

**Water-Related Issues of the Humid Tropics
and Other Warm Humid Regions**

IHP Humid Tropics Programme Series No. 6



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*'... By the Year 2000 almost one-third
of the world's people will be living in the humid tropics.'*



Contents:

- 1. Introduction 1**
- 2. Women and the environment – their role and contribution 2**
- 3. Women and water 15**
- 4. Women's contribution to water projects 28**
- 5. Recognizing the role of women 37**
- 6. The need for education and training 41**
- 7. Looking to the future 43**
- References 47**

1. INTRODUCTION

The recent interest in the broader issues of environment and development and the interlinkages between them has brought into focus the particular significance of the part played by women. So far in this series there has been little specific reference to women in the humid tropics, although women have been evident in many of the photographs. Indeed, women are highly visible throughout the humid tropics – carrying fuelwood, fetching water, pumping water, working in the fields, selling at the market, and so on.

However, these women are often referred to as being 'invisible'. This is because much of the work they do does not appear in national accounting and censuses. There is very little data on areas such as small-scale agriculture and the informal sector, where women mostly work; similarly, time and effort spent collecting water and fuel, working in the fields, as well as looking after the household is rarely recorded. For this reason there has been a general lack of awareness of the definite contribution made by women. In the case of water supply, for example, even though it is the women who are mainly responsible for collecting domestic water in developing countries, they had until recently not been involved at any stage in planning and decision-making.

This publication focuses on women in the humid tropics: their importance as users and managers of natural resources, with particular reference to fresh water, as well as their vulnerability to environmental degradation and the effects of poverty. Emphasis is given to the vital contribution of women in water supply and sanitation projects, and the need for women's full participation at all levels. The issue of women is viewed in the context of gender in relation to programmes of the United Nations and recommendations from major international conferences.

The crucial part played by women in environment and sustainable development is not specific to the region of the humid tropics: it is characteristic of all developing countries. Since the zone of the humid tropics is almost entirely occupied by developing countries, the issue of women in the humid tropics has a special relevance.



2. WOMEN AND THE ENVIRONMENT - THEIR ROLE AND CONTRIBUTION

Many women in the humid tropics are directly involved with the environment in their daily activities, indeed many are wholly dependent on the natural environment for their basic needs – water, food, fuel – for themselves and their families. These women play a vital part in the management of the earth's natural resources and their knowledge and awareness are key to achieving the goal of sustainable development. Furthermore, women are valuable as environmental educators and communicators both within the family and the community.

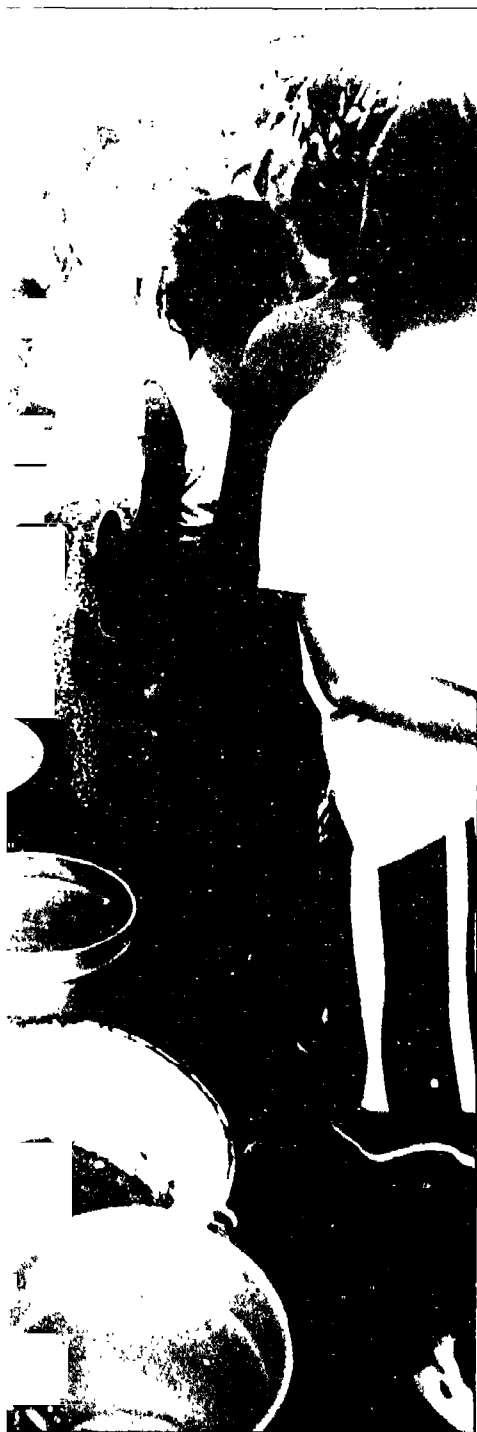
Women are central to the conservation and protection of the environment in the humid tropics. In the tropical forests, which are now rapidly disappearing, women form part of the indigenous communities who depend on the forest resources for their basic needs. The coastal margins provide another distinctive, but threatened environment, where women traditionally depend on the natural resources, particularly fish, for their livelihood. Much of the land in the humid tropics is used for agriculture, women work on the land as cultivators of subsistence crops and as workers on commercial farms. Although most women in the humid tropics live in rural areas, an increasing number are living in cities, where, in addition to general environmental problems such as pollution, traffic congestion and noise, living conditions for the poor are particularly unfavourable.

Collection of basic resources

In both rural and urban areas women are almost entirely responsible for the collection of water for domestic use. The daily task of drawing and carrying water can involve walking distances of as much as five kilometres or more to the source of water, waiting in line at the pump, which as a result of its design and poor maintenance is often difficult to use, and then returning with a load which may weigh as much as 20 kg. The women are not only responsible for the collection of water, they are also the main users of water – for cooking, washing, and in family hygiene and sanitation. (The role of women in all aspects of water is dealt with in more detail in a later section.)

The forests of the humid tropics, with their enormous number of species of trees and other plants, provide a variety of resources used by women. Wood and other biomass materials form the main source of domestic energy, and traditionally it is the women who collect the fuelwood for the cooking fires and stoves. Women and children spend several hours a day searching for and collecting branches, twigs, leaves and brushwood. The time spent varies





according to the distances involved and the availability of materials suitable for burning; a study in Bangladesh showed that women and children in rural areas spent an average of 3–5 hours a day collecting fuelwood (FAO/SIDA, 1987). However, it should be noted that as women normally collect small branches and dead-wood which are easier to cut, it is generally accepted that women cause limited damage to the trees. In some areas, especially around urban centres, women sell fuelwood as a valuable source of income; for example, women in Sierra Leone collect the wood from the fallow land when a new farm is cleared and sell it to passers by or to urban traders (Rodda, 1991). In many societies it is also the women's responsibility to collect branches and leaves for fodder for domestic animals.

Women have a vast knowledge of indigenous tropical plants which they utilize for a variety of purposes. Many trees provide a valuable source of food not only in the form of fruit and nuts but also from other parts of the plant such as the sap. A variety of household items are made from plant materials – mats, baskets,

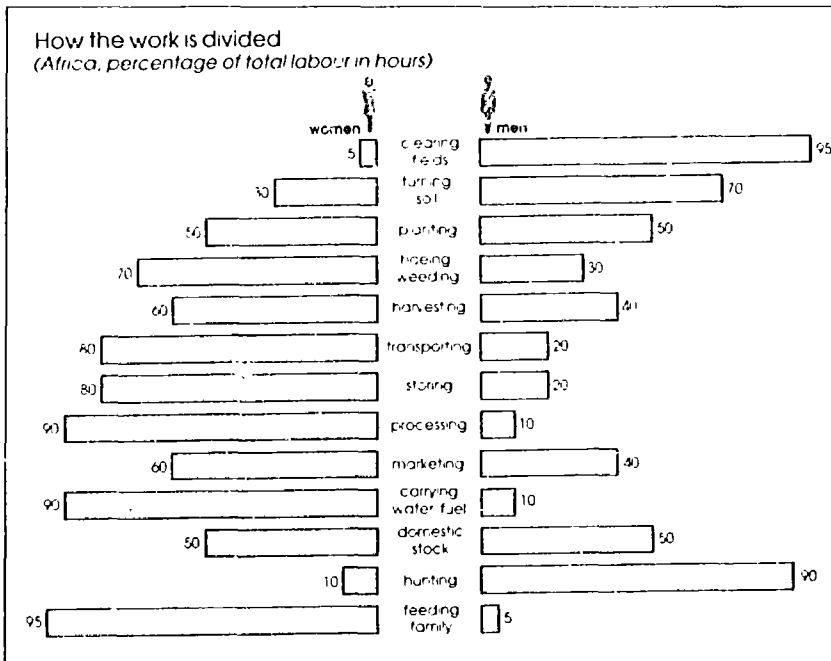


Figure 2.1

(FAO/SIDA)

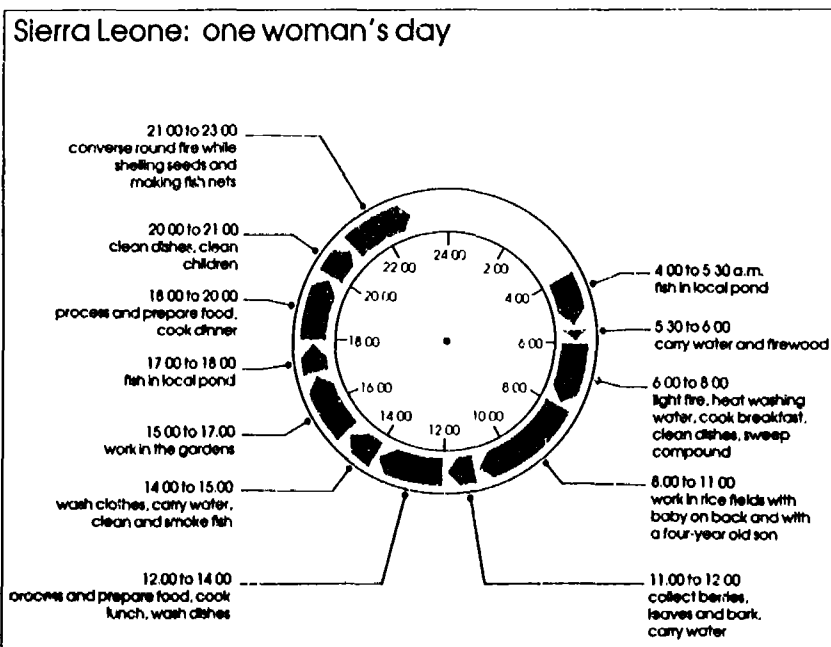


Figure 2.2

(FAO/SIDA)



bowls and spoons, as well as the fences women build to protect their garden crops. Plants are also used for making dyes and for medicinal purposes.

Studies undertaken in forest communities show distinct roles for men and women. There are many customs associated with the trees and in some cases certain species are designated as 'women's trees' or 'men's trees'. For example, in the area of the Pacific the breadfruit tree is regarded as a 'men's tree', being important for its timber, although the women are often allowed to take the fruit from it. Women and men have different attitudes towards trees; whereas men tend to consider them solely in terms of their commercial value, women have a more fundamental appreciation of them. Women are being increasingly involved in the forestry projects being developed by the Food and Agriculture Organization of the United Nations (FAO) and non-governmental organizations (NGOs). In fact, it is often women who persuade the men to take part in such projects.

Farming and fishing

In developing countries women are very important in agriculture, especially with regard to food production. In Africa over 70 per cent of the food is produced by women and in Asia they are responsible for 50–60 per cent. In addition to cultivating the crops, women often care for domestic livestock.

Many women are also employed in commercial agriculture, mostly working at the more menial and lower paid jobs such as harvesting, weeding and spraying. In Malaysia women make up 67 per cent of the labour force on rubber plantations; elsewhere large numbers of women are employed on tea and coffee plantations, especially for harvesting.

Another area of food production involving women is in activities related to fishing. Women fish mainly in shallow waters such as ponds, lagoons and rivers, not too far from their homes. Fishing is especially important to women living in the coastal lowlands and in the small island communities in south east Asia and the Pacific. For example, in Fiji, catches of freshwater clams and mangrove crabs are made almost entirely by women. Women are also involved in the processing and marketing of fish caught by coastal fishermen, as in West Africa where fish smoking is an important occupation for the women.

Human settlements

Women spend more time in the home than men, and are therefore very relevant in any consideration of human settlements. This is especially so where living conditions are poor and women are continuously struggling to care for the household and family, often in a cramped inadequate dwelling without easy access to fuel and water. Some of the most difficult circumstances are found in the overcrowded shanty towns and squatter settlements of the rapidly expanding urban centres of the Third World. Of the world's 25 largest cities, 19 are in developing countries and of those 10 are within the humid tropics.

In the area of the humid tropics environmental problems in these cities are exacerbated by the climatic conditions. The squatter settlements are usually located on the least favourable land such as marshland, steep slopes, or dangerously close to industrial developments.

In Latin America and the Caribbean 73 per cent of the population live in towns and cities where women outnumber men 107–100 (United Nations, 1991), many having migrated from the rural areas as girls of 15 or less in search of work. Many constraints affect women in connection with access to housing; in some countries there are laws preventing them from owning houses or from obtaining credit.

The problematic issue of migration presents serious implications for the environment as it affects the balance between population and natural resources. Many women migrate, either by themselves or with their husbands and families, in search of a better livelihood by seeking employment in the cities. Sometimes, as landless peasants or environmental refugees, they have no choice but to leave their land. Another problem concerns the large number of women who remain in the rural areas when men migrate. These women are left with the sole responsibility of running the farm and supplying the family with food.



Miuda is forty-three years old, illiterate and a grandmother of eight children. She, her husband and four daughters (the last one two years old) illegally occupy the land on which they live in a squatter settlement in Salvador da Bahia, Brazil.

Miuda bought the lot on which they now live from Mr Bahia, a previous illegal resident who had weeded the area and so gained some sort of 'right' over it. The lot, close to a brook at the bottom of a hill, looked like a swamp, and Miuda and Antonio had to fill it with earth before building a mud home. There was some sort of water supply (a well not far away) but no sanitation, no road, no rain drainage, no electricity and no garbage collection. The sewers from the housing schemes on top of the hill discharged openly into the brook, and every time the rain got heavy (a frequent event in the tropics) the mud home was flooded with sewage water.

(Extract from 'Miuda's World' by Grazia Borrini in *The UNESCO Courier*, March 1992)

Women - victims of environmental degradation

'I am not a very important woman in international terms, but I am very important in that I am directly involved in the struggle. I am very interested in women and sustainable agriculture for one reason: my community and I are in a food crisis. We are aware that this crisis is directly related not only to our politics and to our economic situation, but it is also related to our environmental crisis in Africa.

As a rural woman, my environment is the basis of my economy and my total survival. It is from the land that I get my food. It is from the land around me that I get my fuelwood and my water. Therefore, if this land around me declines, my basic survival also declines, and I cannot sustain my life. As a woman, environmental decline means that I have to walk long miles to fetch firewood and water. I have very little time, therefore, to grow vegetables and other food.

And because the environment has deteriorated, my soils have also deteriorated. So, even if I have seven children and some go miles to fetch water, others miles to fetch firewood, and I take another group to the land, we still will not produce as my grandmother used to produce. Therefore, if my agriculture has to be sustainable, my environment also has to be sustainable.'

(Sithembiso Nyoni, Organization for Rural Association for Progress, Zimbabwe)



The close relationship between women and the environment means that they are particularly vulnerable to the effects of environmental degradation as forests are destroyed, soils deteriorate, and water and air become increasingly polluted. Diminishing resources of water and wood cause women to walk further in the search for their basic supplies; and in order to save time, they carry larger and heavier loads, which in turn has implications for their health. All of this has a wider effect on the family and community, because when women spend more time collecting fuel and water they have less time for caring for the family and for working in the fields to produce food.

Another problem is that the resources they find are frequently of inferior quality. A safe supply of drinking water is essential; yet water is invariably contaminated. This may be caused by untreated sewage, wastes from agriculture and industry, and from sediment resulting from commercial developments such as logging and mining; while sometimes the deterioration is simply because of more intensive domestic use, as in the case of village ponds in India. The shortage of suitable fuelwood often leads to the use of alternative products which may be more harmful; for example, the burning of dung emits a more toxic smoke than wood, and at the same time uses up a valuable source of fertilizer. A study of the impact of logging on women in Papua New Guinea shows that freshwater and food supplies are being affected. The freshwater streams are frequently clogged by sediments and tree debris causing the destruction of the sago palm which grows in the deltas, and which is a staple food for some people. Offshore reef resources are also being threatened by increased sedimentation (APDC, 1992).

Women's health is often adversely affected as a result of greater exposure to certain environmental health hazards. Women suffer as a result of carrying heavy loads of water and wood from an early age. They are also particularly exposed to smoke from cooking fires. As a result of their frequent contact with water, women are more likely to be affected by contaminated water, which is a major health risk in the humid tropics (see the publication *Water and Health in this series*). Due to their childbearing role, women are physiologically more



sensitive than men to environmental pollution, and this can also have an effect on the unborn child.

Women can be seen as victims not only because of the direct impact of environmental degradation, but also on account of their socioeconomic status. As already described, many women, especially rural women in developing countries, have a lifestyle characterized by an excessive work burden; collecting water and fuel, caring for the home and family, as well as working in the fields or making products to sell. In addition women form the larger proportion of the world's poor. The 1991 Human Development Report (UNDP) recognizes the 'gender bias' in poverty which is reinforced by economic forces which favour male labour to female labour. The United Nations International Fund for Agriculture and Development (IFAD) reports that the gender question cuts across all classifications of the poor and that women-headed households are particularly vulnerable. These are on the increase in rural areas as more men migrate from the villages. In Sub-Saharan Africa 31 per cent of rural households are headed by women. This trend is also becoming more noticeable in urban areas in developing countries, especially in Latin America. Figures for 114 developing countries show an increase of 47 per cent in the number of women living below the poverty line in 1988 compared with the period 1965-70.



Table 2.1

Total number of rural women living below the poverty line

Region	(millions)
Asia	374
Asia (excluding China and India)	153
Sub-Saharan Africa	129
Near East and North Africa	18
Latin America and the Caribbean	43
Total 114 developing countries	564
Total least developed countries	149

Households headed by women as per cent of rural households (1988)

Region	%
Asia	9
Asia(excluding China and India)	14
Sub-Saharan Africa	31
Near East and North Africa	17
Latin America and the Caribbean	17
Total 114 developing countries	12
Total least developed countries	23

(Source: IFAD, 1992)



There is a very close link between environmental degradation and poverty. It takes the form of a vicious circle: poor people have no choice but to degrade their environment as they over-exploit their natural resource base in order to survive; people remain poor as they cannot make a living from a degraded environment. This link was one of the areas of particular focus in the 1992 United Nations Conference on Environment and Development (UNCED). The specific vulnerabilities of women were recognized, and the need for special policies and programmes to be implemented at the community and local levels was emphasized. A symposium focusing on the links between women and children, poverty and the environment entitled 'Women and Children First' was organized by UNCED during the preparations for the Conference.

Sudden destruction and degradation of the environment is frequently caused by natural and man-made disasters. Women as farmers and carers of the family and household are greatly

affected by the impact of such disasters which can destroy homes and productive farmland. Regions of the humid tropics are particularly prone to disasters resulting from typhoons, floods and similar events.

Women make up the greater number of the refugees in the world, it being estimated that 80 per cent of refugees are women and children. Many countries in the humid tropics have sizeable refugee populations. The pressure on the environment as a result of the sudden increase in population can be considerable, especially where natural resources such as water and fuel are already under stress.

Table 2.2

Refugees and asylum seekers in need of protection and/or assistance for selected countries in humid tropics (as of 31 December 1990)

<i>Africa</i>		<i>East Asia and Pacific</i>	
Angola	11 900	Indonesia	20 500
Burundi	90 700	Malaysia	14 600
Cameroon	6 900	Papua New Guinea	8 000
Central African Rep.	6 300	Philippines	19 600
Congo	3 400	Thailand	454 200
Côte d'Ivoire	270 500	Viet Nam	16 700
Ghana	8 000		
Guinea	325 000		
Guinea Bissau	1 600	<i>Latin America and the Caribbean</i>	
Kenya	12 300	Belize	6 200
Malawi	909 000	Costa Rica	26 900
Nigeria	5 300	Cuba	3 000
Rwanda	21 500	Ecuador	3 750
Sierra Leone	125 000	French Guiana	10 000
Tanzania, United Rep.	266 200	Guatemala	6 700
Uganda	156 000	Honduras	2 700
Zaire	370 900	Mexico	53 000
Zambia	133 950	Panama	1 200

(after Forbes-Martin, 1992)

Population growth and levels of consumption

Impinging on the whole problem of environmental degradation, available natural resources and the issue of sustainable development are two factors – population growth and levels of consumption. These are often perceived in the context of the North and the South, with the rich countries of the North accused of being largely responsible for unsustainable high rates of consumption, and causing damage to the environment through emissions of carbon dioxide and other wastes; while the countries of the South have rapidly expanding populations which are increasingly difficult for the land to support

Predictions of the world's population growth indicate that the world population of 5.3 billion in 1990 will increase to 6.3 billion by the year 2000 and to 8.5 billion by 2025 (UNFPA). It is estimated that 94 per cent of this increase will be in the developing countries. In the humid tropics many areas are already experiencing a rapid rise in population, especially along coastal margins which have seen urban and industrial development as well as the expansion of tourism. This growth in population exerts a great pressure on the environment and its natural resources.

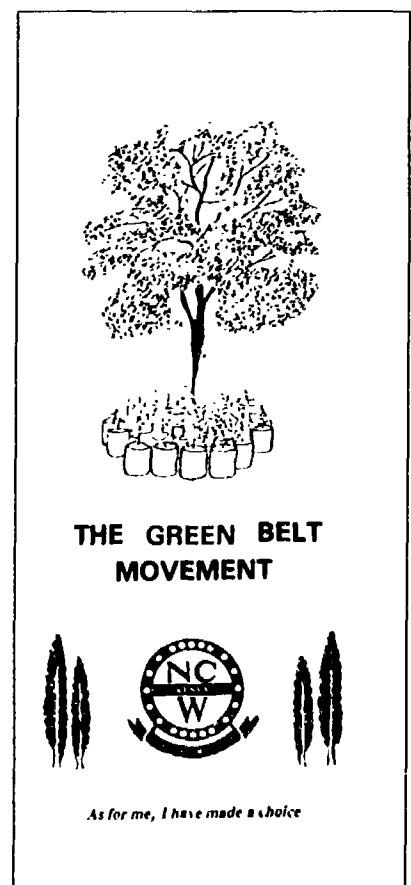
Women play an important part in slowing population growth and they are central to family-planning policies. There is a link between women's status and population, as an improvement in the status of women results in a reduction in birth rates.

High rates of consumption, characteristic of industrialized countries, can have a major impact on the humid tropics. The increasing demands of the high-consuming countries for resources such as timber, for example, lead to greater exploitation of the tropical forests. In this connection, women, as environmentally aware, discerning consumers, are already playing a key role in helping to reduce excessive consumption.

Women in action

Women's groups and organizations have been at the forefront in environmental improvement and conservation, especially at the grassroots level. The Green Belt Movement in Kenya was founded in 1977 by the ecologist Wangari Maathai under the auspices of the National Council of Women in Kenya. Its aim was the planting of trees in areas affected by deforestation and land degradation. Tree nurseries were set up where women raised the seedlings, which were then distributed to small farmers and community organizations for planting in small lots around the villages. The success of the Green Belt Movement has not only been in improving the environment and in renewing a valuable resource, but also in the benefits to the women of the practical forestry and management skills they have learned (as well as the earning of a cash income). By 1992 there were over a thousand such tree nurseries in Kenya, and some ten million trees had been successfully planted. The movement is now extending to other countries in eastern and southern Africa.

The Chipko Movement in India is another well known example. It started when village women successfully protected their local forest trees by linking arms around the trunks of the trees to prevent the commercial loggers from felling them. From these



'They (the women)

took everything in hand,

from directing the teams

of workers to providing

building materials and

organizing the thousands

of volunteers who gave up

their spare time

to work on the project.'

(Marta Trejos, CEFEMINA)

beginnings in 1974, the Movement expanded to become a national ecological movement promoting people's needs for natural resources.

An example of a successful housing project involving women is the Guarari project in the outskirts of San José, Costa Rica. Here the women, who had mostly migrated from rural areas, were seeking an alternative to living in the slums of the shanty towns. The project, co-ordinated by a women's NGO, CEFEMINA, involved women in the planning and building of a whole housing community, consisting of groups of houses interspersed with leisure areas, as well as community centres with various facilities. Plans also allowed for the restriction of traffic and the protection of natural areas, including the river, which has been protected from sewage effluent contamination by the building of a water treatment plant.

Other women's organizations in urban areas are also active in improving the environment. One example is the Metro Manila Council of Women Balikatan Movement in the Philippines, which set up the first garbage recycling project in the capital city. This organization has encouraged households to separate dry waste, which is collected on a weekly basis and then sold to junk traders, who in turn sell the recyclable materials to local factories. The women members of the organization, known as 'eco-aides', collect the waste from the households, and continuously promote the project by sending information literature to households and by organizing seminars and meetings in the local communities. As a result of this project the environment has improved in that the streets and canals have become cleaner; in addition different groups of people – the women workers, the households and the junk dealers – have benefited from the money they earn.

An interesting project linking urban and rural communities is that developed by a group of housewives in Mexico, CACRETEM (Housewives' Campaign to Regenerate the Eroded Lands of Mexico). This involved the organization of women in some 6,000 urban households in collecting organic waste which could be made into fertilizer, using the slogan 'From the Kitchen to the Country-side with love'. With the support of the media, this scheme has expanded and has led to the development of other, similar projects.



Women can also be very effective as campaigners against actions which are harmful to the environment. A women's group, 'Narripokkho', successfully mobilized other groups and individuals in a nationwide campaign against the dumping of toxic waste in the Bay of Bengal. Likewise in Malaysia, it was the women, concerned about the health of their children, who instigated action leading to a court case against a company whose factories had dumped waste (including radioactive material) in proximity to the local community. Also in Malaysia, women of the Penan, indigenous people of Sarawak, have been active in setting up blockades to stop the commercial logging which they believe is destroying the forest and ruining their traditional way of life. A campaign to investigate the environmental impact of the Tucurui dam in the Amazon forest in Brazil, has been spearheaded by Ms Sonia Pereira, President of the Brazilian Movement in Defence of Life, who, as a lawyer, has taken the State Electric Company to court, and has also worked world-wide in promoting the campaign.

Women not only contribute to the management of the environment as users of natural resources, but also in their central role in the family and community, especially in relation to communication and education – formal and informal. Environmental education starts at an early age, and it is mostly from the mother that children acquire environmental values and ethics, as well as their attitudes regarding the use of natural resources. As carers of their families, women are naturally concerned about the state of the environment and for its preservation for their children's future.

3. WOMEN AND WATER

'Women play a central part in the provision, management and safeguarding of water.'

(Dublin Statement)

Women in developing countries are often referred to as water suppliers and water managers. Daily collecting of water is almost entirely the responsibility of the women, and it is the women who allocate water for its different use within the household.

The term 'humid tropics' suggests a climate with sufficient precipitation to endow the lands with a plentiful supply of moisture. However, the amount and distribution of precipitation varies within the region. Some areas experience an annual rainfall of around 2000 mm, evenly distributed throughout the year. Others have a distinct seasonal pattern, where although precipitation is sufficient to maintain freshwater resources in the wet season, water shortages and drought conditions may occur during the rest of the year. In the case of areas experiencing monsoon climates, annual precipitation totals may be very high, but they are concentrated in one or two seasons.

Intense rainfall is one of the main causes of water-related problems in the humid tropics. It leads to frequent flooding, and

excessive runoff resulting in soil erosion which in turn leads to increased sediment in rivers and reservoirs. Rapid runoff is also a problem in urban areas where flooding often occurs because of lack of drainage systems. In certain areas of the humid tropics the presence of a high water table leads to the likelihood of pollution of groundwater. Another difficulty is the overall high rate of evaporation which reduces the availability of water, especially during the dry season.

However, an adequate, accessible supply of water of good quality depends on more than a humid climate. Sufficient precipitation or the occurrence of plentiful groundwater does not ensure a reliable water supply. Proper collection, storage, treatment and distribution systems are required, and some or all of these are often lacking. The same applies to systems for the collection and treatment of waste, the absence of which can result in surface waters and groundwaters becoming polluted.





Women - water suppliers

The access to a supply of water of good quality and at an affordable cost is a basic need for all people, yet despite the efforts of the International Drinking Water Supply and Sanitation Decade (1981-1990), some 1,200 million people in developing countries are still without access to a safe water supply (WHO, 1992). (Safe water refers to safe drinking water available in the home or within 15 minutes' walking distance, and includes treated water and untreated uncontaminated water from protected sources.)

The quantity and quality of available fresh water resources is a crucial environmental issue, even in the humid tropics. For the women collecting the water the task has now been made easier in some areas as a result of the installation of village wells, but in others, for example in the overcrowded shanty towns in the cities, water is becoming increasingly difficult to obtain.

Women are highly aware of the deterioration of their water resource, a fact illustrated by the comments of a 60 year old village woman in southern India as reported by a water project worker:

'When I was a young girl I was collecting four pots a day, but it wasn't very far away as the river was always full then. For the past five or six years the spring that feeds the river has not been there because the huge Panjapattl lake is drying up. The monsoons are not how they used to be. They were longer and less heavy. Now the rain pours down so heavily it takes everything with it.'
(WaterAid 1993)

The task of collecting water is central to community life in developing countries. Water is often a focus of village conversation, the local wells being a popular meeting point, and in some societies fetching water is one of the few occasions when the women can leave the immediate confines of their houses. However, the burden is considerable, as is the time involved, a situation compounded by the increase in demand for water for uses such as improved hygiene, which puts greater pressures on limited resources.



In many communities the tradition of women fetching water begins at an early age when girls accompany their mothers on the daily routine walk to the water source. They start with a small container, the size of the vessel being carried increasing as they grow. The walk in rural areas can be difficult, often along uneven, slippery paths.

In a study in Kenya it was found that 70 per cent of all the trips to collect water was made by women over the age of 15 years. On average they were carrying loads of 20-25 kg distances of 3.5 km 1.5 times a day. The walk to the water source was often over rough

Women, Water and Work

Have you seen my hands?

They are hands that are sturdy.

The cord I use to get the water has made them hard.

This interminable cord I must pull to take the water from the well

I go to look for water at the bottom of the well.

Have you seen my feet?

They have been cracked and hurt.

The thorns along the way have spoiled them.

These unbearable merciless thorns that constantly hurt me on my interminable road to go to the well.

Have you seen my arms?

They are heavy and suffering from the weight of the water from the well.

They are tired and weary from this heavy bucket that I have to bring up from the bottom of the well.

Aminata Traore,

Water and Sanitation Expert, Mali.



Women acquire an excellent knowledge of local water sources and studies have shown that they select water according to certain criteria such as accessibility, availability, distance, time, quality and use. They also have criteria for judging the quality such as colour and taste. One study in Guinea-Bissau described how in one village ' . . . two-thirds of the women gave high priority to good drinking water. They drew this water from a large pond to which they walked a distance of up to 880 metres. Water from a nearer well was used only for clothes washing and kitchen purposes. The remaining women collected water from an open well for all purposes even though they considered this water not to be as clean as that from the pond. In this choice, however, they by-passed another closer source, because of the high iron content in the water.' (van Wijk-Sijesma, 1985).

In urban areas, too, it is women who are largely responsible for collecting water; the walk may not be as long where there are public water points – usually on the more important roads – but waiting in line is still a problem. In the shanty towns there is generally an absence of public water points, and here women tend to rely on vendors for water, paying a price they can ill afford for water often of a suspect quality. Where a piped water supply is available, women often cannot afford the connection fees or service charges. For example, an appraisal mission from the Canadian International Development Agency (CIDA) in Nicaragua reported that the cost of connection to a water system was between 25 per cent and 70 per cent of the annual income for low- to middle- income-earning women (Syme, 1992).

Sahabat Warita – a squatter settlement in Kuala Lumpur

'With only one stand pipe to provide drinking water for 50 families, the squatter dwellers have drawn up time slots for each family to collect water for their needs. Some have to collect water at two or three in the morning and most often it's the women who have to do it since their men are not going to wake up to do this! The women have to bring their children with them for fear of being alone at that hour.

There are wells that they used to use but now that more and more makeshift latrines have been built, the water is no longer good for drinking. The settlers used to defacate in the nearby rubber estates but the older children who have been to school or work in offices are not willing to do that anymore. They still rely on the little streams nearby to bathe and wash clothes and dishes in, even though the nearby rubber processing factory pours waste products into it.

Their children are sick with fever and diarrhoea all the time but the women say that once the children grow up a little and get used to the water, they will be alright.'

Interview with a grassroots worker (APDC, 1992)

Women - water managers

Having collected the water, women are then in charge of its use in the household, and sometimes within the village community. Water is needed for cooking, washing clothes, personal hygiene, cleaning, and in sanitation and waste disposal. In addition many women use water in food processing and craft making, as well as for vegetable gardens and domestic animals.

With the introduction of more community-based water management, women are now in charge of the wells in some villages, and are responsible for their location, cleaning and even maintenance. As far as sanitation is concerned, women are mostly responsible for all the sanitary arrangements' including the cleaning of latrines and the disposal of excreta. In large cities in developing countries, this work is often a source of employment for poor women.

As the main users of domestic water and carers of the household and family, women play a crucial role in health and hygiene. This is especially relevant in health education, as mothers train their children in basic hygiene, and women are also useful in educating others by communicating with them in the community.



**'Water should be seen
through women's eyes,
as a common
denominator that goes
into many components
of rural management
systems '**

(Joseph Ouma)

Unsafe, contaminated water is one of the major causes of health problems. The World Health Organization (WHO) estimates that as many as 80 per cent of the illnesses in developing countries are related to water. In the humid tropics there is the added problem that climate conditions are conducive to the development of human pathogens. Of the diseases linked with water, waterborne diseases, which include diarrhoea, are the most widespread, and are transmitted by consuming water by drinking or in food. Other diseases are transmitted by vectors associated with a water habitat, for example, schistosomiasis transmitted by a water snail, and malaria transmitted by the Anopheles mosquito. Certain diseases develop as a result of inadequate personal hygiene and lack of washing (see 'Water and Health' in this series).

The traditional role of women in water resource management is the subject of a study carried out by Professor Joseph Ouma of Kenya in the region of the inner basin of Lake Victoria. He observed that, in this region, water forms a component of a group of natural resources needed in the everyday life for agriculture, fishing, hunting and in the manufacture of salt and handicrafts as well as in various local commercial ventures. His studies found that the passing down of traditional knowledge of water resources such as the location of a supply of water for drinking, general domestic uses, farming, and suitable sites for fishing, is vital. Women are valued for this knowledge and their ability to manage resources; a factor which is often given higher priority in the choosing of a bride than material wealth.

Another aspect of the study is the impact on women of societal changes such as more formal schooling and the tendency for migration of labour. As a result, women have less help from their daughters in collecting water, yet at the same time more water is being used on account of improved hygiene. There has also been an increase in women's workloads, as they are having to do more of the farmwork that was previously the responsibility of the boys and men. The introduction of monetary economy in the region has resulted in the predominance of male decision-making, and the marginalization of women's knowledge of local resources. Discussions with groups consisting of women of different ages revealed that they, unlike the men, had a wealth of information related to water resources spanning several decades. Professor Ouma suggests that women's knowledge should be a vital component of local water resource management, as should the full participation of women in rural water projects (Ogana, 1991).

Women, water and agriculture

In the humid tropics many women work on the land as farmers and farm workers and are responsible for ensuring there is sufficient water for crops and animals under their care. Traditional methods of watering fields, based on the knowledge of local water resources and the needs of different crops, has been passed down through generations. In some areas such as the steep, terraced slopes in south-east Asia, these methods involve ingenious hydraulic technology using bamboo pipes to transport water to the fields.

Women are particularly important in the production of rice. In Asia, women are traditionally responsible for transplanting, weeding, harvesting and winnowing, whereas in Africa the system varies from region to region, and in certain areas the division of labour is on a crop basis, which means that women growing rice are involved in all the farming operations related to that crop.



An FAO study 'Women in Rice-farming Systems: Focus Sub-Saharan Africa' (Dey, 1984) shows that in many cases women rice farmers have little benefit from projects compared with men farmers, and that projects do not take advantage of the women's knowledge of local conditions. Projects were mostly designed by engineers or other technical staff, who did not appreciate the importance of women in rice farming, and by not consulting them did not make use of their knowledge.

In the Gambia a project to increase rice production by opening up access to uncultivated mangrove swamps would have benefited from research on the farming system and the role of the women, as well as from early consultation with the women farmers. When discussions did eventually take place, the project management was impressed with the women's knowledge of rice farming, particularly in relation to problems associated with water and salinity levels. The study cites another irrigation project in Zanzibar which, in contrast, provides a positive example of women's involvement. There, women provide half the registered tenants in the scheme and they have benefited from a more reliable water supply and the production of an extra crop in the dry season. Furthermore, women's dominant role in rice production was recognized from the beginning, and women were involved in decision-making at household and project levels.

In general women farmers, being mainly concerned with subsistence farming, have seen few benefits from irrigation, which is mainly associated with commercial farming. In fact, many women have been adversely affected, as large-scale irrigation can result in the lowering of the water table causing village wells to dry up. In India one study showed that in the 1980s village wells used by women became dry largely as a result of an increase in irrigated sugar cane cultivation (Shiva, 1988). Another study in the same country looked at the areas where the 'Green Revolution' allowed the cultivation of two or more crops of high-yielding varieties of rice a year, and found that the increase in demand for water caused the level of groundwater drop to 80 metres (Hoon, 1991). Also, in resettlement schemes resulting from the construction of dams for irrigation, women's needs are often ignored, and compensation payments given to the men are often not shared. In the case of the Mahaweli Irrigation project in Sri Lanka, resettlement denied women access to traditional forest foods and other products (APDC, 1992). Women also do not often benefit from the drainage of natural wetlands for agriculture, as the land is likely to be used for commercial farming. In addition, they lose the resources provided by these shallow waters, in particular food from the fish.

Another problem faced by farmers in the humid tropics is the removal of soil by rapid runoff. Women are becoming central to projects in land improvement and conservation, and it is usually they who persuade the men to take part in such projects. Women are active in FAO schemes such as reforestation to prevent soil erosion in Jamaica, and the introduction of settled agroforestry systems to shifting agriculturists in Thailand. World Food Programme (WFP) projects to improve food production by training farmers in ecologically sound farming techniques also involve women farmers; for example in the Dominican Republic, where terracing and mixed cropping are being introduced; and in Haiti where erosion of deforested slopes is being prevented.

Volunteers from local communities in Haiti making contour walls on hillsides to stop erosion (WFP)



Women, water and disasters

Natural disasters such as tropical cyclones, floods and landslides have a considerable impact on women, often destroying their homes and livelihoods. More women than men are killed due to the effects of natural disasters. This is due partly to the fact that women are not as strong physically, often on account of being pregnant or nursing mothers. Another reason is that women's responsibility for the home and children means that they are reluctant to leave the home even when they are in danger. However, women are very significant in post-disaster survival strategies, as suppliers of water, food and fuel, and carers of the home and family.

One area of the humid tropics particularly prone to frequent flooding is the densely populated coastal lowland of Bangladesh. During the floods of 1991, a woman relief worker reported that many women lost their lives while trying to save their children, others were afraid to leave their homes lest they were blamed for anything that might happen to their houses. Some women were reluctant to be rescued from their homes because their bodies were not fully covered. In such cases the lack of sufficient female relief workers and doctors is critical.

'I learned specific lessons from these experiences. First of all, the events surrounding this cyclone have shown that in environmental disasters women are made more vulnerable by their social status, both during and after the full impact of the event; and secondly, while it is necessary to have more women involved in relief work, discrimination can seriously impede their work.' (Reardon, 1993).

Although women are frequently involved as labour for digging drainage canals in flood control schemes, they are not really considered more specifically in terms of flood forecasting. A report for the World Meteorological Organization (WMO) suggests that the flood warnings are not being effectively disseminated to the people who need to know. Women are not directly involved in this system, yet participation of village women would be advantageous. Not only are they fully aware of the damage caused by the floods as it affects them directly, but also their family and household responsibilities mean that they are they are likely to be available in the village when needed.

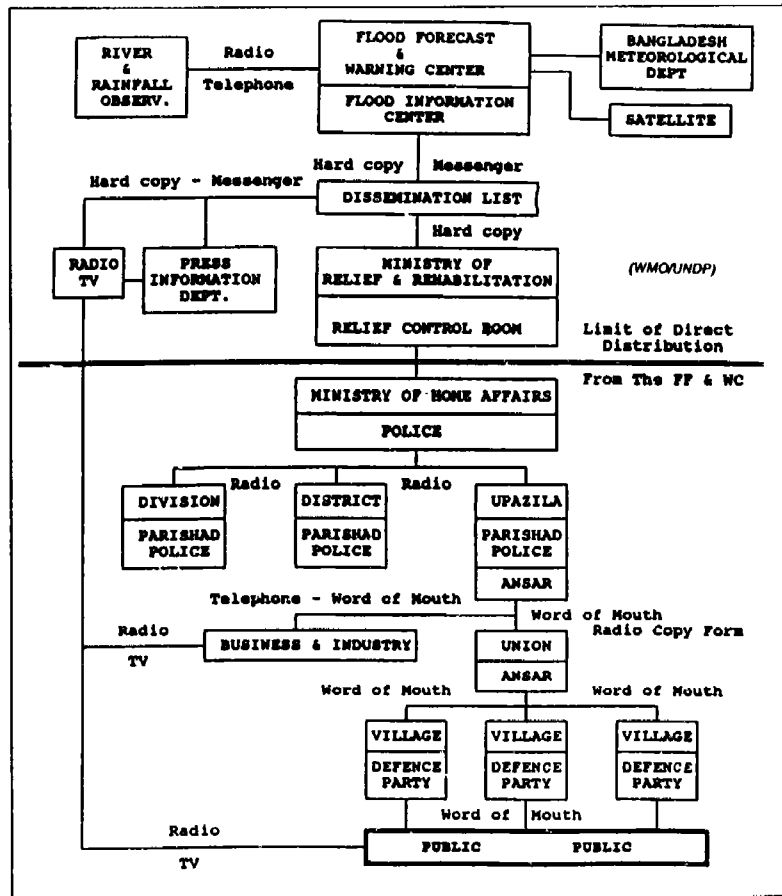
A project involving women in Bangladesh has been proposed by the World Bank and United Nations Development Programme (UNDP). Their Flood Action Plan proposes to incorporate women in flood prevention activities which include soil conservation and afforestation. The project will benefit from the women's knowledge of local river flows and soils, while the women will be provided with skills training (INSTRAW, 1993).

Women removing soil from silted up canals in Bangladesh



Figure 3.1

Flood warning schemes in Bangladesh operate through a network from the Ministry of Home Affairs down to the Upazila and Unions (local government) and then to the villages where the Village Defence Party is responsible for alerting those in the areas expected to be flooded.



4. WOMEN'S CONTRIBUTION TO WATER PROJECTS

In view of women's key role in water supply and sanitation, it is surprising that the importance of women has remained unrecognized for such a long time. There has been a general absence of women in projects at all stages, from the initial planning and design of water pumps, to training in maintenance and management.

Women's knowledge and experience in the supply and use of water can be invaluable, and problems could be avoided by consulting women on such items as local sources of water, the location of the well and the design of the pump. For example, the positioning of a well in the centre of a village is unwise if it is to be used by women for personal washing; pump handles are often too high for women to reach or too heavy for them to use; and there are rarely extra facilities such as a block on which to rest the water container, or a place for washing clothes. Frequent breakdown of the pumps is a major problem, compounded by the fact that the men who have been trained to repair them do not see the urgency of doing such a task which does not affect them directly. It is logical that the women, who are the users and who are available in the village, should have the responsibility for the supervision and maintenance of the pumps. Projects where women have been trained in these tasks have proved to be very successful. The introduction of pumps such as the India Mark II which are easier for women to use is another positive step forward.

The special needs of women have been rarely taken into account in sanitation projects, particularly with regard to the need for privacy. For example, a study in Viet Nam refers to women restricting eating and training themselves not to have bowel move-



Women have a valuable knowledge of local sources of water.





ments during the day; another in India among the street dwellers in Bombay notes that while men can wash at the public water taps, this would be seen as immoral behaviour for women (van Wijk-Sijbesma, 1985). Very often difficulties such as women refusing to use the latrines because their feet could be seen from the outside, could easily have been avoided by simply consulting the women in the early stages. Women are now being involved more in sani-

tation, especially in relation to health and hygiene. In many projects women are acting as animators, visiting women in other communities and giving them help and advice in water/health issues. In several African countries women are actively participating in the building of latrines; in Uganda a woman mason is leading a project which produces concrete slabs for covering pit latrines in rural communities (WaterAid).

The recognition and greater involvement of women in water projects, especially at grassroots level was one of the positive achievements of the International Decade for Drinking Water Supply and Sanitation (1981-1990). As women play an increasing part in projects and the benefits of their participation are realized, the emphasis is changing from merely recognizing the role of women, to regarding the participation of women as being essential to the success of the project.

Promotion of the Role of Women In Water and Environmental Sanitation Services (PROWWESS)

This project was launched in 1983 by the UNDP with the aim of supporting and expanding the involvement of women in activities related to the Drinking Water and Sanitation Decade. A particular focus of PROWWESS has been the development of replicable models which involve women in drinking water supply and sanitation projects at community level, and the development of methods using the participatory approach.

Training workshops have been provided and PROWWESS has also developed its own education materials, including a field manual for trainers. The work of PROWWESS has also included monitoring, evaluation and research. Working with governments, bilateral development agencies and local NGOs, PROWWESS has been involved in field projects in some 20 developing countries, including Bangladesh, India, Indonesia, Thailand, Sri Lanka, Kenya, Nigeria, and Guinea-Bissau within the zone of the humid tropics.

The following extracts from the PROWWESS manual 'Tools for Community Participation' show the type of participatory exercises successfully employed in its projects.

Figure 4.1

F I E L D I N S I G H T

One activity, done in two subgroups, was the building of three-dimensional village maps.

To make their maps, or models, participants used all kinds of odds and ends such as (clay, sand, cardboard, buttons, shells, cotton, fabric and other materials) contributed by local trainers, supplemented by other materials collected by the participants themselves.

Each village team was asked to draw a map depicting the ward and to compile a list of characteristics, resources and problems. The volunteers were critical to this process as they alone knew the village. They were to instruct agency representatives about their site. Each group then reported its findings to the others. The activity went well with virtually every village volunteer taking active part.

The point in introducing the map activity was to engage the group in an intensive, highly creative self-directed experience. It would serve at least two purposes:

- to establish, in their own minds, through their own living experience, the high level of energy, enjoyment and creativity that can be generated by a participatory approach in which the facilitators' role is minimal and
- to enable the subgroup members themselves to share their village experience in the process of creating their maps and to use the end product as a concrete take-off point for subsequent activities.

Each group presented its village map. Water problems represented included:

- dry river
- dirty waterhole
- an untapped spring
- borehole with a broken handpump, village waiting for government to repair it

Out of these presentations came the idea to use this activity in the villages, to let the villagers build their own maps to tell about their village, and to share their perceptions of problems and distances associated with water.

Indonesia

Figure 4.2

Methods: Analytic

WATER TRANSPORTATION AND STORAGE

PURPOSE:

To help participants analyse how water drawn from the pump can become contaminated before it is consumed in the home and what can be done to prevent this contamination (or what can be done to purify contaminated water).

TIME: 1 hour

MATERIALS:

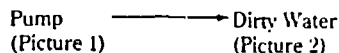
Three pictures depicting:

1. Two women getting water at a pump
2. A man or a child drinking a glass of dirty water
3. Another man or child drinking a glass of clean water

PROCEDURES:

■ Participants examine the picture of women getting water at the pump and describe what is happening, what the names of the two women are and whether the water they have gotten from the pump is clean. The picture is then attached to the board.

■ Participants then study the picture of the person drinking the dirty water. Trainer explains that this is (one of the women's names) husband or child, on the next day, drinking the water she brought home from the pump. The picture is attached to the board at some distance from the pump picture with an arrow between the two:



The trainer asks, "What could have happened between the first and second picture to cause the water to have become contaminated?"

When all the possible reasons (events) have been described, the trainer attaches the second picture (person drinking clean water) below the picture of the person drinking dirty water and explains that this is the husband/child of the second woman at the pump. An arrow is drawn between the pump picture and the clean water picture:



The trainer asks, "What has this woman done to keep her drinking water clean?"

Participants discuss what can be done in a village to help people keep their pump water clean.

Adapted from an exercise developed by Agma Prins, Consultant.

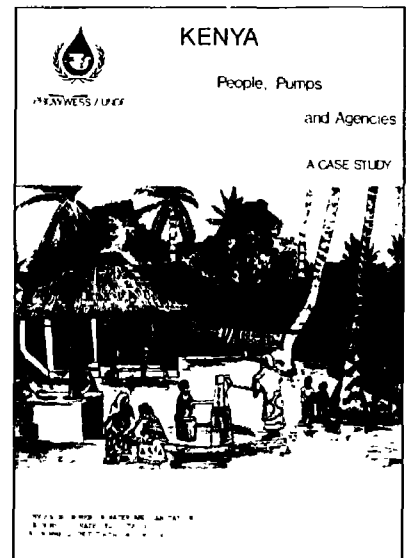
Projects undertaken by PROWESS demonstrate the advantages of involving women in terms of the effectiveness of the project in relation to water, and in the benefits to the community. In Bangladesh in the slums of Dhaka (where diarrhoea was rampant due to the sanitary conditions of one latrine to forty people, and few public water taps in working order), local women, many of whom were illiterate, were trained to help others in the treating and prevention of diarrhoea. These women benefited from improved health and access to water, and they also used water for growing fruit and vegetables for sale. In addition, they gained in confidence and had improved status in their community and were well equipped to participate in future activities.

Some PROWESS projects have involved women directly in water supply and sanitation. In a project in the south coastal region of Kenya, women were encouraged to form the core of the village water committees, including the responsible positions of treasurer and pump caretaker. These committees became increasingly autonomous; electing leaders, collecting materials for construction work, helping in pump installation and repairs, and collecting money for pump maintenance. Women were also trained as extension workers to advise and help others. In a project in Lesotho, women are active in building latrines. One in four of all latrine builders trained in Lesotho is a woman.

A project in Indonesia focused more on the strategy for involving women in a water users group, and provided training for village women in leadership, book-keeping, and in maintenance and repair work.

'Many of us are just housewives. We never counselled people before. When we had meetings previously I was too shy to go house to house. So we had general meetings and repeated the same thing each time. Now I am confident to go house to house, and I change what I say depending on the situation.'

(Housewife volunteer from PKK, national welfare movement of Indonesia, and participant in PROWESS project)



Other projects involving women

Many non-governmental organizations are now involving women in water projects. WaterAid, the UK-based specialist water NGO, has a strong gender dimension in its projects and is increasingly taking women's views into account, as for example in the positioning and design of village wells.

Women's participation is a key aspect of many of the projects it supports in developing countries. For example, in southern India WaterAid is working with local organizations that encourage women to form local committees (sangams) through which women can organize themselves to bring about change and improve their lives. The League for Education and Development has set up sangams among the poor villagers or harijans, who formerly depended on the landowners for water.

With the help of WaterAid, fifteen villages have installed handpumps and women have been trained as pump caretakers (see photo). Although the provision of water was the first priority, it has served as a starting point for other activities to benefit these poor village communities, such as health and education, including basic literacy. The women utilize the wetter land near the pump to grow fruit to sell at the local market and through the sangam they have organized loans for the development of cottage industries.

'While working with the women, we realised how much more aware of the environment they were, and how they determined the environment to a large extent. . .

But as women and harijans they felt they had no power to change things. . .

The women had the will but did not know where to start.'

(Project worker)



'KWAHO recognizes that women are the latent force for change and their empowerment to participate is the prerequisite to the success of a community based project.'

The Kenya Water for Health Organization (KWAHO), which has taken part in PROWESS projects, has been at the forefront in involving women. KWAHO's main objective is to assist local communities in improving their health by providing safe drinking water and adequate sanitation through their own efforts and at their own pace.

An example of one of KWAHO's successful on-going water and sanitation projects is that in the Kachogo Kakola area near Lake Victoria. This project was set up to address a series of problems manifested particularly in serious health epidemics such as cholera as well as in the general prevalence of other waterborne diseases. Water problems in the area were caused by frequent flooding in the wet season and the resultant contamination of rivers from human wastes and agrochemicals applied to irrigated rice fields.

It was established that the most viable solution to these problems would be the development of shallow wells for water supply, with the use of the Afridev handpump, and funding was acquired for 90 wells. The project involved the participation of 61 women's groups (Mwangola, 1991).

Table 4.1

**Kenya Water for Health Organization (KWAHO)
Kanythiondo Women's Group (started in 1989)**

Chairperson Mrs Benter Owiniti
Vice-Chairperson Mrs Mary Ayiecho *Hon Secretary* Mrs Jane Juma
Treasurer Mrs Debora Okech *Vice-Secretary* Mrs Monica Odongo
Other Committee Members: Mrs Margaret Mirenga, Mrs Pamela Aton, Mrs Jane Nyarodi, Mrs Philista Ooko, Mrs Patrisiah Aros, Mrs Stella Nyakado, Mrs Janet Ogwela, Mrs Feronica Ayieko.
Co-opted Committee Members: Henry J. Abwao, Stephen Mbeke, Wilson Ogwela, Joseph Nyarodi.
Group Members: Women: 210; Men: 70.

Aims and Objectives of the Group

1. To mobilize members to start projects.
 2. To enrol more members.
 3. To help in aiding stranded students with school fees in case of a members request.
 4. To educate members and non-members the value of starting a project like: water project, to grow both indigenous and exotic trees, zero grazing, or any useful trade.
 5. To organize 'harambee' (self help) work and even fund-raising to raise the standard of the group.
 6. To aid any member with a problem like: bereavement, court case, fire, flood or hunger, pay hospital fee in case a member is sick and cannot meet the cost.
- (after Mwangola, 1991)

KWAHO ensures that women are involved in the siting of the wells and gives them training in their construction, and in the installation, maintenance and repair of the handpumps. As a result of this project water points have now been provided for 80 per cent of the targeted population. Sanitation has also been improved by the building of pit latrines. Benefits have been seen not only in terms of the improved health as a result of the water supply and sanitation, but also in the use made of the women's time saved by not having to walk to fetch water. In addition, many women are now involved in income-generating activities such as vegetable-growing and craft-making. Women are at the centre of the project, and have themselves gained considerably from being involved at all stages – initiation, development and management.

Through UNESCO's co-action project 'Water for All', the Associated Country Women of the World is providing basic water and sanitation facilities to help women in remote rural villages. Projects include well and latrine construction in Sri Lanka, Belize, and the Solomon Islands, as well as water for agriculture in Kenya and the Gambia. Another women's NGO, Soroptimist International, is working with the United Nations Fund for Women (UNIFEM) in the state of Orissa in India to enable women to make use of local waters for freshwater fish farming. Previously women had been excluded from this activity, but this project will provide them with training and access to credit to develop their own income generating activities based on fishing.

**Women constructing
ferrocement watertanks as part
of a Swiss multisectoral
development programme**



The increased participation of women is also characteristic of water projects developed by national governments and supported by UNDP, such as the scheme in Malawi to introduce community self-help in pump maintenance. The lack of regular maintenance had meant that many of the handpumps were out of action for up to nine months before being repaired. Under this scheme, women are being trained to maintain the pumps, each village having its own committee with a pump caretaker and two assistants (Paqui, 1989).

Individual success stories

Many successful projects have resulted from specific contributions by women. The Global Assembly of Women and the Environment in Miami, Florida in November 1991 focused on such projects. These 'success stories' involving women from all regions of the world were selected because they were affordable, repeatable and sustainable. Out of the total of 218 'success stories' selected, 56 related to water.

Many of the 'success stories' from the humid tropics were at the grassroots level, where women, tired of waiting for something to be done, had taken the initiative. In Indonesia, women leaders in a mountain village in central Java, which depended on a polluted river for water, decided to bring clean water from a spring 500 metres up the mountain. The women were responsible for designing the project and managing the distribution of water, and are now involved in collecting fees from the households to cover maintenance costs. In Cameroon a woman farmer reacted to the problem of lower food production by organizing other women into working on the land to conserve water and soil, using techniques such as contour farming and mulching.

Some of the 'success stories' were of women involved in water management and at government level. A woman hydrologist in the West Indies instigated tests on aquifers used as a source of domestic water supply which had become contaminated from agrochemicals. She then successfully campaigned for a groundwater management programme to provide safe water. Another example was of a woman from the University of Para in the Amazon lowlands who played a key role in devising a simple inexpensive method of decontaminating water to enable its use for drinking. In Thailand, a woman researcher working on the quality and level of groundwater in Bangkok, has embarked on a project to prevent the decline in groundwater levels and to prevent subsidence.

**'It's in the best interest
of me and my family
to maintain the pump.
I remember too well how
sick we used to get
from water drawn from
the polluted stream before
we had the pump.'**

(Margaret Chagwera,
handpump caretaker,
Nkumbuwa village, Malawi)

5. RECOGNIZING THE ROLE OF WOMEN

Women and sustainable development

The concept of the significance of women in relation to sustainable development is still far from being widely accepted. The report of the *World Commission on Environment and Development*, 'Our Common Future' (1987), which brought the world's attention to the term 'sustainable development', included very little reference to women. Furthermore, the issue of women was also omitted from the original agenda for the United Nations Conference on Environment and Development (UNCED), as identified by the United Nations General Assembly. However, by the time the preparatory processes were completed and the Conference, the 'Earth



Summit', took place in Rio de Janeiro in June 1992, the issue of women was not only included as a distinct item, but was also mainstreamed throughout the documentation.

The main output from the Earth Summit was Agenda 21 – the plan of action for sustainable development for the twenty-first century, containing detailed programmes and recommendations in different areas related to environment and development. Agenda 21 includes a separate chapter on women, and there are also specific recommendations relating to women in other chapters, such as those concerned with poverty, human settlements, health, education, sustainable agriculture, freshwater resources, forests, and biological diversity.

In the run-up to the Earth Summit two important international conferences on the subject of women and the environment were held in Miami, USA, in November 1991. The Global Assembly on Women and the Environment, sponsored by the United Nations Environment Programme, focused on the areas of energy, water, waste, and environmentally friendly systems; and emphasized the positive contribution of women to the environment. The World Women's Congress for a Healthy Planet organized by the International Policy Action Committee highlighted evidence from women witnesses on the effects of environmental degradation from different parts of the world; and the conference produced a Women's Action Agenda for the 21st Century.

As far as the specific topic of water is concerned, the relevance of women in relation to water supply and sanitation became apparent during the International Drinking Water Supply and Sanitation Decade (1981–1990) and at the Conference marking the end of the Decade in New Delhi (September 1990), where women made a significant contribution to the discussions. The New Delhi Statement recognized that the poor, especially women and children, are the main victims of problems arising from lack of safe water. The Statement recommended institutional reforms, including the full participation of women at all levels in sector institutions and that women should be encouraged to play influential roles in community water management and hygiene education.

One of the outcomes of the Drinking Water Decade was the formation of the Collaborative Council for Water Supply and Sanitation, which has its secretariat at WHO. The Council, which is made up of water professionals, is striving to ensure that sustainable water supply and sanitation will be available to all people, with special attention to the needs of the poor. At its meeting in Oslo in 1991, the Council agreed to focus on seven key

'Women have a vital role in environmental management and development. Their full participation is therefore essential to achieving sustainable development.'

(Principle 20, Rio Declaration on Environment and Development, 1992.)

areas related to improved planning and management of water supplies, one of which is the issue of 'gender for sustainability'.

The importance of the gender dimension was reinforced in the discussions at the International Conference on Water and the Environment, (Dublin, 1992), which had one of its four principles devoted to women.

'Women play a central part in the provision, management and safeguarding of water. - This pivotal role of women as providers and users of water and guardians of the living environment has seldom been reflected in institutional arrangements for the development and management of water resources. Acceptance and implementation of this principle requires positive policies to address women's specific needs and to equip and empower women to participate at all levels in water resources programmes, including decision-making and implementation, in ways defined by them.'

(Principle No. 3 Dublin statement)



Women in the context of the United Nations

The issue of women has received special attention by the United Nations. The first World Conference on Women took place in Mexico City in 1975, and was followed by the United Nations Decade for Women (1976-1985). The second and third Conferences on Women were held in Copenhagen 1980 and Nairobi 1985. The key instruments emanating from these events are the Convention on the Elimination of All Forms of Discrimination against Women, which came into force in 1981 and has now been ratified by over 100 countries; and the Nairobi Forward-looking Strategies for the Advancement of Women to the Year 2000, adopted at the Nairobi Conference marking the end of the Decade for Women.

In recognizing the value of women at all levels these strategies provide the framework for commitment to the advancement of women and the elimination of gender-based discrimination. The theme for the Decade was equality, development and peace. Among the more specific areas identified were: women affected by drought; urban poor women; women deprived of their traditional means of livelihood; and minority and indigenous women. All of these are particularly relevant to the region of the humid tropics. The issues of environment and water resources, though given brief mention within the section on development, were not the main focus at that time. However, it was in the discussions in Forum'85, the parallel non-governmental conference on women, that the relationship between women and natural resources was first emphasized at a major international meeting.

The international focus will again be on the contribution and status of women with the Fourth World Conference on Women taking place in Beijing in September 1995.

'To achieve optimum development of human and material resources, women's strengths and capabilities, including their great contribution to the welfare of families and to the development of society, must be fully acknowledged and valued. The attainment of the goals and objectives of the Decade requires a sharing of this responsibility by men and women and by society as a whole and requires that women play a central role as intellectuals, policy-makers, decision-makers, planners, and contributors and beneficiaries of development.'

(Nairobi Forward-looking Strategies)

6. THE NEED FOR EDUCATION AND TRAINING



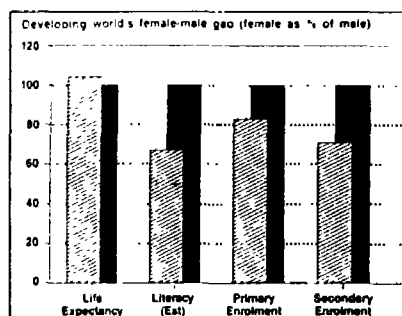
From the examples presented in this publication it is evident that where women in developing countries are now being involved in projects and programmes, they are for the most part contributing as volunteers and labourers. They are virtually absent from the professional sector. It is essential that more women be involved as advisers, planners, scientist, engineers, in all areas from academia to government services.

The lack of women at the advisory and policy-making levels is due largely to the disparity between levels of women's and men's education, especially in developing countries, starting with the most basic education and levels of literacy. According to UNICEF, statistics on rates of adult literacy show that in practically all developing countries there are more illiterate women than men. Of the 100 million children in the world having no access to primary school education in 1990, at least 60 million were girls.

The inequity between boys and girls receiving education can be explained by a variety of reasons. Accessibility is often a key factor. It is preferable for girls to be near the home as they traditionally help in the house. There may also be a lack of single sex schools or of separate facilities for girls; or there may be insufficient women teachers (in some societies girls are not permitted to be taught by men). Traditional factors often act as a constraint, as in many societies girls are expected to marry young. Finance is a major concern, especially in the case of secondary and higher education. Parents are often willing to make a sacrifice to pay for a son's education, but not for that of a daughter.

Of the countries within the humid tropics the degree of disparity between education of boys and girls varies. Figures from UNICEF show a favourable situation for girls in some countries, for

Figure 6.1



example, Malaysia and Nicaragua; but in Guinea the figure for girls as a percentage of boys is 44 per cent for primary and 31 per cent for secondary education.

In addition to basic literacy, it is also necessary to consider the type of education and the subjects studied. Even in countries where there is no gender disparity in terms of educational opportunities, there are fewer women studying science and engineering. The fact that many women are not technically literate is particularly relevant with regard to water supply and sanitation. It is also noticeable that fewer women than men participate in education and training opportunities. Of the fellowships in hydrology awarded by the WMO, only a small proportion of the recipients are women, the numbers for 1992 being 6 women and 54 men. A sample of five UNESCO supported courses on hydrology indicated that approximately 14 per cent of the participants were women.

The United Nations International Research and Training Institute for the Advancement of Women (INSTRAW), responsible for research, training and information activities to integrate women in development, recommended that the following aspects should be included in Water and Sanitation training programmes.

- Special provisions must be made for recruiting a certain percentage of women as trainees.
- Special measures are needed to facilitate women's participation in training, such as locating training sites in their villages and providing simple child care facilities.
- Women must be trained as trainers at the village level in order to reach other women.
- Since more women than men work as community volunteers, the community should be mobilized to support them either in cash or in kind or exemption from obligatory labour. If this is not possible, they should be given recognition or appreciation.
- In training community-level health workers, every effort should be made to promote collaborative activities integrating water and sanitation components in the primary health care and health and hygiene education programmes.

INSTRAW has produced a multi-media training package on Women, Water Supply and Sanitation, a resource directed at senior government officials, development planners, local authorities and NGOs involved in water supply and sanitation. The training package is designed to incorporate the integration of women's needs and to involve their participation in planning, technical operations, maintenance, and assessment and implementation of water supply and sanitation projects.



7. LOOKING TO THE FUTURE

The process of involving and consulting women in development projects has started, albeit in a fairly limited way. Agencies and organizations responsible for projects are beginning to look at the gender dimension, particularly in relation to the participatory approach.

Clearly there is a need for more research on the whole issue of gender awareness, such as the differences in women's and men's field of knowledge and expertise, and the different attitude in relation to interest, motivation and the perception of benefits. In questions relating to natural resources and sustainable development, it is important to study the differences in women's and men's access and use of resources, in particular with regard to the right to land. The involvement of more women as experts and advisers in projects is essential to women's credibility. Another aspect for consideration in relation to projects is the danger of women becoming marginalized, and whether treating women separately or by mainstreaming is the best approach. As more projects use the participatory approach it will be important to assess and evaluate, particularly with regard to women's participation, the benefits both to the women, and to the success of the project (Rodda, 1991).



One particular problem is the lack of reliable gender-based statistics. Women's contribution is mostly 'invisible', coming under the category of the household or the informal work sector. Most of the evidence of women, their key role, involvement, and also their marginalization comes from anecdotes and photographic material. Impact forming though this is, it does not provide a basis for quantitative analysis and study. Where separate statistics for women are more widely available, in health for example, there are very few statistics relating to environmental aspects such as the effect of women inhaling smoke from cooking fires.

From the rich collection of experience with women in water and sanitation projects, the *Collaborative Council for Water Supply and Sanitation* recognizes the value of involving women on account of their traditional roles, and the benefits especially in terms of health and socioeconomic factors. At its meeting in Morocco in September 1993, the Council emphasized the need to involve women at all levels including professional and managerial roles. However, it recommended that gender issues should not focus on women alone, and that full benefits will only be achieved when women and men share the responsibilities. Just as women need to be involved more in management, finance and maintenance, so men should participate in hygiene education and sanitation, and they should take a fair share of the time and labour which is so often expected of women. There should be a move away from the usual assumption that in projects men are responsible for the 'public sphere' and women for the 'private sphere'. However, the Collaborative Council accepts that women are still not fully recognized and that there is a need to highlight women's concerns. It is also important to ensure that an emphasis on women in projects does not result in an increase in their work burden.

The Gender Working Group of the Collaborative Council has produced a Gender Issues Sourcebook intended for use by development practitioners who are trying to implement gender sensitive projects in the water and sanitation sector. As well as giving a discussion of gender issues, the book provides guidelines and tools based on methods already used, but which have been adapted to reflect a gender analysis rather than a women in development (WID) approach. The Sourcebook highlights three key actions: the importance of disaggregated statistics in data analysis; the need to look at the ways in which women and men interrelate in the community; and the incorporation of the results of these actions into project design and implementation. This Sourcebook is to be further developed to be useful at policy, planning and international levels.



Although there is some progress being made in the recognition and involvement of women in water supply and sanitation, much remains to be achieved. The fact that the gender dimension is more frequently advocated does not necessarily mean that gender policies are being implemented. The Collaborative Council reported that in a survey of more than 100 projects, despite the advocacy for women's involvement in project documents, only 17 per cent of the projects scored highly on actual participation by women.

A study of sanitarians in Nigeria shows that even where women have the necessary qualifications it does not guarantee equal involvement. This study reveals that although the first women sanitarians graduated in Nigeria in 1974, in most states women still form a small proportion of the total number of sanitarians (Emeharole, 1991).

The need for greater attention to be given to programmes and projects on women, environment and sustainable development was emphasized at the Interregional Workshop on the Role of Women in Environmentally Sound and Sustainable Development, organized by the United Nations in Beijing in September 1992 as a follow-up to UNCED. The workshop focused on the development of project proposals involving women on issues highlighted in UNCED. It was

Table 7.1

Ratios of women sanitarians to male sanitarians and female sanitarians to population by State in Nigeria, 1990.

State*	1988 projected population	Total no. of male sanitarians	Total no. of women sanitarians	Ratio of women sanitarians to male sanitarians	Ratio of women sanitarians to population
Abuja	196 820	20	4	1:5	1:49 000
Akwa	—	—	—	—	—
Ibom	3 604 330	95	24	1:4	1:150 000
Anambra	6 595 710	264	116	1:2	—
Bauchi	—	—	—	—	—
Bendel	4 513 060	235	20	1:12	1:22 000
Benue	—	—	—	—	—
Borno	5 497 000	61	49	1:1	1:112 000
Cross-River	2 774 030	163	4	1:41	1:693 000
Gongola	—	—	—	—	—
Imo	6 735 090	290	30	1:10	1:224 000
Kaduna	3 488 171	93	5	1:19	1:697 000
Kano	10 590 235	153	7	1:22	1:1 512 000
Katsina	4 027 539	97	7	1:14	1:575 000
Kwara	3 144 100	169	39	1:4	1:80 000
Lagos	—	—	—	—	—
Niger	—	—	—	—	—
Ogun	2 844 295	165	15	1:11	1:189 000
Ondo	—	—	—	—	—
Oyo	5 353 393	509	81	1:6	1:66 000
Plateau	3 716 570	156	33	1:5	1:112 000
Rivers	3 154 105	236	64	1:4	1:49 000
Solkoto	—	—	—	—	—

* Dashes indicate States that did not respond to the questionnaire on the number of women sanitarians in their State.

generally recognized that women in developing countries lack the required skills and experience in preparing technical cooperation programmes and that this needs to be remedied if women are to participate fully.

The principle of increasing women's involvement at all levels has been strongly advocated in statements and recommendations from major international conferences. In this respect the outcome of the *United Nations Conference on Environment and Development* (UNCED) was particularly significant. This Conference not only recognized the importance of women in its statement of principles, but also endorsed activities promoting the participation of women in its programme of action – *Agenda 21*. Evidence of the greater emphasis on women has already been apparent in the discussions in the specific fora emanating from UNCED, namely the *Commission for Sustainable Development and the International Negotiating Committee for a Convention on Desertification*.

The chapter in *Agenda 21* devoted to women, 'Global Action for Women Towards Sustainable Development', sets out objectives for governments together with recommendations for action and implementation. In addition to urging governments to ratify, implement and strengthen existing internationally agreed instruments relating to women, *Agenda 21* recommends that governments increase the number of women involved as decision makers, and scientific and technical advisers. The need to improve women's accessibility and equity in relation to education, health care, employment, and finance and credit is also advocated. With regard to research, it is recommended that countries develop gender-sensitive databases, information systems and participatory action-oriented research and policy analyses in areas of environment and development particularly relevant to women. Specific areas include the impact of environmental degradation on women, the value of unpaid work, and the development of environmental, social and gender impact analyses in programmes and policies.

It is essential that in the monitoring of the UNCED follow-up there is a focus on these and other recommendations related to women to ensure that they are implemented. This is particularly important in relation to the preparations for the forthcoming *World Conference on Women* in Beijing, China in 1995. It sometimes happens that in times of economic stringency or other difficulties, gender issues and the specific requirements of women become marginalized. This is usually on account of ignorance and lack of awareness on the part of those involved in policy- and decision-making. It is hoped that this publication has informed and provided enlightenment on the valuable and crucial contribution of women in the humid tropics, especially in relation to the sustainable development and management of water resources.



'There is a pressing need to continue to centralize women's issues and to ensure the incorporation of their collective perspectives, experiences and contributions to sustainable development. The implementation of the programme areas of Agenda 21 which extensively incorporates the important role of women in sustainable development will help to meet this need.'

(Maurice Strong, Secretary-General of UNCED)

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