

WOMEN, NATURAL RESOURCE MANAGEMENT, AND POVERTY

A review of issues and opportunities



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EXECUTIVE SUMMARY

It has long been recognized that women are the primary users and potential stewards of many natural resources that provide the means for basic survival (Rio Declaration, 1992; UNCED, 1992; CBD, 1993; Declaration on World Food Security, 1996). In Africa, for example, women are charged with 80% of the food security (Madonsela, 2002) and 90% of the water security in rural communities (GWA, 2006). Women collect fuelwood for energy, plants and herbs for medicine, and utilize natural resources to support the economic stability of families and communities. Because the majority of the rural poor are women and because their social roles and responsibilities require them to rely heavily on the goods and services that are provided by the natural world, women are disproportionately impacted by the loss of natural resources.

While researchers disagree on how to calculate poverty, there is consensus on three critical points: 1. The majority of the world's poor are women; 2. Over half of the world's poor live in rural areas and depend heavily on natural resources for survival; 3. Resource degradation is an acute problem in rural areas, with some 60% of the world's poorest people living in ecologically vulnerable areas (Angelsen, 1997). The loss of natural resources not only undermines food, health, energy and water security (FAO, 2001; UNDP, 2006) it also increases the vulnerability and decreases the resiliency of rural women and their families to external forces such as rapid demographic shifts, rapid economic growth, and war and conflict (Lambrou, 2000; UNDP).

Despite their reliance on natural resources for survival and livelihoods, the unique information that women have regarding resource use and management, and the potential stewardship role that they can play, women are not systematically engaged in the planning and implementation of natural resource management activities. To ensure the sustainability of poverty alleviation and natural resource management efforts in vulnerable rural ecosystems, women must be engaged in planning and implementation and they must share the benefits of management outcomes. Further, initiatives must take into account and address the obstacles and constraints that inhibit women from managing their resources sustainably. These issues include insecure land and resource tenure; time poverty; educational/training opportunities; access to financing; increased exposure to health risks; and social, cultural, political, and economic barriers. Research shows that when women are included, natural resource management outcomes are improved, for example:

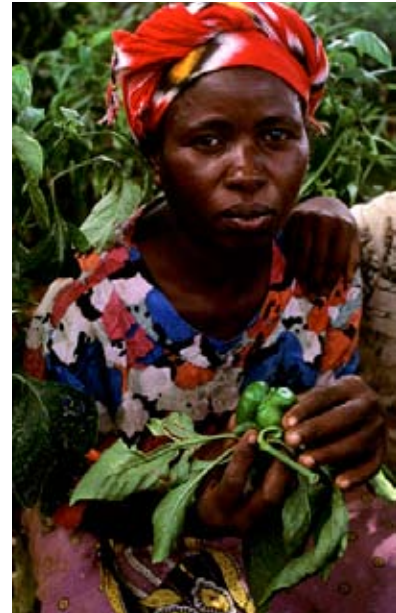


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“Over half of the world’s poor live in rural areas and depend heavily on natural resources for survival.”

“Approximately 70% of the world’s poor and over 65% of the world’s illiterate are women.”

- In Nepal and Gujarat, forest cover is increased by 75% when women are included in the process of protecting forests (Agarwal 2003).
- Research covering 61 nations over a 15 year time period found that the presence of women’s NGO’s in addition to environmental NGO’s is significantly correlated with decreased deforestation (Shandra 2008).
- In Sudan, among the most important factor to getting key natural resource management technologies adopted is the education level of women and improved messaging to women (Muneer, 2002).

In order to improve natural resource management and decrease rural poverty, women must be systematically engaged in the planning, implementation and monitoring of conservation efforts; and they must benefit from the results.



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WOMEN, POVERTY AND NATURAL RESOURCE MANAGEMENT

The degradation of natural resources impacts everyone regardless of gender, race, age and level of income. However, the extent to which natural resources degradation affects individuals varies depending upon several key factors, most significantly: economic status and gender. Because the majority of the world's poor are women, the links between economic status and gender are inextricable.

POVERTY

Approximately 70% of the world's poor and over 65% of the world's illiterate are women (ILO, 1996; IFAD, 2001). The vast majority of these individuals live in rural areas (OECD, 2001; UNDP, 2006). In fact, rural poverty accounts for nearly 63% of poverty worldwide, reaching 90% in some countries like Bangladesh and between 65% and 95% in sub-Saharan Africa (Kahn, 2001; Byers, 2001).

Despite recent increases in migration toward urban centers, the correlation between poverty and remoteness remains strong and is predicted to be significant in most countries over the long term (Angelsen, 1997). Further, the total number of poor rural women is expected to increase because of general population trends, an increase in female-headed households, (Drimie, 2002) and barriers to urban migration for women including lack of money, social roles and responsibilities, and lack of alternative livelihoods (Tacoli, 2009).

Rural people, especially rural women, are often isolated from economic opportunities, have less access to basic social services, and therefore rely heavily on goods and services derived from natural resources (OECD, 2001). Around the world, natural resources provide an array of goods and services for basic survival. Forests enable women to gather firewood, fish, collect materials for making handicrafts and allow access to non-timber forest products such as medicinal plants and fruits. Near shore and coastal systems enable activities such as the gathering firewood (mangroves), fishing, accessing building materials, and utilizing fresh water resources. In South Africa, more than 60% of women rely directly on natural resources for their survival needs for themselves and their families; in Mozambique, this number climbs to 70% (Mutangadura, 2004).

In addition to basic sustenance, the use of natural resources is often a large proportion of the livelihood needs for women in rural communities. For example, in Sub-Saharan Africa women derive 30-50% of non-farm income sources from natural resources; in Southern Africa, the reliance on natural resources for in-



Photo: Dietmar Temps

“As natural resources decline, women must dedicate increasing amounts of time to obtaining resources for both sustenance and livelihood needs.”

come increases to 80-90%. In South Asia, approximately 60% of rural household income comes from non-farm sources (Ellis, 1999). As natural resources are degraded, women’s already very limited economic opportunities are jeopardized and poverty rates climb.

In addition to direct economic losses, women’s economic status is also indirectly affected by degraded natural resources. As natural resources decline, women must dedicate increasing amounts of time to obtaining resources for both sustenance and livelihood needs. This increase in time contributes to ‘time poverty’ and prohibits women and girls from pursuing other activities including income generating activities. Trapped in a vicious cycle, the inability to generate revenue further contributes to greater resource loss and increased inequality (Blackden, 2006). For example, in Uganda wood is necessary as a fuel source for the preparation of food and alcohol for sale by women. As resource availability decreases due to unsustainable deforestation activities, income generating activities become less viable and may be abandoned altogether (Shandra, 2008). Without the added income from food and alcohol sales, women must increasingly rely on natural resources for sustenance as they no longer have the available funds to purchase sustainable alternatives to meet their needs.

Another example includes women producing charcoal in Ghana. Their incomes declined as forests were cleared to expand agriculture for exporting. Because of unsustainable deforestation, women are no longer able to access materials for charcoal. In Vietnam, as resources disappear and distances between forests and markets increase, women are increasingly unable to sell non-timber forest products in the markets and must rely increasingly on natural resources to meet their needs (Quang, 2006).

In summary, because the majority of the rural poor are women and because their social roles and responsibilities require them to rely heavily on the goods and services that are provided by the natural world, women are disproportionately impacted both directly and indirectly by the loss of natural resources (Aguilar, 2006; Adger et al., 2003; ADB et al., 2003, Lambrou, 2004). It is currently estimated that over 60% of the world’s poorest people live in ecologically vulnerable areas (Angelsen, 1997). This degradation threatens not only the natural resources within a region but contributes to furthering the poverty and disempowerment of women.



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LAND TENURE

Despite a strong reliance on land and natural resources for survival and livelihood, women own less than 2% of the world's titled land (FAO, 2003; Coleman, 2008; see also UNIFEM, Women Watch, 2010). While women often have legal rights to own land and resources such as in the case of Zimbabwe, Cameroon and Ethiopia (PRB, 2002; Sass, 2002) in reality customs often prevent women from taking *de facto* control of land and natural resources. (UN DESA, 2006; Coleman, 2008). This lack of land ownership or tenure negatively impacts women's economic status because landowners receive the greatest benefit from increased productivity and farming yields and this increased productivity enables landowners to rely less on natural resources for survival (OECD, 2001; Quang, 2005).

In addition to their inability to realize improved productivity from secured land rights, women are often unable or unwilling to adapt their agriculture and foraging activities to changing ecological conditions or to improve sustainability. Women who do not have land tenure are not incentivized to practice sustainable agriculture or development methods or make investments in long-term infrastructure. For example, in Zimbabwe, researchers found that women are significantly less likely to plant trees for food, medicine, and fuelwood in

areas where future access is uncertain (Fortmann, 1997). In other instances, men dissuade women from making long-term improvements expressly to prevent them from acquiring land tenure. For example, tree planting by secondary rights users such as women is not encouraged in the Congo as it is a widely recognized as a way in which a land user may make a long-term claim to land (Flintan, 2003). In Cameroon, some men will only allow women to plant short-lived trees, such as papaya, to prevent women from gaining land tenure (Flintan, 2003). In Kenya, men reserve the right to make final decisions about how the land is used. A woman must therefore secure the approval of her husband before she can build a terrace to conserve the soil. Situations frequently arise where men do not grant approval and women remain powerless to improve land use (Mwanduka and Thampy, 1995).

In addition to being unable or unwilling to invest in sustainable practices in the absence of land tenure, women cannot use land as collateral for accessing credit. Women have access to less than 10% of the world's credit (FAO, 2002). The lack of access to credit means they often cannot improve farming practices by adopting new technologies or hiring labor when needed (PRB, 2002; FAO, 2006). The inability to improve farming practices leads to increased deforestation because as farmlands



Photo: Dietmar Temps

“As a result of women’s inability to acquire land tenure and credit for improved practices, women are excluded from taking advantage of current and emerging economic opportunities.”

collapse due to unsustainable farming practices, more land is needed on which to grow food (see for example Lao PDR, 2008). Conversely, when women have access to credit, information and improved farming techniques, land productivity increases. In fact, recent studies suggest that with equal access to credit, women could increase their access to productive resources such as land, seed and fertilizer thereby increasing productivity of land by up to 20% (AFP, 2007). In Burkina Faso, the allocation of smaller plots to men and women separately instead of allocating larger plots to household heads produced both higher yields and social benefits. Women were equally good or even better irrigation farmers than men and were able to increase their economic contribution to their households. As they became more economically independent, they were also able to help support their relatives and increase their own opportunities for individual accumulation of wealth in the form of livestock. The effects of having individual plots added incentives for women to invest more capital and labor in their land thereby significantly improving productivity (OECD, 1998).

As a result of women’s inability to acquire land tenure and credit for improved practices, women are excluded from taking advantage of current and emerging economic opportunities. For example, women are often excluded from emerging carbon markets because without secure land tenure, international accrediting organizations will not recognize offset efforts (Henneke per. Com., 2010; CCBA, 2008; Martin, 2008).

In summary, the incentives for women to implement conservation and sustainable management to improve productivity of farmland and the ability to take advantage of current and emerging economic opportunities are mediated by lack of access to land tenure and credit thereby leading to continued poverty. As poverty



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remains stagnant or increases and productivity of land decreases, deforestation rates go up as women are forced to find new land on which to grow food and access resources for survival.

EDUCATION

Lack of education and access to information generally, and specifically with regard to natural resource management, is another barrier that impacts women more than men. Women in rural areas have lower levels of education than rural men (Lambrou, 2006).

PRIMARY EDUCATION

Rural women are less likely to achieve the same level of basic education as men for several reasons. Reliance on natural resources means poor women must spend many hours a day obtaining natural resources to meet their families' daily needs. As the health and availability of natural resources declines, women's workloads increase. Women must travel further and increase personal risk in order to secure resources from new locations (Koda, 2004). For example, as forests are cleared, women must walk further to collect necessary resources such as fuelwood (Agarwal, 1992). During the 1970's, women in Nepal were able to collect fuelwood in 2 hours; however, just ten years later, fuelwood collection took an entire day and involved walking through difficult terrain (Loughran

and Pritchett, 1997). In Sudan, the time taken by women to collect fuelwood in some areas has increased fourfold during a 10-year period (PRB, 2000). It is not unusual for women in India to spend five hours daily collecting firewood when traditionally this chore had been done weekly (Buckingham-Hatfield, 2000). As time burdens increase for women, girls are forced to leave school and assist with daily household chores (UN, 2008). A study in Mozambique's primary schools found that the single most important factor in poor performance was the time and strain imposed by the child's workload (UNICEF, 2010).

Other factors that account for girls' unequal access to education in rural areas include a lack of a safe means of transportation, poor security in schools, and the lack of separate sanitation facilities (UN, 2006). Further, if one of the children in a household has to drop out of school because of the cost of schooling or for other reasons, the dropout is usually the girl. For example, in Malawi, after long periods of drought more girls dropped out of school to save money on school fees and to assist with household tasks (Valentini, 2005). The lack of education in younger generations has implications for sustained gender inequality and continued cycles of chronic poverty and natural resource degradation.

TECHNICAL TRAINING

Rural women are less likely to have access to useful non-formal education or training opportunities, with the exception of literacy courses and courses in handicrafts (IFAD, 2001). Because technical outreach and agriculture extension services frequently target cash crop producers, men receive the bulk of training and funding. Further, agricultural outreach and training experts tend to be men, and male outreach experts often overlook the role of women in providing food. For example:

- In Thailand, the scarcity of female government officials, extension agents and trainers hampers women's access to information, resources and technology provided by external institutions. "Research has found that formal communications from government officials in Thailand are unconsciously gender-biased. For instance, letters and invitations to meetings are always addressed to the head of the household who is usually male. Further, male officials themselves prefer to contact male villagers. In addition, while training courses can help to advance the skills of some villagers, there is no formal obligation on the part of those trained to communicate their new knowledge with other villagers. As a result, new skills are not systematically shared, and opportunities to multiply and scale up technology transfer are lost" (FAO, 2003a).



- In El Salvador, a project area had 21% female-headed households and women farmers were particularly active in vegetable, soybean and fruit tree production. However, only 4% of the participants for crop-production training were women. There were a number of reasons for this including the absence of land rights for women, women's workload, and cultural norms. Further, gender biases were found among project staff. After gender training was introduced to the project, education ratios were reversed and the number of women in training rose to 70%. Gradually, gender ratios stabilized closer to a balanced program (IFAD, 2001).

- A recent study in Africa notes that women very rarely participate in courses on animal traction. Training on animal health often excludes women even when they are the ones doing the livestock-raising (IFAD, 2001). Such gender bias may have been justified at one point in time, but now, with large-scale male out-migration, women are performing most farming tasks and therefore need equal access to knowledge.

In summary, women as farmers are often overlooked despite their role in providing most of the food consumed locally. This oversight means that education is biased toward male community members. Therefore, women do not have access to information to improve agricultural and natural resource management practices. This

lack of education results in a decrease of farmland productivity and leads to unsustainable natural resource management practices including deforestation and the expansion of farming onto marginalized lands (OECD, 2002). It also precludes women from engaging in key economic opportunities. Further, as the availability of natural resources declines, girls are withdrawn from school to help meet the needs of families with implications for future natural resource management strategies.

HEALTH

Loss of access to healthy natural resources affects women's well-being disproportionately to that of men (Huyun, 2005). The health impacts borne by women are often related to such things as deforestation, the collapse of fisheries, and desertification. Women are disproportionately impacted for several reasons including: increased exposure due to social roles and responsibilities such as in the case of water borne diseases and indoor air pollution, increased vulnerability because of lower health status and the special risks faced during pregnancy, and because of societal norms and behaviors such as the use of rape during conflict and the sexual promiscuity of male partners.

INDOOR AIR POLLUTION

Approximately 3 billion people worldwide cannot afford fossil fuels to meet basic energy demands such as cooking, cleaning, lighting and heating. An estimated 2.4 billion of these people rely on traditional biomass including wood, agricultural residues and dung to meet their daily energy needs. Four out of five live in rural areas of South Asia and sub-Saharan Africa (Bruce et al., 2000). In many areas, women are the community members primarily tasked with providing energy security. For example, in India women collect 80% of the biomass that is used for fuel (Singhal, 2000).

Deforestation is a serious problem in terms of energy availability. As deforestation rates increase, women are forced to shift to alternative fuel sources such as dung and crop residue (Global NTFP Partnership, 2006). The smoke from biomass fuels, especially when alternative fuels must be used in the absence of wood, are toxic and have been associated with acute lower respiratory infections, chronic obstructive pulmonary disease, and lung cancer in women and children in poor nations (Shandra, 2008). In fact, inhalation of sooty smoke from indoor fires is estimated to result in 1.6 million deaths each year (WHO, 2005). More women and children die from indoor air pollution than from malaria (International Energy Agency, 2010). These health problems are exacerbated by deforestation because fires fueled by dung or crop residues require continuous tending resulting in increased exposure, increased illness and further loss of time to conduct other activities (Buckingham-Hatfield, 2000).

Fuel scarcity also translates into the preparation of less food and/or less nutritious food (Buckingham-Hatfield, 2000). For example, in Bangladesh, there has been a shift from daily cooking of two meals to only one because of fuelwood shortages. In Mexico a shift from the staple diet of beans to other less fuel intensive and nutritious foods has occurred (Huyun, 2005). In Vietnam, women who have ample rice are able to both consume and sell rice and collect non-timber forest products, but poor women forgo their daily nutritional needs to save time to gather fuel resources from nearby forests. These dietary shifts have important health implications for women including malnutrition and anemia which increase susceptibility to illness and pregnancy complications (Santow, 1995).

“As deforestation rates increase, women are forced to shift to alternative fuel sources such as dung and crop residue.”



Photo: Dietmar Temps

WATER

Domestic water is used for processing and preparing food, drinking, bathing and washing, irrigating home gardens and watering livestock. The time spent in locating, collecting, and transporting sufficient quantities of water for household use is one of the most critical and time consuming daily activities for women and girls. For example, in Egypt 30% of women walk over an hour a day to meet their water needs (FAO, 2003c), while in other parts of Africa women and children spend eight hours a day collecting water (Gender and Water Alliance, 2003). Recent data shows that women and girls carry approximately 71% of the water when none is readily available (MICS and DHS surveys from 18 African countries in 2005, 2006).



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In addition to time and energy burdens faced in procuring water as a resource, women and girls suffer physical harm from obtaining water and other natural resources. For example, women frequently carry loads that weigh up to 75 pounds, often on their heads and back. As collection distances increase, fuelwood and water loads have been linked to spine damage, pregnancy complications including miscarriage, and maternal mortality (Huyun, 2005). Further, women and girls face alarmingly high risks of being raped while gathering water and other natural resources. For example, in 2009 more than 8,000 women were raped while obtaining water and other resources in the provinces of North Kivu and South Kivu in the Democratic Republic of the Congo (UNFPA). Between 1996 and 1997, in the Dadaab camps in northeast Kenya, approximately 90% of reported rapes occurred while Somali women were gathering water, fuelwood and tending livestock (Women's Commission for Refugee Women and Children, 2002).

In addition to physical harm, women are more frequently exposed to disease, infection and toxic substances that contaminate water supplies simply because of their increased exposure to water. Contamination of water resources stems from a variety of factors. For example, more than 80% of sewage in developing countries is discharged untreated, polluting rivers, lakes and coastal areas (Scott, 2004). Deforestation increases transmission of diseases that stem from fecal contamination of water such as bacterial, cryptosporidium, and dysentery infections, and hepatitis (Lilly et al., 1997). For example, increases in hookworm infection during periods of flooding are often caused by deforestation-associated river silting that produces soil changes facilitating the transmission of the hookworm parasite (Lilly, 1997; Fuseini, 2010). It is estimated that about 44 million pregnant women have hookworm infections, posing a considerable health burden in developing societies (Unicef, 2008).

An array of other diseases that are closely linked to deforestation and other environmental changes and have dramatic impacts on women's health include:

- **Filariasis:** A parasitic disease caused by thread-like worms. The worms may damage the lymph system causing swelling which can lead to elephantiasis. Filariasis is spread by mosquitoes.
- **Giardia lamblia:** A microorganism (protozoa), sometimes found in drinking water, which may cause diarrhea, cramps, and illness (Giardiasis). Giardia are commonly found in surface water sources like reservoirs, lakes, and rivers.
- **Schistosomiasis:** A disease (also called Bilharzia) caused by parasitic worms found in freshwater. Schistosomiasis can damage the liver, lungs, intestines and bladder.
- **River blindness:** A major cause of preventable blindness. The disease (onchocerciasis) is the world's second-leading infectious cause of blindness and is caused by parasitic worms which are transmitted by the bite of the blackfly. Due to the vector's breeding habitat, the disease is more severe along the major rivers in the northern and central areas of Africa.
- **Guinea worm:** Infection occurs when a person ingests water contaminated with aquatic crustaceans or water fleas that carry the Guinea worm larvae. Guinea worm disease often afflicts women who are exposed to contaminated water

sources, often when washing clothes or collecting water. The worm also takes a toll on societies by causing absenteeism among infected school-aged children (see www.cartercenter.org).

- **Trachoma:** 70% of the world's blind are women; many of whom have been infected directly or through their children, with Trachoma, a blinding bacterial eye infection occurring in communities with limited access to water. This rate is 3 times the rate of men who are infected (Women and Trachoma, 2009).

MALARIA

Deforestation has serious implications for the spread of malaria (Walsh et al., 1993; Ault, 1994; Taylor, 1997; Olson 2010). In areas where malaria is highly endemic, semi-immunity to malaria is acquired during the first 10-15 years of life. Therefore, while the impact of malaria on children is enormous and in 2000 malaria was the cause of 18% of childhood deaths (Rowe et al., 2000), adults with immunity are rarely affected by the disease. However, while malaria rates are low in most adults, pregnant women in endemic areas are highly susceptible to malaria in both frequency and severity. Malaria affects an estimated 24 million pregnant women, and each year 75,000-200,000 infant deaths are caused by malarial infection during pregnancy (Steketee, 2001). Pregnancies are also associated with high rates of maternal death



Photo: Annie Griffiths, Ripple Effect Images

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“As fisheries collapse, women are at an increased risk of contracting HIV/AIDS”

from fever, severe anemia, abortion, stillbirth, and low birth weights (Brabin, 1983; Steketee et al., 2001; Uneke, 2007).

Deforestation (and in some instances mining) increases malarial transmissions in three ways: habitat modification, population migration of people and changes in feeding patterns of mosquitoes (Pattanayak et al., 2006; Vitter et al., 2009). When habitat is disrupted by deforestation, mosquitoes that breed in partial shade or sunlit waters replace forest breeding mosquitoes (Olsen, 2010). These new mosquitoes are often more efficient vectors than those replaced populations. Deforestation can also result in a massive increase in mosquito breeding sites. Dragging logs through the forest can cause water-filled furrows. Tire marks, hoof prints, and even human footprints can provide ideal breeding places for mosquitoes. Removal of vegetation along stream edges; slowing of water runoff by debris; and impoundment for water supplies; accumulation of coconut shells, tins, tires, and other rubbish; and pooling of water in tree stumps, all increase the mosquito population numbers (Walsh et al., 1993).

Specific examples of where deforestation has resulted in an increase in malaria include; in Brazil a 4.3% change in deforestation from August 1997 through August 2000 is associated with a 48% increase of malaria incidence (Olsen et al., 2010). The clearing of forests in Malaysia for forestry and mining led to a marked increase in the numbers of mosquitoes and associated malaria cases (Bockarie and Paru, 1993). In Sri Lanka clearing land for tea estates led to severe epidemics of malaria in areas in which were previously classified as mildly malarious (Jones, 1951; Bockarie and Paru, 1993).

HIV/AIDS

The decline of natural resources, particularly in fishing communities, has serious implications for the spread of diseases including, most notably, HIV/AIDS. In rural fishing communities, women and girls are among the hardest hit by HIV/AIDS. They are more biologically vulnerable to infection than men. They are also more socially vulnerable due to discriminatory social and cultural practices. Further, because of their weak social position women are either unaware of or unable to insist on safe sex practices. Gender inequalities also affect the ability of women to disclose their HIV status and utilize treatment and care services. Moreover, their lack of economic independence makes them more likely to engage in survival sex (Bishop-Sambrook, 2004).

While women living near sites of intense deforestation or mining have elevated rates of HIV/AIDS as compared to baseline communities, fishing communities

have among the highest rates of HIV/AIDS in the world. A recent study of HIV rates among fisherfolk in ten countries found that in nine of those ten countries the prevalence rates of HIV/AIDS are four to 14 times higher in fishing villages than the national average (Seeley, 2005). The HIV/AIDS rates are frequently highest in women. Examples of elevated rates in fishing communities include:

- Thailand: up to 20% of fishing boat crews tested HIV-positive, compared with 1.5% in the general population;
- Lake Victoria, Africa: fishermen are five times more likely to die of AIDS than farmers;
- Honduras: 8% of adults in fishing communities have HIV, four times the national average;
- Uganda: a quarter of fisherfolk are HIV-positive, compared to 4% in surrounding villages;
- Kiribati: girls as young as 12 are pressured by their families to become sex workers for foreign fishing fleets;
- Cambodia: almost 20% of fisherfolk are HIV positive, making them the second worst affected occupational group after brothel-based sex workers.

As fisheries collapse, women are at an increased risk of contracting the disease in part because poverty increases and risky behavior increases, often in response to food insecurity. In short, women more frequently trade sex for food or money. In fact, recent reports show that women who

reported lacking sufficient food to eat had 80% increased probability of selling sex for money or resources, a 70% increased probability of engaging in unprotected sex and reporting lack of sexual control, and a 50% increased probability of intergenerational sex (FAO, 2004). The lack of income generating opportunities, specifically in fishing communities, leads to extremely elevated rates of women engaging in high risk activities including fish for sex trades (Appleton, 2000; Allison and Seeley, 2004; Tanzarn and Bishop-Sambrook, 2003).

The links between natural resource degradation and HIV/AIDS result in a negative feedback loop (see text box 1). For example, as local fisheries collapse due to the influx of larger international fishing vessels, small scale fishers travel further distances to find fish. While they are away, fishermen frequently engage in sex with multiple partners, including sex workers, many of whom are trading sex for food (FAO, 2003). Small scale fishers contract HIV/AIDS and then return to their communities and infect their partners. As villagers become sick from the disease, they abandon sustainable natural resource practices because they are weak, undernourished, and need to find resources in the easiest places possible including harvesting fish from sensitive near-shore nurseries and medicinal plants and food items from nearby protected forests. When villagers succumb

to the disease, women and children often lose land rights and are forced to further utilize natural resources to meet their survival needs (Torell et al., 2007).

The impact of HIV/AIDS erodes the asset base of poor rural women, depletes their labor force, reduces their range of knowledge and skills, restricts their ability to earn cash from farming and non-farm activities, and undermines their ability to feed themselves and maintain adequate levels of nutrition.

In summary, the loss of healthy natural resources has serious implications for the well being of poor rural people, especially women and children. Women have specific roles and responsibilities in communities, lower health status, risks faced during pregnancy, and societal norms, women more frequently suffer from some negative health effects including diseases that stem from indoor air pollution, water borne diseases, malaria and HIV/AIDS. Women also suffer physical harm while gathering natural resources due to the physical challenges of their activities and exposure to violent crime and other dangers. As the integrity of natural resources declines such as through deforestation and overfishing, the impact on women's health increases.

THE IMPACTS OF AIDS ON AGRICULTURE AND NATURAL RESOURCE LIVELIHOODS

AGRICULTURE

The nature of production makes some farming systems more vulnerable to the impact of AIDS than others. Farming systems requiring high inputs of physical labor, farm power, purchased inputs and technical skills are very sensitive to the depletion of the household asset base. Systems are more vulnerable if they have limited rainfall, a critical dependence on the timeliness of operations, marked labor peaks and a limited range of crops. For example, tree-based or root crop systems are likely to be more resilient than labor-intensive irrigated vegetable production or cereal cultivation, at least in the short term. The loss of labor, draught animals, tools and equipment, and cash to purchase inputs results in a reduction in the area cultivated, increased land under fallow, switches to less labor-intensive cropping systems, and the abandonment of soil and water conservation practices.

LIVESTOCK

The livestock base is often depleted as households struggle to raise cash to buy medicines and food. They are also slaughtered during funerals and may be taken by the relatives of a deceased male. Livestock suffer if household members do not have enough time or fodder to care for them. Widows and children may not have the knowledge and skills to care for specific animals due to gender differences in the ownership and care of animals. A reduction in the draught animal base not only results in a smaller area under cultivation and increases the burden of transporting goods but also reduces opportunities to earn a rental income.

FORESTS AND WOODLANDS

Households in need often resort to communally owned resources such as forests and woodlands as a valuable safety net providing food, medicines and materials for household and livelihood activities. These resources may be over-exploited when whole communities are in crisis, threatening their long term viability as a safety net and reducing the agro-biodiversity of the area. Woodlands and the products and

services they provide are also destroyed by uncontrolled forest fires. Fires are a common way of clearing land for farming but they are being used more frequently to overcome labor shortages and by people who lack experience in their safe use.

FISHERIES

Fishing communities are among the most heavily AIDS-impacted communities due to their behavior, lifestyle and environment. As a result of the impact of AIDS, open water fishing practices are changing from fishing in deeper waters to fishing less frequently and closer to shore in areas which are often already over exploited. With fish ponds, less time is spent on feeding fish and pond maintenance. Both systems experience small catches of fish which are of lower monetary value, less capacity to repair fishing equipment and nets, less money to replace equipment or restock ponds, and a loss of specialist knowledge.

EXTENSION SERVICES

Extension staff and rural development workers are at risk of HIV infection if they spend extended periods working away from home. This has significant implications for the capacity of these organizations to deliver services to rural communities. Sick staff members are unable to perform their duties, they die and their colleagues have to attend their funerals. The service loses their knowledge, skills and expertise and has no spare capacity to respond to changing needs and priorities of the rural population. In some countries, the loss of staff outstrips the ability to train new replacements, leaving those remaining with heavier workloads. In addition, the financial resources of the organization are drained by the costs of treatment, funerals, compensation, early retirement, retraining and insurance.

From: Bishop-Sambrook. 2004. Addressing HIV/AIDS through Agriculture and Natural Resource Sectors: a Guide for Extension Workers. Socio-economic and Gender Analysis Program(SEAGA)/FAO.

Text Box 1- Areas of collapsed natural resources, especially depleted fisheries, often leads to an increase in rates of HIV/AIDS. Increases in rates of HIV/AIDS also negatively impact natural resources.

ENGAGE WOMEN, DRIVE CHANGE

EMPOWERING WOMEN TO MANAGE NATURAL RESOURCES

Much of the world's natural resources exist in areas that are either managed as common property resources or as open access resources. Examples of common property or open access resources that are threatened with over-exploitation include habitats such as near-shore coastal areas, coral reefs, pastoral lands, wetlands, lakes, and forests, among others. These types of resources are utilized extensively by the rural poor, and because women are less likely to own land, they rely more heavily on common property or open access resources to obtain materials for basic sustenance. Hence women tend to be disproportionately impacted by environmental degradation, as well as by measures such as restrictions on access to forests, leasing or sale of common lands to private entrepreneurs and conversion of common lands to other uses.

Common property and open access resources are often lost by depletion and/or removal of resources from the common pool. There are a number of policies and factors that affect the availability and quality of resources such as official land use policies, resource extraction, intensified stakeholder use, economic development, legal system inadequacies, privatization schemes, improved valuation and loss of traditional practices among others. As the common property and open access resource bases are diminished, women must increasingly rely on marginal lands or clear additional forest space to meet their needs (OECD, 2001).

In addition to direct removal of resources from the common pool, legal systems are often ill equipped to decide on property laws and are often unable to effectively decide cases where traditional and constitutional laws do not align, thereby preventing women from owning land or making sound management decisions with regards to the natural resources they use. Judges and legislatures are often blind to traditional claims, claims made by women, or claims made by indigenous peoples. Therefore, lands occupied or used and managed by women are often treated as open access, and these resources are often under increased threat of degradation because the stewards of the land, the women, are not represented in the process or as a clamant in enforcement/judicial processes.



Photo: Lynn Johnson, Ripple Effect Images

“Judges and legislatures are often blind to traditional claims, claims made by women, or claims made by indigenous peoples.”

“In these transactions, governments often fail to account for role of women at the site level.”

Specific examples of common pool resource decisions that omit women include:

- OFFICIAL LAND/RESOURCE USE POLICIES

Governments are often under pressure from outsiders to use open access resources unsustainably. For example, governments award logging concessions to timber companies and sell fishing access rights to international governments often under situations of financial or political pressure (OECD, 2001). In these transactions, governments often fail to account for role of women at the site level. For example, on Lake Victoria, following an export boom due to increased demand in world markets, the decline of post-catch processing

had a direct impact on the women involved in local fish processing and trading. As the fishery began to decline, women no longer had incomes from their processing work and had few alternative livelihood options. Poverty rates among women increased as did the rate of diseases such as HIV/AIDS.

- PRIVATIZATION SCHEMES

State policies often sponsor privatization schemes and the conversion of land operated under common property laws to private land held by a few large landowners. Privatization has the impact of marginalizing poor women and making them more vulnerable to drought and other impacts resulting from poor natural resource management. Sometimes privatization is *de facto* through powerful community members who refuse to honor traditional arrangements. The emergence of new technologies, improved crops, or new markets often increases incentives for powerful community members to make claims on common access resources for their exclusive use. Further, efforts that raise the value of common property encourage a redistribution of land to powerful community members. The inability of women to own land means that when women effectively manage natural resources and increase the value of common pool land, they risk having that land removed from their management as it increases in value.



Photo: Annie Griffiths, Ripple Effect Images

Water presents a particularly dire example of the impact of privatization on a resource. Water makes up one of the three largest industries in the world (alongside oil, gas and electricity). There is growing investment in water infrastructure by private companies including dams and sanitation systems. In 2005, the market value of private water companies was \$660 billion (See Summit Water Universe). In 2006, approximately \$145 billion was spent in water improvements by private companies. Consequently, women's access to water will continue to decline not only because the resource is severely limited but also because of the growing number of privatization schemes.

- **INTENSIFIED STAKEHOLDER USE**
Converting common property and open access lands to intensive farming, livestock grazing, fuelwood production, or other activities by better-off farmers directly impacts the livelihoods of women, and increases pressures on the remaining common resources that women have access to. The resulting environmental impact can be severe. For example, in many parts of Asia and Latin America, mangroves have been converted to commercial aquaculture, devastating large areas critical as fish breeding grounds, erosion-control buffers, natural silt traps, and water purifiers. In many of these areas, natural resources utilized by poor women have declined as reefs are smothered by silt resulting in less breeding area for



Photo: Annie Griffiths, Ripple Effect Images

fish and other potentially renewable natural resources. Privatization of common property land for cultivation is substantial in India. This has led to a notable increase in firewood collection time – borne almost entirely by women – decreased access to fodder, and a subsequent increase in market purchases.

- **IMPROVED VALUATION**
Although women's role in securing water resources is clear, programs and policies related to water security, rights and sustainable management often fail to factor in women. In many cases these programs and policies are detrimental to the well-being of women. For example, interventions such as irrigation habitually fail to take into consideration the existing imbalance between men's and women's ownership rights, division of labor and incomes. By raising the

“By ensuring women’s ability to secure tenure over the lands and resources that they use, investments in natural resource management will be more effective, efficient and sustainable.”

value of the land, irrigation brings about social change which usually favors men. Irrigation systems also tend to favor mono-cropping, often for the production of cash crops, and thus may exclude provisions for a more diversified crop pattern supporting a variety of food types.

In summary, by ensuring women’s ability to secure tenure over the lands and resources that they use, investments in natural resource management will be more effective, efficient and sustainable. Further, by enabling women to employ long- term management strategies in the resources they use, women will be better able to ensure the health, livelihoods and security of their families. Finally, in order to maximize the impact of natural resource management efforts, women should be included in land use policy and development decisions, gender disaggregated socioeconomic data should inform land use decisions, and privatization schemes should take into consideration site level impacts, especially impacts to women.



Photo: Annie Griffiths, Ripple Effect Images

ENGAGING WOMEN IN NATURAL RESOURCE MANAGEMENT IS GOOD FOR WOMEN

By understanding the different roles of men and women in natural resource use and management, and systematically incorporating these differences into the design of interventions and investments, natural resource management outcomes will be improved. Further, conservation and natural resource management activities can have direct benefits for women and their families. While much more work needs to be done to understand the conditions under which natural resource management can contribute to poverty alleviation, anecdotal evidence suggest that a variety of conservation interventions can provide a safety net for the poorest of the poor and provide a foundation for alleviating poverty (Leisher et al, 2010) (see Text Box 2).

Specific examples of how improved natural resource management has also improved the well-being and empowerment of girls and women include:

- In Morocco, a rural water supply and sanitation project was targeted to improve access to clean, reliable water and reduce the time women and girls spent collecting water. Over a four year timeframe, the time spent collecting water was reduced by between 50 and 90% and girls' attendance in school rose 20% (World Bank, 2003);
- In El Salvador, a watershed and gender project encouraged women to learn new skills through participation and involvement in watershed management. The project promoted women as leaders of small-scale companies and trained them as community managers. As a result, women acquired technical agricultural knowledge and are now performing tasks previously considered suitable only for men (Agua Project Report, 2002);
- In Nigeria, the construction of a tourist resort on the Obudu plateau led to deforestation and water shortages. Local women were forced to spend more time collecting water. Further, the overall health of families in the community declined. The Nigerian Conservation Foundation (NCF) implemented a watershed management project on the Obudu plateau in 1999 and encouraged women to engage in the decision making process, provide leadership and get involved with construction and maintenance activities. NCF activities resulted in increased availability of water and an associated reduction in water collection times. Moreover, there was an increase in income generating activities for women through farming and marketing. Further, the women's healthcare burden was reduced due to a 45% reduction in cases of diarrhea (see Gender and Water Alliance, 2010).



Photo, Dave Blume

EXAMPLES OF CONSERVATION BENEFITS FOR WOMEN

Opportunities exist for environmental NGOs to contribute to poverty alleviation and improved conservation outcomes by including gender considerations. For example, research has shown that when payment for ecosystem services targets women there is an increase in spending on education, health and nutrition. (Davis 2003). Other examples include:

from: Leisher, C., M. Sanjayan, J. Blockhus, A. Kontoleon and S. N. Larsen. 2010. Does Conserving Biodiversity Work To Reduce Poverty? A State of Knowledge Review. in press.

NON-TIMBER FOREST PRODUCTS (NTFP's) - Marshall et al. (2006) studied 16 NTFP value chains in Mexico and Bolivia and found that "NTFP activities are one of the few cash-generating opportunities for women in marginalized rural communities". Moreover, among female-headed households, forest resources often contribute significantly more total household income than in male-headed households (Shackleton & Shackleton, 2004). Available evidence suggests that NTFP commercialization tends to benefit the poorer people in a community, especially women, unless there is significant money to be made, in which case the powerful and better-off people take control.

AGROFORESTRY - Evidence from West Africa suggests that indigenous domesticated fruit trees can improve the livelihoods of poor households, especially women (Leakey et al., 2005; Schreckenberg et al., 2006).

ECOTOURISM - A study of global tourism (Markandya et al., 2003) found that the typical tourism multiplier is between 2 and 3, meaning each dollar spent by a tourist generates 2 to 3 more in the national economy. Many of these economic benefits flow to women. Hemmati (1999) reviewed a decade of global tourism data and found that tourism is a particularly important sector for women and that women comprise a higher percentage in the tourism sector than in the general workforce (46 versus 34 %). This is not surprising given the service nature of the industry. The industry also has need for a high proportion of low-skill domestic type work, something often accessible to women (Ashley et al., 2000)

FISH SPILLOVER - WRI (2005) and Leisher et al. (2007) found that spillover from two community-managed marine areas in Fiji roughly doubled local incomes within five years of establishing the no-take zone compared to control sites, and women were the primary beneficiaries

MANGROVE CONSERVATION AND RESTORATION - Women may also benefit from mangrove restoration if they are involved in collecting or processing mangrove products. Processing crabs harvested from mangroves in Brazil, for example, provides an important supplemental source of income for women (Magalhaes et al. 2007).

AGROFORESTRY - Evidence from West Africa suggests that indigenous domesticated fruit trees can improve the livelihoods of poor households, especially women (Leakey et al., 2005; Schreckenberg et al., 2006). In one study, women perceived greater livelihood benefits from agroforestry tree products than men (Akpabio, 2009)

Text Box 2- Conservation efforts can increase gender inequality and poverty if they do not take gender perspectives into account. See (Shandra, 2008)

ENGAGING WOMEN IN NATURAL RESOURCE MANAGEMENT IS GOOD FOR NATURAL RESOURCES

The failure to include women in decision making and implementation of natural resources management can result in unsatisfactory outcomes. For example, it has been shown that where legislation has restricted the collection of natural resources, both women and men will take large risks to continue using the resource unless alternatives are provided or found (Tapia and Flintan, 2002; Abbot and Mace, 1999). In Malawi, it was shown that despite patrolling by authorities and the imposition of penalties or fines, 83.5% of the women who collect wood in the Malawi National Park did so illegally. Researchers concluded that *“even with increased patrolling effort or more severe penalties, law enforcement polices alone are unlikely to protect the woodlands because they fail to provide alternative supplies of fuelwood for resident households”* (Abbot and Mace, 1999:421).

Conversely, the inclusion of women in natural resource management efforts can dramatically improve project outcomes and sustainability. For example, a study of community water and sanitation projects in 88 communities in 15 countries found that projects designed and run with the full participation of women are more sustainable and effective than those that do not engage women (Van Wijk-Sijbesma, 1998; UN Water TaskForce, 2006). Further, a review of five case studies of natural resource projects in countries across Sub-Saharan Africa, in a variety of sectors (livestock, erosion control, adoption of agricultural technology, smallholder agriculture and aquaculture), supports the claim that opportunities for environmental sustainability and economic productivity are increased when women are vested with authority to make land use management decisions (Thomas-Slayter and Sodikoff, 2001).



Photo: Ami vitale, Ripple Effect Images

Importantly, as a result of a growing body of evidence demonstrating that when women are engaged natural resource management and poverty alleviation outcomes are improved, there has been an upsurge in the number of women appointed to decision making roles, especially in the areas of water and sanitation. In 2005, there were over 40 women Ministers of Water or Environment, representing every region and level of development in the world (UN, 2007).

SUMMARY OF FINDINGS

Women throughout the developing world are adversely affected by the decline of natural resources, particularly through the loss of use of open access and common property resources. Natural resource degradation results in increased household labor, increased poverty, decreased educational opportunities and decreased health of women. The relationships between poverty, gender and environmental degradation are interlinked. Consequently, as poverty and inequality rates go up, there is often increased deforestation, increased fishing pressure, conversion of mangroves, water source degradation and other impacts to common property and open access resources. Further, external forces such as demographic changes, economic growth and war and conflict add additional pressures to both natural resource management and poverty alleviation efforts.

This review documents the links between women, natural resource management and poverty. It reveals several key aspects of the relationship between women and the environment, including:

- The impact of natural resource loss and degradation disproportionately affects poor rural women because of their dependence on natural resources; especially women who live in ecologically vulnerable areas.
- Women face barriers to their inclusion in governance systems, decision making and benefit sharing related to natural resource management that marginalize their roles, contributions and rights. These barriers stem from policy, economic status, societal norms and cultural practices.
- Women have unique skills and experience that can improve the management of natural resources and yet they are not systematically engaged in natural resource management investments, policies and management decision making.
- More systematic inclusion of women and gender aspects into conservation efforts has the potential to create positive impacts on poverty alleviation, natural resource management and the empowerment of women.
- To better understand the links between natural resource management, poverty and gender projects, practitioners need to collect and use gender disaggregated data when designing and implementing conservation and natural resource management initiatives.

The examples used in this review demonstrate the positive impact that the inclusion of women can have on natural resource management, poverty alleviation and women’s empowerment. However, in order to dramatically scale up natural resource management efforts that benefit women, gender disaggregated data must be rapidly acquired. Without a concerted effort to improve information and data collection, efforts to address the links between women, natural resource management and poverty alleviation will remain ad-hoc and suboptimal.

The conservation and development communities are presented with a unique opportunity to make low-cost, high-return adjustments to their current strategies. Working together, across sectors, to systematically engage women will not only further the protection of our terrestrial, marine, and freshwater resources it will save the lives and improve the well-being of hundreds of millions of women and the communities that these women work to support.

“In order to dramatically scale up natural resource management efforts that benefit women, gender disaggregated data must be rapidly acquired.”



Photo: World Bank

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