), who conducted a quantitative study of decision-making and values among 24 of Ethiopia's ethnic groups, make important points: given that one-size-fits-all policies are often ineffective and that constraints for women's bargaining strategies may be at the institutional rather than individual level, policies for social change may best focus on change at the group level (also found in India by Agarwal 1994; 2010). Legislation on gender equity can help, though it alone is typically insufficient.

The relevant literature emphasizes women's existing capabilities in group formation, and women's mutual aid networks (see Table 3).[25] In Burkina Faso, for instance, the success and centrality of the Mossi's traditional *naam* groups—wherein individuals from a given locality come together on the basis of age or gender—have been particularly well documented (Pochettino, 1995). *Naam* groups have been at the root of much of Burkina's rural activism, and State as well as international donor and NGO interventions have drawn upon such pre-existing, traditional associations to reach the rural populace (Pochettino 1995, Dialla, 2005).

Others focus on gender-segregated grouping behavior based on common activities. In an Ethiopian example, Flintan (2007, p. 84) notes that "One NGO…has been using the traditional coffee ceremony, where women gather on a daily basis, as a forum for discussing sensitive issues such as violence". She notes that local women see the advantages of "group power" (p. 74), and concludes that: "…it can prove less politically sensitive and more socially acceptable to bring

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[23] A large body of literature also exists on the dangers of cooking with fuelwood, dangers most extreme for women and children, who due to their roles in cooking, are more exposed to the indoor smoke created during the combustion process. Kirk Smith, at the University of California, Berkeley's School of Public Health, has been a prolific writer on this subject (e.g., Smith 2008).

[24] "Collective action can be defined as voluntary action taken by a group to achieve common interests" (Meinzen-Dick and di Gregorio 2004).

[25] That men also group is well known: Klooster (2002) describes proactive indigenous organizing to protect their land/forest by Santa Fé indigenous men in groups against the male Quirogan Mestizo interlopers (Michoacán, Mexico)—with positive effects in terms of forest cover.

TABLE 2 *Firewood Collection Issues*

Gender-Defining Features of Fuelwood Collection		
Sub-Saharan Africa	women collect water & fuelwood ubiquitously	Whitehead 1999
Ethiopia (pastoralist)	women without voice at center of fuelwood trade; concern about possibility for sustainability unless women are involved	Flintan 2007, Ridgewell *et al*. 2007
Zimbabwe	fuelwood collection is ‘women’s work’, unless by cart when men/boys do it	Goebel 2003
Mexico (Michoacán)	widows, single women, and women whose husbands are otherwise occupied are particularly burdened by the collection of firewood	Klooster 2002
Pakistan (Northwest Frontier Province)	sometimes armed men gather firewood; women are in *purdah* and only old women occasionally gather firewood	Southwold-Llewellyn 2006
India (Uttar Pradesh)	while women collect fuelwood, men make decisions not to participate in increasing fuelwood production	Dhanagare 2000
India (Rajasthan’s Sariska Reserve)	men set rules against harvesting biomass. Following these prescriptions —> inability to cook, a central female role expectation	Torri 2010
India (Rajasthan’s Sariska Reserve)	women’s role; legally collect headloads of fuelwood from private & common areas; sharp instruments, animal/motor power prohibited, so mostly dead, fallen branches are collected	Heltberg *et al*. 2000
Dependence on Fuelwood		
Malawi	90% of energy consumption from biomass, 75% of that from forests	Jumbe & Angelsen 2006
Malawi (Liwonde)	People actively involved in fuelwood sales, with women the main traders	Jumbe & Angelsen 2006
Mali	Dogon women collect firewood for cooking, brewing & pottery making	van Beek & Banga, 1992
India (Rajasthan, Maharashtra)	women rely on fuelwood, important element in forest management	Gupte 2004
Mexico (Michoacán)	almost 100% of rural women cook with firewood	Klooster 2002
Mexico (Bajío)	Women depend on corn cobs for fuel	Chambers & Momsen 2007
Fuelwood, Time Constraints, and Efforts to Address the Problem		
Ghana (Northern)	Reduced cooking time was a major factor in Kusasi’s shift from African locust bean to soybean in production of a gender-defining soup *(kpalago)*	Padmanabhan 2007
Tanzania (Northern)	significant amounts of time spent by Ihanzu women collecting firewood	Sanders 2000
Swaziland	women reduced their use of legumes/other traditional dishes requiring long cooking times, with adverse effects on local biodiversity & nutrition	Malaza 2003
Burkina Faso	techniques women employ preparing shea butter related to availability of water, firewood & labour, with implications for quality & taste.	Elias & Carney 2007
Africa (incl. Ethiopia)	Carbon projects that require tree planting & water management examined; greater agricultural workload for women acknowledged, but with hope that substantial time spent gathering fuelwood & water can be reduced	Shames *et al*. 2012
India (Behrungud, Andhra Pradesh)	adoption of improved cook stoves reduce fuel use from 110 to 88 tonnes/year where people self-organized for better forest management; dry, dead waste from timber harvests sufficient for local needs	D’Silva & Nagnath 2002

TABLE 3 *Women's Groups in Dry Forests*

Sub-Saharan Africa	stresses ubiquity of village associations based on gender & sometimes age	Thorsen 2002
Africa	women form particularly strong collectives, allowing them to alleviate the two most severe production bottlenecks: lack of cash and labour	Thomas 1988
Ethiopia (Borana)	women's mutual aid networks & their ongoing importance, particularly crucial during times of drought	Aregu & Belete 2007
Kenya	stress Kenyan women's abilities at forming into groups (widely appreciated after Wangari Maathai's Nobel Prize)	Amuyunzu-Nyamongo & Francis 2006
Côte d'Ivoire (Senufo & Jula)	historical analysis (1981-97) of cotton growers; women's use of broader scales in mobilizing support in domestic disagreements with husbands. Local men & extension agents stopped them	Bassett 2002
India (Maharashtra)	tribal women self-organizing to combat alcoholism (to both save money and prevent beatings)	Gupte 2004
India (Behoongud, Andhra Pradesh)	self-organizing & forest-conserving effort, responding to shortages of wood in 1990. Committee was led by a woman, 50% of members were women.	D'Silva & Nagnath 2002
India (Uttar Pradesh & beyond)	Chipko movement: initiated by rural women (1970s); aimed to preserve region's trees, spread throughout the country (1980s)	Jain 1984
Turkey (Central Anatolia)	emphasizes normal networking & indigenous grouping to strengthen women's roles, expand available space (in markets, plant collection trips), protect selves from male attack	Ertug 2003

women together because they are a user group (such as fuelwood collectors) rather than because they are women" (p. 72). This was the approach taken in CIFOR's Adaptive Collaborative Management (ACM) project in Chimaliro, Malawi, bringing men together as honey collectors and women as mushroom collectors—resulting eventually in greater inter-gender collaboration (Kamoto, 2005).

Studies have shown that rapid improvements in gender equity can be achieved through collectivities. Odame (2002) examines the functioning of women's groups in western Kenya designed primarily to encourage agroforestry and the roles of men who become involved in them. She notes these women's general abilities to control their own participation and to manage the dominance of men, while making use of men's positive contributions. Faughnan (2012, p. 29) maintains that, "Examples from Ethiopia, Rwanda, Kenya, Zambia show increasing voice and visibility of rural women in land committees". Likewise, Tanui *et al*. (2012) describe a case in Uganda where women's involvement in multi-level groups increased over time as did men's: "[W]omen's participation in decision-making and community leadership positions had improved in the three years since by-law reforms were initiated" (p. 218).[26] Shames *et al*. (2012), in their study of six carbon projects in Africa, also found that reaching women worked better through groups than individually.

Given the existence of hierarchical social relations, working collaboratively with women requires some special attention. Specifically separating men and women, at least initially, can allow women's voices to be better heard. Eventually of course men and women probably need to strengthen their skills for communicating effectively with one another—a learning process that takes varying amounts of time. Such groups can function even more effectively if participants take advantage of external networking to access resources and opportunities from actors at larger scales.

Explicit challenges to traditional gender norms

A number of authors have noted the persistent economic attacks on men's idealized roles in East and southern Africa (e.g., Silberschmidt 2001; see Table 4). Barker and Ricardo (2006, p. 183) note that African gender norms emphasize "male sexual needs as uncontrollable, multiple partners as evidence of sexual prowess, and dominance over women".

Kandirikirira (2002) links Namibian men's anti-social (and anti-woman) behavior to their experience of colonialism and racism and to their sense of emasculation. She says these "…systematically undermine black male self-worth and manipulate division, mistrust and dysfunction in order efficiently to oppress black people" (p. 115). The difficulty of making the changes implied by these patterns is clear, partly because of the strength of what many have called "hegemonic masculinity".[27]

Bujra (2002) asks an important question in her analysis of programs that target men in HIV/AIDS prevention[28] in Africa

[26] This is reminiscent of many experienced within CIFOR's ACM project, some gender-relevant elements of which are described in Colfer (2005b)—though much of this work was undertaken in humid forests (where group approaches are also appropriate).

[27] This concept is useful in some contexts, not in others.

[28] See Lopez (2008) for an analysis of the interactions between HIV/AIDS and the forest sector in southern Africa.

TABLE 4 *Male Gender Stereotypes*

Sub-Saharan Africa	high levels of male out-migration, & loss of land & cattle, both bases for men to "achieve manhood" in local world views. Traditional gender norms seen as exacerbating conflict & spread of HIV/AIDS.	Barker & Ricardo 2006
Africa	"social pressure to take risks, be self-reliant, and prove their manhood by having sex with multiple partners" (p. 11).	Jacobsen 2006
Rwanda	Dismal situation with few economic or educational options for young men	Sommers 2006
Kenya (rural)	note the "marginalization of men" who cannot pay bridewealth.	Amuyunzu-Nyamonga & Frances 2006

(particularly Lushoto, Tanzania)—one not often asked in forestry contexts: "A continuing insistence on men's essential dominance is here allied (perhaps) to wishful thinking—that they might 'choose' not to exercise it….In a context where men *enjoy* power, in what circumstance would they sacrifice that enjoyment?" (p. 212). She argues for explicit attention to gender inequities:

> "It is important to listen to what men say about sex and about their relations with women; but this needs to be done in such a way that those social definitions that threaten women's health are challenged rather than confirmed or celebrated" (p. 229).

The same concerns apply in efforts to change male-female relations that impinge on forests and human well being. De Schutter (2012), a man who writes primarily of women's food insecurity, emphasizes the need for structural change and calls for:

> … achieving the right combination of measures that recognize the specific obstacles women face (particularly time poverty and restricted mobility resulting from their role in the "care" economy), and measures that seek to transform the existing gender division of roles by redistributing tasks both within the household and in other spheres. As long as we simply recognize the role of women in the "care" economy by accommodating their specific needs, the existing division of roles within the household and associated gender stereotypes will remain in place, and could even be reinforced. Redistributing roles and challenging the associated gender stereotypes require a transformative approach, whereby the support provided to women not only recognizes their specific needs, but…provides the opportunity to question existing social and cultural norms" (p. 18; see also Kandirikirira (2002)).

The literature is much less attentive to the stereotypical positive roles/features that many men also have or take on (e.g., physical strength, courage, skill at public involvement, responsibilities for family members, and more) that also place significant pressures on them. Women's stereotypical sex roles—which also fulfill vital functions for society's continuation—are likely to be just as entrenched as men's, often emphasizing their nurturing roles/features: gentleness, submissiveness, femininity; cooking, cleaning, bearing and looking after children; and often responsibility for agriculture and NTFP collection. For both genders, realities on the ground are far less predictable than these stereotypes imply (e.g., Angelsen *et al*. 2014, Sunderland *et al*. 2014).

There have been efforts to make changes. In the domains of reproductive health and domestic violence, the use of gender transformative approaches that encourage local men and women to challenge exploitative gender norms have had some success. But Bujra (2002) has found and critiqued efforts to address HIV/AIDS that reinforced exploitative views of women and men's relationships with them (e.g., targeting truckers in Tanzania; the military in Ghana, Malawi). More encouraging approaches are spreading to the field of agriculture, where transforming gender relations is seen as key to achieving positive agricultural development outcomes (e.g., collection by Quisumbing *et al*. 2014, CGIAR Research Program on Aquatic Agricultural Systems 2012). Others describe both positive and negative signs: Alemu and Flintan (2007) discuss the growing willingness of some Afar men (Ethiopia) to help women with "women's work", combined with other men's lethargy due to increasing use of the mild narcotic, *khat*; Padmanabhan (2007) analyses the negotiations and cultural transformations in northern Ghana that come about as

- Kusasi men's roles are attacked by their inability to provide the traditional staple, millet;
- Kusasi women's involvement in agriculture increases accordingly; and
- women distance themselves from the cash crop, onion, by their fear of prospering—which can lead to accusations of witchcraft.

The partial solution Kandirikirira (2002) describes, and proposes, is action research (also called for specifically in dry forests by Berardi and Mistry 2006) and facilitated analysis of ethnic and gender realities, followed by a process of taking action to change those. The local groups involved in Kandirikirira's work proposed the following multi-pronged approaches to promote transformations in gender relations: training teachers, hostel matrons and community volunteers in counseling; setting up resource centers; development of informal adult-child meeting places ("firesides"); PRA projects in school by children; child-to-child projects that prepare

materials for younger children on non-discriminatory gender relations; and forum theater and debating clubs at school focused on relevant dialogue.[29]

Global diversity and dynamism in social and ecological conditions mean that holistic and place-based approaches that encourage social learning are going to be the most effective in the long run. Such approaches have been shown to deal well with local and meso-level conflicts such as those discussed above pertaining to dry forests; and they have been used successfully to attack inequitable gender stereotypes and behavior (see section on "Group Focus and Collective Action"; or Colfer's global collection, 2005b).

Another feature that supports such approaches is the greater willingness of people undergoing one change to consider making other changes. The problems with men's roles described above, for instance, can be a stimulus for individuals to consider other related changes. Problems and conflicts can lead to improved resolution, rather than a downward spiral, particularly with good facilitation of group process.

Focus on products and fields of interest to women

The simplest and most obvious opportunity for forestry and agroforestry professionals comes with the selection of products and locales which women manage. Understanding which products women grow, collect, harvest, process, use, and sell in a given location is an important first step. Women's high involvement in firewood collection is worth noting, and efforts to manage it more sustainably are required.

Similarly getting an accurate sense of gendered land use patterns is key. Women and men frequently exploit different spaces. For instance, women tend to collect products (NTFPs, firewood) from commons and uncultivated lands such as areas of bush, interstices between fields, and roadsides. Women are often associated with marginal areas and with home gardens, which hold great potential in terms of nutritional variety, food security, biodiversity maintenance, and gender equity. Yet, these spaces, crucial for women's livelihoods and family subsistence, are often ignored in analyses that focus on "productive" lands in private usufruct.

While a focus on such products and fields carries with it the danger of addressing what some have termed "practical" rather than "strategic" interests of women (Molyneux 1985, Boyd 2009), such attention does recognize the serious social constraints that interfere with immediate and genuine gender equity. The global link (except in the Middle East) between women's contribution to household subsistence (whether through agricultural production, wage labour, or other means) and high female status within the household and community was recognized decades ago (Sanday 1974). Attempts to strengthen this contribution make sense, taking appropriate care to address relevant cultural dangers (e.g., accusations of promiscuity or witchcraft or increased domestic violence).

The focus on NTFPs that women control is indeed increasingly popular among researchers and development practitioners. For example, the story of shea butter in dry West Africa and women's central role in its harvest, production and marketing has been thoroughly addressed by Chalfin (2004), supplemented by Elias and Carney (2007) and Wardell and Fold (2013). Likewise, Dreibelbis (2013) describes the advantages to women of the recent boom in argan oil, a traditional element in the diets of the Berbers of southwestern Morocco. Its growing popularity in the West—for reducing cholesterol and triglycerides in the blood, and in cosmetics—has been a boon for the Moroccan women whose arduous labour extracts the oil from the seeds. Unfortunately, this boon has also had negative impacts, including over-use and deforestation, which are threatening the resource's sustainability. Shackleton *et al.* (2011) examine gendered value chains of relevant NTFPs in Zambia, Ethiopia and Burkina Faso, and offer targeted suggestions for ways to strengthen women's roles and benefits from various stages of the processes. Their analysis, however, assumes a continuation of women's primary responsibility for domestic work—a practical assumption, yes, but one that probably needs to change (as suggested above) if genuine empowerment is to occur.

A number of analyses emphasize the difficult-to-predict social adaptations that different groups make to new crops and markets or other changes. As described earlier under Theme 6 (Commercialisation of crops and forest products), many of these changes have had adverse effects on women. Yet, Padmanabhan's (2007) analysis of the Kusasi and Dagomba of Ghana—described in detail under Theme 6—demonstrates the uniqueness of each situation and the importance of finetuning any approach to local realities to generate outcomes that can benefit women. She explains that among the Kusasi and Dagomba, local gender symbolism includes both the male staple and female soup. To make the soup, both groups preferred *dawadawa* (African locust bean, or *Parkia clappertoniana* Keay—more recently called *P. biglobosa*), an increasingly rare ingredient. Both have had to substitute soybean in their soup. Dagomba women, who have done little agriculture in the past, have retained their reverence for dawadawa, which they obtain from men. When they must cook it together with soybean, they separate it in a tied rubber container which they cook in the same pot. Among the Kusasi, soybean has been well accepted and has almost completely replaced the traditional, once symbolically laden dawadawa, with resulting improvements in younger women's status—due to their new independence to grow and sell soybeans themselves and its easier preparation. Padmanabhan emphasizes the "terrain of cultural representations and struggles over meaning" (p. 60) in her analysis—issues that have been under-attended in natural resource contexts—and an important lesson for foresters, agroforesters, and agriculturalists to keep in mind as new crops are introduced and encouraged.

[29] The significance of children in forest regions has not been addressed here, but there are a range of important gender issues, bearing on educational opportunities, responsibility for care of siblings, involvement in both work at home, in the fields/forest, in paid labour, and more—an important topic that Michael Balinga, of CIFOR, has begun examining, and one that needs considerably more attention.

The *fields* that are emphasized by outside actors can also have significant effects on gender relations. Nemarundwe (2005) describes a situation in which Zimbabwean women obtained land for a garden project encouraged by a local NGO—described above under "Conflict". She emphasizes the positive empowering role that outsiders *can* play (in contrast to Schroeder's 1999, experience in the Gambia) in inter-gender disagreements. The rise and fall of fads within the forestry world also carry potential positive and negative gender implications (e.g., the interest now in anything related to climate change or landscapes). On the positive side, see, for instance, the work of Djoudi and Brockhaus (2011) or Boyd (2009) on gender and climate change; Or on landscapes, Colfer *et al*. (2014).

Torri (2012) notes the dismal history of agronomic inattention to the typically female-dominated home gardens (also noted by Lopez-Alzina 2007, for Mexico, and repeatedly in the collection by Howard 2003, which included both humid and dry forest areas). But there has been an efflorescence of home herbal gardens in India established mostly by women's self-help groups (190 000 gardens in three states, Tamil Nadu, Karnatak and Kerala). Torri's focus is on a herbal home gardening project in Tamil Nadu that catered to lower caste women. The women involved reported gaining status within their communities from the training they received, as well as economic, nutritional and health benefits. The program, besides strengthening their involvement in gardening, also enhanced their husbands' views of them (as these women were often consulted by higher caste women for health information) and gave them greater say over their own health care, including in some cases much-valued reproductive decisions.

In a Latin American case, Lopez-Alzina (2007) describes the clear and gendered differentiation among fields, traditionally among the people of Yaxcaba in Yucatán State, southeast Mexico, where men worked the *milpa* and women, the home garden. But new lands (*terrenos*), provided recently to some families, have a more open, flexible division of labour and women have free access to it (unlike the *milpa*). Lopez-Alzina also found that men and women influenced each other's decisionmaking about cropping in both *milpa* and home garden, as well as the new *terrenos*. Attention to such gendered patterns of land use and control over agricultural and forest products can reveal entry points for enhancing women's rights or economic opportunities and, down the line, strengthening their "strategic" needs, such as their status within the household and community.

Addressing migration and population-related issues

Strengthening local economic conditions has been a longstanding development goal, and one that has proven difficult to achieve. One of the gender-relevant elements of this effort, however, is its potential for reducing out-migration (assuming the separation of families is not a desirable outcome, genderwise). In the more common cases of male out-migration, such a reduction can reduce women's drudgery and domestic conflict and improve their health—though there are surely cases in which migration is a sensible option. Success at such reduction could also contribute to enhancing men's self-image by allowing them to live up to the provisioning standards that are common parts of ideal male roles.[30] These are also some of the reasons many authors have recommended an end to policies of forced resettlement (e.g., Baird and Shoemaker 2007; Brockington 2002; Lin 2008; Schmidt-Soltau and Brockington 2007).[31]

In situations where migration continues, efforts to build on and reinforce women's decision-making opportunities and authority are also worthwhile. Moreover, strengthening women's rights to land and credit is pressing in situations where women become heads of households with associated responsibilities but without the required rights to land and other assets to fulfill these.

Any recommendation relating to family planning is controversial, but it is a subject that goes directly to the heart of women's empowerment, as well as the wellbeing of the entire family. Population growth has been identified as an ecological problem in many studies of dry forest areas, and women's opportunities as well as their own health and that of their families are seriously constrained if they are subject to continual pregnancy, nursing and childcare (Colfer *et al*. 2008). Yet, in areas where infant mortality rates remain high, reducing fertility is a non-starter. Improvements in health care are well known to foster a demographic transition. So too are changes in gender norms that value boys over girls—and that confer an inferior status to women who do not bear sons—thereby creating further impetus to have many children in order to ensure sufficient sons. Strengthening women's ability to make decisions about family planning as well as their access to affordable and appropriate means of birth control—*should they wish to use these*—are key steps in this process. Working with men on these issues is also essential. The sensitivity of the topic means that participatory approaches are vital for addressing this issue. It is equally essential that those concerned about forests and landscapes at broader scales begin to work together with those addressing poverty, governance, health and population concerns.

As population pressure is also linked to resource availability, policies that limit land grabbing and the expansion of agribusiness at the expense of small-scale farming are required to prevent the creation and migration of landless households in search of arable lands in already densely populated areas.

Besides these suggestions for ways forward, we highlight a couple of important topics that need additional attention: integrating the health literature with the forest literature on gender issues; addressing the lives of children and the

[30] We are suggesting this, not to reinforce "hegemonic masculinity", but to move toward a situation where men are comfortable with themselves and thus probably more open to women's empowerment as well.

[31] Although the details of Schmidt-Soltau and Brockington's evidence are suspect (see Curran *et al*. 2009), the main point is not.

implications of current roles for their own lives and for their parents'; looking further into gender and water and livestock issues in dry forests.

In sum, efforts to address gender concerns in dry forest environments have been hampered by a lack of attention to differing cultural notions about men's and women's roles; to the interactions among parts of human and ecological systems; and to the unique, culturally specific responses to external change efforts. We hope that the material provided, particularly in Part II, can stimulate readers to be more attentive to the social patterns identified here and others that they encounter in the field. We imagine that the approaches that others have found useful, in Part III, can help readers to anticipate the kinds of problems and opportunities for collaborative work extant in their forest regions. Overall, we anticipate that such attention will stimulate more effective work with women and men in local communities, cooperatively designed to improve conditions—human and ecological—here on earth.

ACKNOWLEGEMENTS

We sincerely thank CIFOR's Ramadhani Achdiawan for his statistical help and Mohammad Agus for his mapping contribution. We also thank Michelle Roberts, Cynthia Fowler, and Terry Sunderland and four anonymous reviewers for their useful suggestions on various versions of this paper, though we alone remain responsible for any remaining errors. We also thank the World Agroforestry Center, Bioversity International, and the Center for International Forestry Research for the funding and support through the CGIAR Research Program on Forests, Trees and Agroforestry that made this analysis possible; and Cornell University for ongoing access to their marvelous libraries.

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