

**United Nations
Division for the Advancement of Women (DAW)
International Strategy for Disaster Reduction (ISDR)
Expert Group Meeting on
“Environmental management and the mitigation of natural disasters:
a gender perspective”
6-9 November 2001
Ankara, Turkey**

Gender and Environment: Lessons to Learn

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Acknowledgements

This article is based on experiences and studies of many people: thank you all for sharing those with us. A special word of thanks to the communities and women who enable us to understand reality of life and the consequences of our endeavours better. Jeroen Dankelman, many thanks for helping me with the drawing of the figures for this article.

1. Introduction

People live in a livelihood with all its specific environmental, human, social, economic and cultural characteristics. (Scoones, 1998) Everywhere the physical environment differs. But also the set-up of society is very differentiated: there are women and men, young and older people, people from different classes, castes, and religious and cultural backgrounds. This article focuses on the differentiated relationships between men and women and their environments. It is based on own experiences and studies - mainly in India and other countries in the world, literature and documentation.

Internationally the attention for gender and environment issues has grown significantly during the past decades. After the first UN Conference on Environment and Human Settlements in Stockholm in 1972, the Women's Decade (1975-1985) started. That found its conclusion during the UN Conference on Women in Nairobi in 1985 and the parallel NGO Forum. At both these occasions for the first time attention was asked for women's position in relation to environment and natural resources at the international level. During the process for the preparations of the UN Conference on Environment and Development (UNCED), Rio 1992, many women's organizations and individuals played a major role in putting gender issues on the agenda and finally in Agenda 21. It was underlined that environmental sustainability for life on this planet was unthinkable without considering the women who make up more than one-half of the world's population. At the World Summit for Social Development, in Copenhagen in 1995, women were able to bring worldwide attention to the fact that the majority of people living in poverty are women and that the majority of women are poor. It was highlighted there, that women must be involved in decision-making to bring about the necessary changes. (Friedlander, 1996)

The Fourth UN Women's Conference in Beijing (September 1995) resulted in the 'Platform for Action' - which was in 1998 endorsed by 70% of the world's 187 governments that adopted this agenda for action. (WEDO, 1998) A special section (K) is included in the 'Platform for Action' on Women and the Environment. It calls upon governments (at all levels), international organizations, NGOs and private sector institutions, (1) to involve women actively in environmental decision-making at all levels, (2) to integrate gender concerns and perspectives in policies and programs for sustainable development, and (3) strengthen or establish mechanisms at the national, regional and international levels to assess the impact of development and environmental policies on women. (United Nations, 1995)

Many development organizations already focus for more than three decades on specific theme-areas, such as gender, human rights and environment, in order to promote sustainable development for people, communities and countries. In each of these areas initiatives are supported and promoted; such as support to women's organizations, gender sensitization processes within organizations, sustainable land-use-activities or environment and development legislation, awareness-raising, advocacy and lobbying.

The reality in which people live, shows, however, that these issues can not be dealt with in an isolated or purely sectoral way. In life you can not separate social and physical

aspects. Therefore, it is very important and relevant to also work on these issues in an integrated way, looking at the linkages (and non-linkages) which exist. It is in a country like India, for example, that already in the 1970s - beginning 1980s several efforts took place, which made linkages between these themes more visible: the activities of the Chipko-movement in the Garhwal and neighboring regions of the Himalaya, in which many women participated in an environmental struggle, or the State of India's Environment report (CSE, 1985) which described the actual relationships between women and the Indian environment. Already in the 18th century some women under leadership of Amrita Sen had actively involved themselves in an environmental struggle for survival in Gujarat (India). In Cape Verde, which was struck by severe droughts, by the end of the 1970s it were women who were growing half a million seedlings a year. Because most of the men work away from the islands, replanting has been left to the women and children. With their work, much of the hillsides had been terraced and replanted, and many low-lying sandy areas planted out with shrubs. (FAO, 1986?) The Acao Democrática Femina Gaúcha in Brazil was originally a women's organization focusing on social and educational issues. But as from 1974 the organization put environment high on its agenda: so even that it had become the Friends of the Earth Brazil. (Dankelman & Davidson, 1988)

This article looks at gender relations in resources use and management, at the implications of environmental degradation for gender differentiation and the steps taken to cope with these. 'Gender' is in this context defined as a sociological indication of comparative relations between (male and female) sexes. 'Gender and Development' considers the interdependent nature of women's and men's positions in society (Barrig & Wehkamp, 1994). The current Gender and Development approach is not only concerned with women, but with the social construction of gender and the assignment of specific roles, responsibilities, and expectations to women and men. (Matiza, 1993).

It should be underlined from the beginning that although the focus of this article will be on gender aspects in resources use and management and women prove to be - often neglected - key players in that, care for the environment should not be added to the long list of care tasks for which women are already responsible. Women's roles are all the time related to those of men. The type of work women carry out and their responsibilities and rights are determined by gender relations. (NEDA, 1997-1) Agarwal warns that the fact that women within their own socio-economic classes occupy different positions from men is related to gender-roles and not to an inborn affinity with the environment. (Agarwal, 1992) Wickramasinghe (1994) stresses that it is mainly a material interest in the well-being of their families which motivates women to become active in environmental struggles.

2. Gender differentiation in resources use and management.

A peasant woman from India explained to us, development workers, policy makers and academics, some time ago in Hyderabad ¹:

“Life is a whole - it is a circle.

That which destroys the circle is threatening life.

That which restores the circle will bring life.“ (CWDS, 1991)

As many recent studies have indicated, women play a predominant role in the management and use of natural resources at the local level. As Joan Davidson describes it, women are often responsible for the *primary environmental care* (Davidson & Myers, 1992). It is of course dangerous to generalize about the position of women; there are many differences according to society or community, class, caste, and age. But what is obvious, all over the world, is the gender differentiation that exists in relation to the management of natural resources.

In her very clear article on ecological transitions and the changing context of women's work in tribal India Geeta Menon (1991) describes **work** as the active, labor-based interaction of human beings with the material world. Historically this interaction has been intricately based upon the natural environments in which human populations survived, since nature and natural resources and processes represented that material world. She distinguishes major areas of human work: food procurement (incl. food gathering/collection and production); the protection of life, property and territory; and childbearing/rearing (incl. maintenance of basic health standards). Extension activities of these areas are: food processing and distribution, house construction, fencing and care of livestock, maintenance of sanitation and physical cleanliness. The traditional tribal economy was based on a division of labor along gender lines.

2.1 Women maintaining the food chain.

Food gathering was primarily a female responsibility. According to feminist contentions, e.g. in the writings of Ester Boserup (1989) it is argued that it was actually ‘woman-the-gatherer’ who was a source of sustained food supply (and not ‘man-the-hunter’). Her activities, among which were the gathering of fruits, nuts, edible leaves, flowers, mushrooms, roots and tubers, medicinal herbs etc. provided daily sustenance, while meat was merely a supplementary food item. Studies on present-day gather-hunter communities show that vegetable foods and fish make up 60 to 80 percent of the total calorie intake of the community.

Women play a major role in **food collection**. The Brahui women in the Noza sub-watershed in Balochistan, Pakistan, go out in early spring. Walking in groups or sometimes alone they collect tiny edible plants and mushrooms. The plants are green and succulent and all lumped together as ‘spinach’ even though each plant has its own name. These spring greens are sometimes life saving and provide much needed nourishment after a long winter of not enough to eat. Medicinal plants are flowering from May through June. Then small groups of women walk in the early mornings to

¹ During the National Peasant Women Summit on Environment, which was held in Hyderabad, August 26-30, 1991. This was a meeting of poor peasant women and policy-makers, academics and development workers, as a preparation for UNCED, with the objective to give voice to women's concerns. It was organised by the Centre for Women's Development Studies (Delhi) and UNIFEM.

collect medicinal plants. In a FAO supported project they went out for walks to identify these plants. Women participating in the activity expressed their desire to record the collected information. One of them, Zer Malik, said:

“We want our daughters to be able to see how much knowledge their ‘illiterate’ mothers actually possessed. Our daughters are not so interested in traditional remedies and are turning more and more to modern allopathic medicine.” (FAO, 1997-1)

Women still play an important role in **fishing** communities. Sometimes they go out fishing themselves, but more often it is they who handle the preservation and marketing (Steady, 1985, 47-50). Other water organisms like cockles, are being used and managed by women.

According to Ester Boserup (1989) and others, women - daily dealing with vegetable foods and wild seeds to experiment by way of planting the seeds - have played a major role in the revolutionary innovation from gathering into production of food, through slash-and-burn cultivation. Because food collection required a thorough knowledge of plant and animal growth, maturation and fruition or reproduction, women have been credited with the discovery of domestication and cultivation of plants and animals and invented selective breeding. They discovered propagation by shoots and cuttings, seed selection and the construction of seedling beds. The following inventions are credited to women in cultivation: the use of ash as fertilizer, the creation of work tools such as the hoe, spade, shovel and simple plough; fallowing and crop rotation; mulching, terracing, contour planting, irrigation and land recuperation through tree planting. Eight out of the most important cereals (worldwide) were all domesticated by women: wheat, rice, barley, oats, sorghum, millet and rye (Stanley, 1982). Sir Alfred Howard in his ‘An Agricultural Testament’ of 1940, underlined that he saw in India’s peasant a knowledge of farming far more advanced than that of the West. In this landuse women played an essential role.

In a study on women’s roles in **food production** in villages in the Garhwal Himalaya (Shiva et al, 1990) it became obvious that women played a major role in natural farming, the farming which is based on sustainable flows of fertility from forests and farm animals to croplands. These food systems have always included the forest and animal systems in their processes. Women’s work in agriculture has traditionally been work in integrating forestry and animal husbandry in farming. The internally recycled resources provide the necessary inputs for seeds, soil moisture, soil nutrients, and pest control.

In Africa women produce 80% of the consumed food, in Asia this percentage is 60% and in Latin America 40%. According to the FAO women make up 45% of the total agricultural labor force throughout Asia. This includes work in subsistence farming as well as on export-oriented farms and plantations. But it was also concluded that women often work longer days on the fields than men, by as much as 43%. In the Noza sub-watershed in Pakistan, an average working day for a Brahui woman is seventeen hours long during the productive season. (FAO, 1997-1) Singh (1988) describes women’s contribution in animal husbandry in Northern India as follows: the woman harvests the crops and stakes the hay for domestic animals, she transports the leaf fodder, and

bedding material over long distances on difficult terrain, she grazes the cattle on distant grazing lands, carries animals to water sources for water, takes care of young calves, milks the animals, cleans the animal shed and executes all other activities related to animal husbandry, except ploughing, castration, purchase and sale. Especially the collection of fodder - leaves, herbs, grasses - is almost exclusively a women's task, and that of children - often girls.

But also in other agricultural activities her role is evident. Bhata and Singh (1987) showed that women in the hill agriculture of Himachal Pradesh do 37% of the work in sowing, 59% in interculture, 66% in harvesting, 59% in trenching and 69% in tending the animals. And all this apart from all the household chores, which include the collection of fuel and water. Women work also in irrigated agriculture: a Grameen Krishi Foundation project in North-West Bangladesh showed that women carry out about 50 percent of all tasks in rice production; they even contribute for 50 percent in the presumably male task of irrigation. (Jordans, 1997) Singh (1988) accounts that a pair of bullocks works for 1,604 hours, a man for 1,212 and a woman 3,485 hours in a year on a one hectare farm in the Indian Himalaya.

Women know a lot about the cultivation practices of indigenous varieties of crops, for example women rice growers in central Libena (India). During an experiment the women identified 25 indigenous rice stalks with at most two or three errors; not only describing the different varieties, but also mentioning other features, such as the ease with which the husk can be removed, the length of time required to cook and suitability to different ecological conditions. The men could hardly get two or more correct answers. In a small sample participatory study with women hill farmers in Dehra Dun, Shiva was provided with not less than 145 species of forest plants that women have knowledge of and which they utilize. (Shiva and Dankelman, 1992) The Brahui women in the Noza sub-watershed (Pakistan) identified 35 medicinal plants during field walks. (FAO, 1997-1)

In irrigated agriculture large quantities of water are used. Women's rights to water for agriculture vary enormously. In the Andes women are allowed to participate in the construction of irrigation systems and thus to establish rights to irrigation water. However, men dominate the written registration process and decision-making bodies. In Tanzania, by contrast, women are prohibited from operating water infrastructure facilities. (NEDA, 1997-2)

2.2 Household chores.

According to Menon (1991), because of the fact that one of the three major areas of human work, childbearing and rearing, is exclusively assigned to women, not only elements like the provision of health services and sanitation/hygienic measures, but also related aspects, like the provision of household energy and water are among women's responsibilities. This is not only true in rural, but often also in urban situations.

Women, and with them girls, are almost the exclusive suppliers of **water** for household use. They also play a predominant role in the provision of water for animals, crop growing, and food processing. It is often women who decide often where to collect

water, how to draw, transport, and store it, what water sources should be used for which purposes, and how to purify drinking water. Women often make a disproportionately high contribution to the provision of water for family consumption compared with men. Male family members rarely help in the often heavy and time-consuming task of water transportation, and then only if they have bicycles or carts. They have acquired specialized knowledge in the field of local water management and use. It is a knowledge they share, especially with their daughters and with each other. Because many other tasks women perform - such as washing clothes and dishes, cleaning houses and latrines, and attending to personal hygiene, women have established specific ways of reusing waste water to conserve supplies.

Most domestic **energy** comes directly from biomass sources. Woodfuels (both firewood and charcoal) and other biofuels, such as animal and crop residues, form the only source of energy for about two billion people, while some 1.5 to 2 billion have no access to electricity. (UNDP, 1998) Although, in spite of price increases, oil consumption and electricity production (especially from hydro sources) have increased, poor households - even in the city - still depend on biomass sources for their energy supply. Although men sometimes may share the task, women have the primary responsibility for meeting household energy needs through fuel collection, preparation (e.g. chopping and drying) and use (cooking and tending the fire). Children, especially girls, take part in many of these tasks. All these tasks may take many hours per day.

Nearly 73% of women in Asia concentrate on obtaining fuelwood, food and fodder from the nearby forests: 64% in Nepal, 84% in the Philippines and 84% in Sri Lanka. (Wickramasinghe, 1994) Men in the Uttar Pradesh hills (India) are found to break the traditional division of labor only by fetching fuel and fodder when the productivity of women's labor is high, for example on irrigated land. When domestic fuel becomes more commercialized and collection is oriented towards large-scale organized sale and charcoal making, men's participation increases. But so long as technology and marketing are absent, the task of fuel gathering is regulated to women. Women can carry loads up to 35 kilograms over distances as much as ten kilometers from home. The weight largely exceeds the maximum weights of 20 kilograms permissible by law in many countries.

In many so-called traditional societies women have played and continue to play an important role in the construction and management of **human shelters** and infrastructure (Steady, 1993). Households closely reflect the conditions of the surrounding physical environment, and it is women, often assisted by female children, who bear the responsibility for protecting members of their households, especially the young, aged, and infirm, from pollution, poor sanitation, and natural disasters, and the risks inherent in poor housing conditions. Women may spend as many as twenty hours a day in the home, especially in secluded societies. In many cases, human activities in human shelters and the physical infrastructure supporting them, such as roads, water, energy, food, and sanitation systems, have come to depend on women's unpaid labor. The responsibility of maintaining a clean and safe household environment, including waste management, still falls primarily on women's shoulders.

2.3 Income generation.

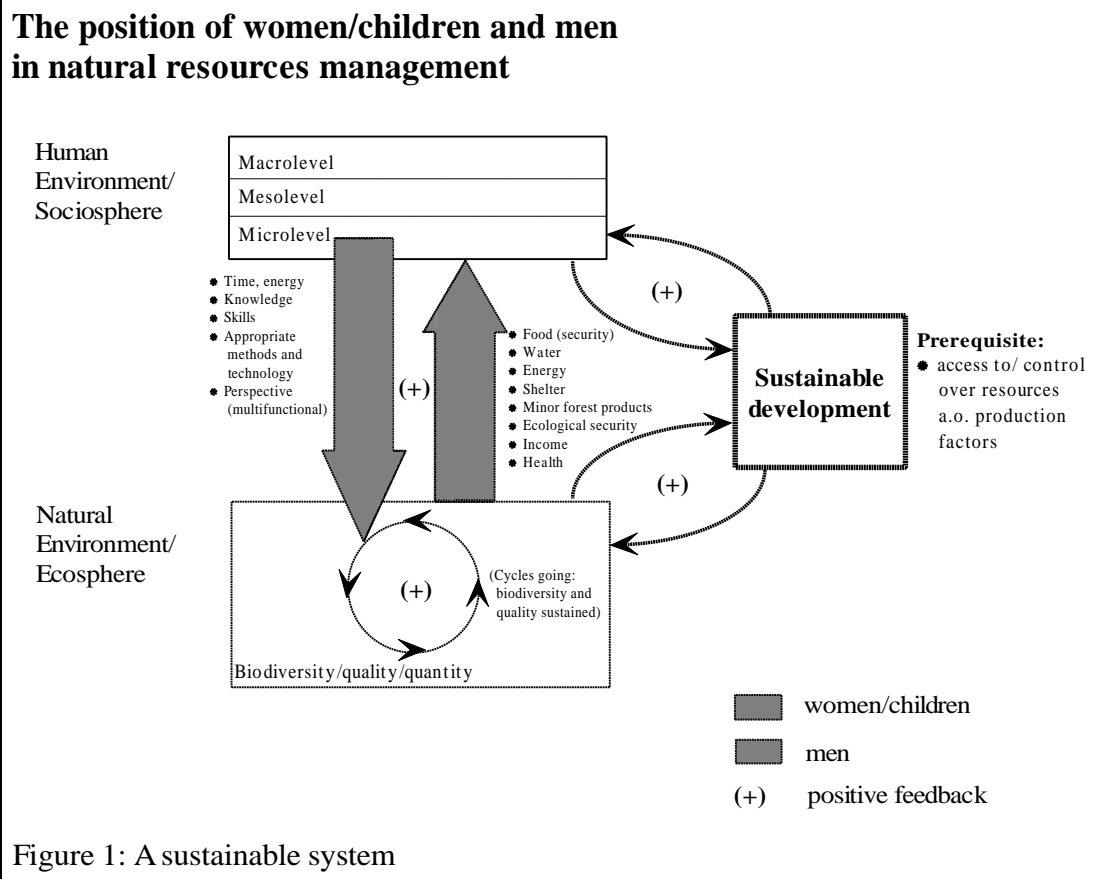
Based on UNDP estimates female economic activity is 68% as compared to male rates; this is 64% in developing countries and 79% in industrial countries. However, female unpaid family workers make up 58% of the total of family workers. (UNDP, 1998) The percentage of self-employed women in the informal sector in Asia is 60 percent. Most women work out of necessity and contribute in an economically important way to the maintenance of their household.

Many of the informal income generation activities in which women are involved are directly or indirectly dependent on natural resources, such as energy sources, non-timber forest products (ntfps), crops and water. Activities are, for example, plantation work (incl. spraying of pesticides), processing and selling of food products, brick making, handicraft, pottery, spinning and weaving. Headloading for sale in urban areas and charcoal preparation and marketing are important income-generating activities for women in certain regions. But also in small and bigger industrial estates, such as leather tanning, workers, including many women, are directly exposed to the environmental conditions of, for example, water and air.

2.4 Conclusions: management and use of resources.

In all the activities described above women and children play a major role by input of their work, energy and expertise. Through these activities they contribute substantially to family's food security, health, production and income generation. All these activities depend almost directly on natural resources, the physical environmental and ecological functions (and ecosystems). The natural resources and physical environment form the basis of a sustainable livelihood system, in which basic human needs are met in the short and long run. Therefore the conclusion is right that often women's work is related to the natural environment and environmental conditions. Although men also perform several tasks in the above mentioned fields, their time and energy input is often substantially less than that of women. This is particularly the case in the growing number of part-time or permanent female-headed households. In some areas in Zimbabwe the percentage of female-headed households is already more than 60%. (NEDA, 1997-1)

One could speak of a **gender differentiation** in the use and management of natural resources and environments. It has been proved by several studies that women, because of the (traditional) division of labor, play also a major role in the sustainable use and management of forest ecosystems, of agricultural land, of water and energy resources and of the environment of human settlements. This role has often been neglected.



In **figure 1** a sustainable system has been outlined. In this a distinction has been made between the human environment, or **sociosphere**, and the natural environment, or **ecosphere**. In the sociosphere a micro- (or grassroots), meso- and macro-level have been distinguished to indicate that the processes taking place at the macro-level are not necessarily the same as those that work through at the microlevel, but that these levels do interact with each other.

In the ecosphere a large quantity and diversity of plant and animal species and varieties, as well as agro-ecosystems, are present. The physical environment - water, soils, and air - have a quality and quantity that sustains life forms, including human life. The components of the ecosphere are related and interact via ecological cycles. Both the sociosphere and the ecosphere show a dynamic balance within themselves and with each other. People contribute energy, time, knowledge and skills, their perspectives, and appropriate cultivation and/or management practices and technology to manage the ecosphere, or livelihood system, and to yield from it what is necessary for the family's subsistence. This means not only resources such as food, water, energy, non-timber forest products, and shelter, but also the generation of ecological security, health and income for the family.

In this situation one could speak about sustainable development: there exists a positive interaction between the different factors, components, and levels of the eco- and socio-sphere, and there is a dynamic balance between that which is asked from the agro-

ecosphere, that which is provided by it, and that which is regenerated. Because of their work and responsibilities, women and children play a key role in maintaining that balance.

2.5 Conditions/critical factors:

Many factors have an influence on these environment-related tasks of women and children, and therefore have an impact on women's work-burden, physical/psychological stress and autonomy. Apart from the division of labor, tasks and responsibilities, critical factors are in this respect:

- their access to and control over (natural) resources - of good quality, such as land, trees, water;
- their access to and control over other means of production, such as income/credit, appropriate technology;
- their access to training and education;
- their active participation and involvement;
- their decision-making power and social status/power, e.g. resource management and use, production and produce;
- their freedom of organization.

These critical factors are not only essential at micro- (or household) level, but also at meso- and macro-levels.

So, not only sociological and power, economic and technological, but also environmental conditions have their influence on women's (and children's) work and lives. This is true most directly in rural situations, but also in urban environments one can observe these aspects. Particularly when it concerns people who live in poverty and/or are marginalized because they depend to a larger extent on freely available (natural) resources.

3. Women's work faces environmental problems.

All over the Southern and Northern regions of the world, many women and children face the problem of environmental degradation and deterioration. Often external developments - like commercialization, export-orientation, structural adjustment programs, external debts, international trade and pricing policies, privatization of community or common resources - result in over-exploitation and/or pollution of natural resources (such as forests, grazing ground, agricultural lands, water resources or fishing grounds). These processes were often characterized by re-direction of uses of land and other resources from community-based to private resources, extraction activities (such as logging and mining), and introduction of non-sustainable technologies (agricultural and industrial). This results in scarcity of resources, degradation of their quality and diversity, disruption of ecological functions - such as retaining water- and pollution of water, soil and air. (Goldman, 1997)

According to an FAO analysis, deforestation was concentrated in the developing world, which lost nearly 200 million hectares between 1980 and 1995. Because of reforestation and plantation efforts the net loss was assessed at some 180 million hectares, or 12 million hectares per year. In the majority of countries that FAO surveyed, deforestation rates have actually increased since 1990. (FAO, 1997)

An indication of this reality is the distance covered for forest produce by the tribals in India: over the past 20 years the difference is more than 6 kms. Because of denudation and government controls placed over remaining forests (e.g. reserves), the area available for slash-and-burn has been reduced. Land in Orissa which had a rotation system of eighteen years, is now re-cultivated every three years. This situation of scarcity and over-exploitation has eroded traditional norms that prevented the occurrence of over-exploitation.. Whereas in normal circumstances work culture is organized to ensure both immediate survival and long-term survival, when immediate survival itself is threatened, the relevance of long-term survival of the community often diminishes.

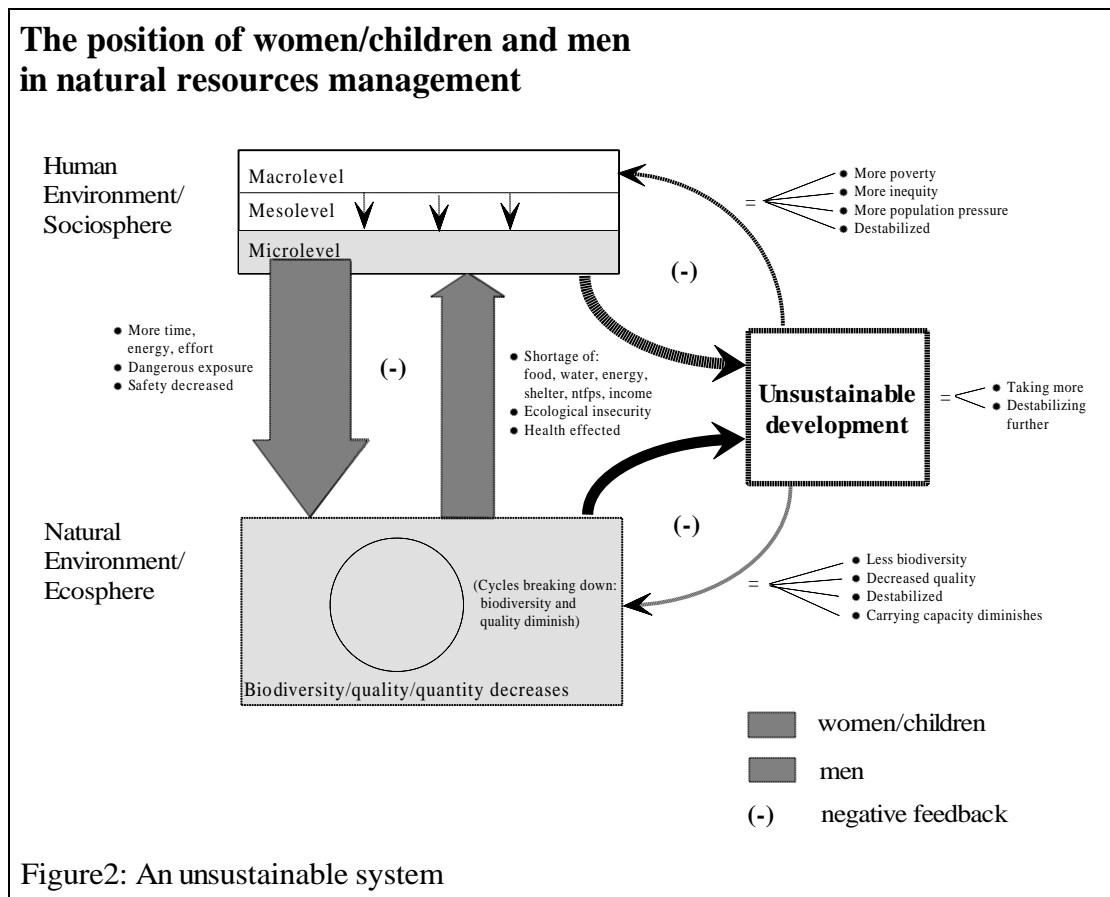


Figure 2 shows what happens when the system becomes unsustainable, both at the level of the ecosphere and the sociosphere. At the level of the ecosphere, more resources are taken than can be regenerated, resulting in a decline of biodiversity. The ecological cycles in the system get destabilized, which means that ecological processes

involving natural resources such as water, soil, and species are disturbed. As well, more pollution is added to the system than it can handle. In other words, its quality diminishes.

At the same time it is observed that the sociosphere becomes destabilized. Inequity among people increases, as does poverty, and the dynamic social relationships between levels (macro and micro) and among levels (within a society, family etc.) gets disturbed. Social dysfunctioning and cultural discontinuity occur. At social level such developments are also reflected in changing power relations at gender level. Women's access to and control over (natural) resources and technology gets often more limited than that of male members of household. In these situations women lose control and are being marginalized and excluded even more.

In this situation, which is often the reality of today, women and children have to put in more time, energy and effort into meeting their family's basic needs for natural resources, security and health. However, as the ecosphere cannot supply enough and the natural cycles that sustain life are disturbed, this task becomes more difficult and sometimes even impossible. Because they have to walk longer distances over rough or disturbed terrain - sometimes overnight - women's work and life become unsafe. With the forests receding 4-8 km, most village women have to walk for at least one hour and in many cases up to two hours each way in the Ganjam areas in India. (Fernandes & Menon, 1987) In parts of the Himalayas and the African Sahel women and children spend 100 to 300 days a year on gathering fuelwood now. (Wickramasinghe, 1994) A study executed in Nepal learned that in a degrading environment, with forest cover going down by more than a half in the past 20 years, heavy rainfall and land slides and floods, particularly girls lives have been adversely effected. Whereas development programs were started to enable more girls to attend primary schools, the scarcity of natural resources and the time and energy needed in collecting and managing these, even resulted in a decrease in girls' school enrollment. (Johnson et al, 1995)

“ You people in the cities do not know how village women like use have to slog. As the farmer forces his bullocks to labor, poverty forces us to labor all the time..... One side is getting inflated while the other is shrinking. The section that is shrinking is getting destroyed.” (CWDS, 1991)

While women's work in the traditional economic activities became more difficult, the addition of new roles in settled agriculture and wage labor has placed an immense extra responsibility on their shoulders. While more had been added, none has been taken away. Women's workload becomes altogether too great because they have to combine their - more difficult - 'main' and 'extension' tasks with their traditional ones, such as child-rearing. In Sri Lanka expansion of commercial agriculture, such as tobacco, in village economies has increased the pressure on women and created dependence on food from the market and the necessity to earn money for this by working as laborers for wages 20-30% lower than those of men. High consumption of fuelwood in curing tobacco has increased land degradation and the pressure on resources: about 4,000 kg of fuelwood is used for curing 1,000 kg of tobacco. Women's sleeping time in peak agriculture seasons was reduced to about five hours, a and about

40-50% of the families did not use boiled water due to the lack of fuelwood. (Wickramasinghe, 1994)

A major alternative for men under such circumstances is migration. Migration itself has become a status ascribing factor for men, whereas women have to take over the economic tasks of the husband in his absence. Often resources, including food, are already scarce. In such cases she may rely on wage labor, apart from her other tasks and responsibilities. This all results in a tremendous pressure on women. In Diourbel in Senegal male-outmigration was a logical response to the modernization of agriculture and declining food security. While women are concerned about the changing environment around them, they are in a weak position to do anything about it. (David, 1995)

Research in Garhwal (India) reveals that the shift from subsistence to commercial agriculture, through the introduction of cash crops and the market economy, has led to a reduction in women's sphere of influence and an increasing dependence of women on men for extension services, purchase of seeds and handling of tools and money. The disappearance of indigenous forests has meant that women have to walk further to collect forest products. Women's crucial role in agriculture is gradually diminished by the introduction of new agro-technology and new crop varieties, which are aimed at male farmers. The same trend can be observed in forestry. Women's role becomes more and more that of a laborer as she loses her control over production and access to resources. (Shiva et al, 1990)

“ Our gomal (pasture) lands, even our village tanks are not safe from the greed of the well-to-do. They have conspired with the panchyat and the government officials, and converted these to private farms, or houses. Our Mahila Sanghas do not have access to these common lands, or we would develop them for the sue of everyone in the village. Women need fuel and fodder - common lands should be under the management of our Sanghas, and not used for private profit by industry or farmers.”
Gangamma, peasant woman from Dharwad District, Karnataka. (CWDS, 1991)

The increasing water scarcity places a major burden on women's lives. In Sri Lanka in a study area 60% of the natural springs have completely disappeared, and the wtaer level is lowering. Women have to walk 1 to 1.5 km to the valleys to fetch a pot of drinking water; this is an extremely hard task due to the difficult terrain and narrow food paths. (Wickramasinghe, 1994) Despite their major responsibility in the field of water management several factors restrict women's influence over this area of their lives. Male heads of household often decide where to build the family home, without necessarily considering the distance to water sources. As well, depending on caste or religious group, there are ownership limits restricting women's access to water sources. There are few or no public water points in slums and on the outskirts of cities. Women have to collect the water from sources outside the city or have to buy it from vendors, whose prices can be high. In segregated communities women are not allowed to be seen in public. Their daughters often bear the burden of water collection. (NEDA-2, 1997)

In agriculture replacement of local varieties with new, introduced high-yielding ones (HYVs) leads to resource scarcity in the farming system. The shift, for example, from

local pulses to introduced soybean implies a shift from domestic to industrial food processing, displacing women from their local resources. Current agricultural research concentrates heavily on increasing the yield of only certain parts of a crop, often those which can be commercially marketed. Traditional potato and mustard varieties provide, for example, fresh leaf vegetables in mountain diets. The HYVs of these crops do not. In the Herwal valley (India), where the women used to grow many indigenous varieties of rice, the HYVs are completely directed at men and at commercial interests. Dwarf varieties which are promoted through the Green Revolution reduce the straw available for fodder and fertilizer, which are essential components of women's sustainable agricultural systems. A reduction in straw leads to a reduction in organic matter, thus contributing to declining soil fertility.

Weeding is predominantly women's work. Increased fertilizer use that is intrinsically required by HYVs has stimulated weed growth dramatically, further increasing women's work burden. On the other hand extensive use of pesticides in agriculture is posing major health problems for sprayers, producers and packers. In Malaysia many women work in the plantation sector and spray pesticides. They complain of sore eyes, skin ashes, burnt fingernails and disruption of the menstruation period. Some mothers exposed to pesticides during early pregnancy get deformed children or they even loose their unborn babies. Veena, one of the sprayers:

"I have been spraying pesticides for the past 20 years. I spray paraquat all time. It is so strong that the odour makes me sick most of the time. In the beginning, I used to cry. Now my only main problem is nose bleed and chest pain. I also have bad stomach pain." (Arumugam, 1992)

Dairy development schemes aimed at the marketing of milk have led to a monopolization by rich land owners of fodder resources of village commons and the denial of access to poorer women to collect fodder. As a Haryan woman put it, "Now I have to steal the grass for my buffalo and when the landlord catches me, he beats me." (Dankelman & Davidson, 1988) Local people, esp. women, often have difficulty in managing the cross-bred animals, as their feed and other requirements are quite different from that of the indigenous cattle. The concentrate feeds required by the new cattle, change the composition of cow dung, making it unsuitable for use in managing soil structure. (Shiva & Dankelman, 1992)

In inner-city areas, many of the poorest people live close to industrial areas which suffer high levels of pollution. Women predominate among urban people in poverty. Control of community resources in urban areas - for example water pumps - tends to be by men, who may marginalize women's need for resources. Also many local laws are against women. For example, in Nairobi it is forbidden to gather wood within the city limits. Women are not cutting down the trees, but are taking the wood that has already fallen: they need it for cooking and heating. Now they have to go far outside the city to collect wood or have to take it away under cover, risking a high fine. (Oxfam, 1996)

As the quality of the ecosystem decreases and pollution increases the users, including women and children are more exposed to dangerous substances and toxic chemicals, for example where housing sites are situated close to polluting and dangerous industrial

estates, waste dumps or open drains/sewers, in small-scale industries, but also on agricultural land. In the slums around the aluminium company industrial area in the Dhankanal district of Orissa (India) -for example -, live entire families, which have migrated from another district of the State. Women told that they had migrated because the households owned little or no settled agricultural land, fuelwood was getting scarce as well, and life under such circumstances had become very hard. But now they live in a very polluted area. (Menon, 1991)

One of the major problems women face in human settlements is - apart from lack of access to (legal) land, waste management and sanitation problems - the fact that many settlements of poor households are situated on dangerous sites, e.g. which are vulnerable to landslides or flooding, but also in the direct surroundings of dangerous industries. The Bhopal disaster of 1985 showed the disastrous effects of such situations on people living in poverty, esp. women and children.

Increasingly, full maintenance of most homes is becoming dependent on the combined income of women and men. Because of the existing division of tasks, women also face the greatest risks of disease from handling contaminated products (including water) within the household. Furthermore, the majority of people seeking refuge from environmentally degraded homelands are often women and children. While living in squatter settlements and slums is bad for everybody and the air may be polluted for anyone, one cannot fail to appreciate the fact that women often face a heavier burden of maintaining deteriorating homesteads and protecting themselves and their children

Also indoor pollution poses major problems on women's health. As the household food preparers, women are often exposed to high levels of smoke for long periods. The majority of the 2.2 million deaths every year from indoor air pollution occur among women. (WRI et al, 1998)

Summarizing, as productivity of the ecosystem declines, shortages of basic supplies, such as food, water, minor forest products, and energy occur. Shelter possibilities worsen and income generation possibilities diminish. Ecological insecurity, caused by conditions such as fluctuations in water availability and erosion, increases. The families and the community suffer directly. Women and children, whose burdens have become heavier and who are more vulnerable, risk worsening health. The ecological destabilization reinforces social dysfunctioning, poverty, and inequality among classes, ages and sexes.

On the other hand, pressure on the ecosystem increases as more people are made to depend on a less productive (eco)system. This further diminishes the carrying capacity and reinforces environmental destabilization. In other words, the interaction between the actors and elements in the system becomes negative.

The main cause behind environmental and social destabilization is an unsustainable development trend - through which process more is taken from both systems than can be regenerated and more is destabilized than can be recovered. (see figure 2) A driving force behind unsustainable development trends is an economy based on profits, which is stimulated by increased and unequal production and consumption. These processes

not only promote inequality between countries and regions, but also reinforce differences and inequality within countries, whereby the rich get richer and the poor lose their access and rights to and their control over (productive) resources. many of these development processes are not culturally adjusted. (UNDP, 1998)

In figure 2 these external and internal processes are indicated as the pressure from the macro- on the micro-level. Another aspect of unsustainable development is the introduction of inappropriate science, planning and technology, which is not location-specific and is based on a constant flow of external inputs, expertise, polluting substances, and energy and water intensity. The institutional aspects are also important: an unsustainable system is often very much top-down directed, excluding local communities and members of households from decision-making processes.

3.2 Conclusion: critical factors.

In this paragraph it has been shown how unsustainable and unjust developments are fueled by unequal power relations, needs and perspectives, at all levels of society. Consequences are reflected not only in the environmental field, but also at social level, in **increased gender differentiation** in use and management of natural resources changes, often adversely affecting women and with them: children. The burden of environmental degradation places extra burdens on women's shoulders, affecting their work and lives.

Summarizing, critical factors in this respect are:

- loss of access to and control over natural resources and (eco)systems of good quality², e.g. land (also in urban situations), water, energy sources, minor forest products, but also seeds and biodiversity;
- loss of their access to and control over other sources of production, such as technology, knowledge, training;
- loss of decision-making power, e.g. on joint resources management;
- more restrictions on women's organization.

Apart from these factors, for the users an unsustainable system is characterized by:

- increased time- and energy input, and walking distances in order to meet basic family needs, resulting in overburdening (too much at once and/or too much over a too long period);
- increased efforts to meet production needs;
- increased shortages of basic resources (food, water, fuel etc) for day-to-day family needs and activities;
- increased direct exposure to unsafe situations and dangerous substances;
- breakdown of educational and income generation opportunities (lack of resources and time), resulting in decline of income;
- overuse of marginal resources enforcing the cycle of environmental degradation and poverty;
- ecological and social insecurity.

² This could be caused by scarcity of natural resources, but also because of re-allocation of resources and systems towards, for example, commercial targets.

These effects mean that:

- work burdens increase tremendously;
- health, survival and welfare are affected adversely;
- development opportunities are limited;
- women's autonomy and status diminishes.

These are all aspects which are essential to tackle in order to sustain people's livelihood systems.

4. Coping strategies of women.

People, including women, develop strategies to handle the problems described above. Many of these strategies depend on the local ecological and cultural context. Some of the coping strategies are:

- More time, effort, and energy is put into work. However, there are limits to how much time a person can spend.
- Women start specific activities aimed at making available more natural resources and increasing the supply. Examples of these include women taking the initiative in tree planting and reforestation and forest-conservation activities. They establish kitchen gardens near their houses, install water points, and regenerate degraded land (e.g. waste land development).
- They economize the use of resources. A common strategy is, for example, shifting to other food-products, which need less cooking-time (often these products are less nutritious), limiting the number of cooked meals or the boiling of water (with all its health consequences). Another possibility is the use of energy/resources-saving devices. These are not always introduced on request of the users themselves and women are not always adequately consulted in the planning and implementation of these projects.
- Another issue which has been taken up by (groups of) women is recycling. In situations of water scarcity, for example, they manage to recycle and reuse water for several purposes.
- Women also look into using alternatives such as solar and wind energy for cooking, switching to alternative crops, or changing planting patterns or technology. When the natural resource base becomes too limited, a common strategy is to look into alternative means of income earning.
- Organization: women, who are already used to working together in the field or collection of natural products, start sharing the problems they face with each other and looking for solutions. Groups might be formed or already existing women's organizations take up the environmental issues in their livelihoods.

- Women organize to prevent pollution or they clean up waste sites. Examples can be found in the waste-disposal activities as those started by a collective of unemployed women, such as in Bamako (Mali) As consumers women, especially the richer and well-off women, can play a powerful role in the promotion of environmentally sound products and their production, such as in Malaysia and South east Asia.
- Women organize against environmental degradation and pollution by protesting against developments that threaten their resource base and livelihoods. In addition to protest demonstrations, they use non-violent means of opposition and blockades to stop such activities as deforestation and mining, dam-construction, industrial activities and theft of their intellectual property frights.
- Cultural expressions such as songs and poems, have been created by women to reflect their environmental concerns.

“ Embrace our trees,
 Save them from being felled,
 The property of our hills
 Save it from being looted. “ (Chipko song)

5. Other actions needed.

Again it should be underlined that it should not be exclusively the responsibility of women to change unsustainable livelihoods into sustainable ones. Women should not be seen as instruments for environmental regeneration and conservation, but as equal partners in those processes. Environmental management is far more the direct responsibility of those in power at national, international and local level and of other development actors, including donors, NGOs and the private sector.

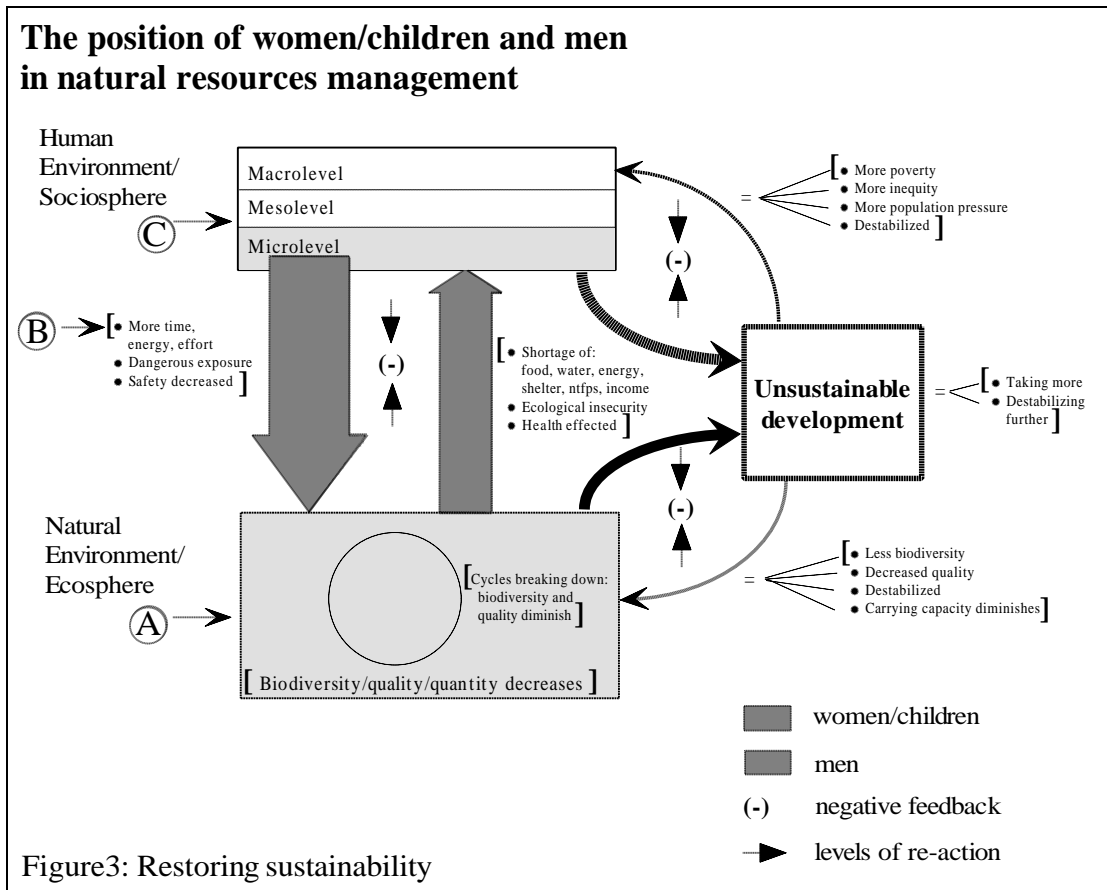


Figure 3 indicates on which levels rectifying actions are being taken to restore sustainability, equality and justice. These focus on the following levels:

- (1) The natural environment or **ecosphere**, in such ways as:
 - increasing the supply of natural resources, by reforestation, external inputs and nature conservation;
 - re-establishing the system and ecological cycles by land rehabilitation, erosion control, water management, ecological farming, multicropping and increase of biodiversity;
 - increasing the quality of the environment by waste and pollution treatment and sanitation, and the introduction of less polluting processes and products.
- (2) Support to **women (and children)** by lightening their burdens and broadening their options, in such ways as:
 - introducing time- and energy-saving devices;
 - developing vocational and natural resources training and educational programs;
 - increasing their access to and control over production factors, e.g. promoting changes in land tenure (rural and urban);
 - providing alternative income possibilities.
- (3) Promoting changes at the **sociosphere**, in such ways as:
 - gender sensitization, at all levels of society;

- introduction and use of participatory approaches and management systems (e.g. joint forest management, water committees);
- institutional and legal changes so as to improve women's decision-making power over resources organization and development;
- promotion of environmental awareness.

As important as each of these activities is, they will all be a constant struggle as long as major causes behind unsustainable development are not eradicated. Fundamental changes are necessary at the national and international development level, such as:

- restructuring international economy and trade relationships;
- fundamental approach of debt problems and changes of conditions of structural adjustment policies;
- introduction of appropriate science and technologies;
- reduce and minimize inequalities in consumption levels;
- information sharing (including access to private sector information);
- increasing access to and control over resources by local users, and giving them rights to those resources;
- empowerment of local people, with specific attention to women and children.

It is necessary not only to focus on one of the above mentioned areas, but to see that improvements are made at **all levels**. This does not necessarily mean that one organization should tackle all of them, but that there is a coverage of all these areas by different actors and that their activities are coordinated.

A very important **prerequisite** is:

- that in each of these areas there is enough understanding and recognition of both environmental, social - including gender-, and macro-aspects.

This means, for example, that while undertaking activities at the ecosphere level, the actor should look at gender-specific aspects. What is good for the environment is not automatically good for women; and that which is good for women does not automatically improve the environment (NEDA, 1997-1) Activities, for example, in the area of sustainable land-use do not necessarily improve women's position; these even could add to women's work-burden. However, in Bangladesh an evaluation showed that women themselves appreciated sustainable land-use activities very much, as these increased their access to and control over resources and ways of production, and also their social status. (DGIS/Novib, 1994) This underlines the need for self-determination of project and program activities by target groups, especially women. In that respect the use of participatory methods, such as participatory technology development (PTD) and participatory rural appraisal (PRA) could be very important instruments (Guijt, 1993).

At **organisational level** several improvements can be made to enable the integrated approach as described above:

- There is a need for **basic understanding** at the organizational level of relationships between gender-development and the natural/physical environment/natural resources base.

- **Capacity-building** at organizational level on gender-environment.
- Use/adaptation of specific **approaches and tools**, e.g. gender/environment analysis, participatory methods, indicators on gender/environment, integration of these in planning, monitoring and evaluation.
- More **coordination** and **cooperation** between organizations working in the field of environment, gender and women's empowerment, and between grassroots women, NGOs, government agencies, academia, etc.
- Specific **activities/pilot projects** in the field of gender-environment, like projects on women's empowerment in sustainable land-use, promoting women's access to land and other natural resources (e.g. through joint forest management), capacity building of women's organizations on environmental advocacy and lobbying, development of livelihood alternatives for women living in seriously degraded environments.

6. Conclusion

Sustainable development asks for a focus on both environmental and social aspects and their inter-linkages. The structured relationship between men and women in society shapes the functions that the environment and natural resources have for both genders, as well as the role that both women and men play in environmental use and management. These dynamics became visible in the reality of communities lives, beginning 1980s. They led to the realization that our efforts towards sustainable development and work in the environmental field need a gender-differentiated and participatory approach. On the other hand it made clear that women's empowerment needs an understanding of the physical context in which people live.

Many different efforts at international and local levels, studies and publications on gender and environmental subjects have been developed since the past 15 years. The variety is big: from field level studies on specific subjects, to theoretical frameworks and guidelines to help integrating gender and environmental aspects. However extensive this information is, still much has to be done to bring lessons together, build basic understanding, and create bridges between the environmental and social, including gender, approaches in national and international institutions.

In the near future much more attention will be needed for the rights aspects of the women-men-environment linkages. Women's rights are recognized as human rights, but among the economic, social and cultural rights also the right to a healthy environment and natural resources base has to be recognized explicitly. Apart from quantitative also a quality focus is needed when looking at access to and control over resources. Concepts like 'ecological footprints' and sustainable livelihoods are useful approaches for a gender-specific sustainable development policy. Intellectual property rights and privatization will be high on the gender and environment action agenda in the near future. Biodiversity and cultural diversity will be valued more and more.

It is important to look more specifically to the interrelationship between age, gender and environment, thereby focusing on the specific roles and positions of girls and of older women. In all our considerations inter-generational aspects will need much more

attention. Apart from equality, it is that focus which urges us to build bridges between social, economic and environmental perspectives.

“Our land is a land of rivers....Our strength is in our being together. We are no longer alone and no longer in the background. We are no longer invisible. We decided not to keep anyone in our village illiterate and we succeeded. Now, we have also decided to take part in elections to get power and decision-making into our own hands.” Julehka Begum, a peasant woman from Gaibandha, Bangladesh (Mazumdar, 1992)

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ABBREVIATIONS

CSE	Centre for Science and Environment, India
CWDS	Centre for Women and Development Studies, India
FAO	Food and Agriculture Organisation of the United Nations
HYVs	high-yielding varieties
ILO	International Labour Organisation
NEDA	Netherlands Development Assistance
NGO	non-governmental organization
ntfps	non timber forest products
UN	United Nations
UNDP	United Nations Development Programme
U.P.	Uttar Pradesh (India)
WRI	World Resources Institute, Washington