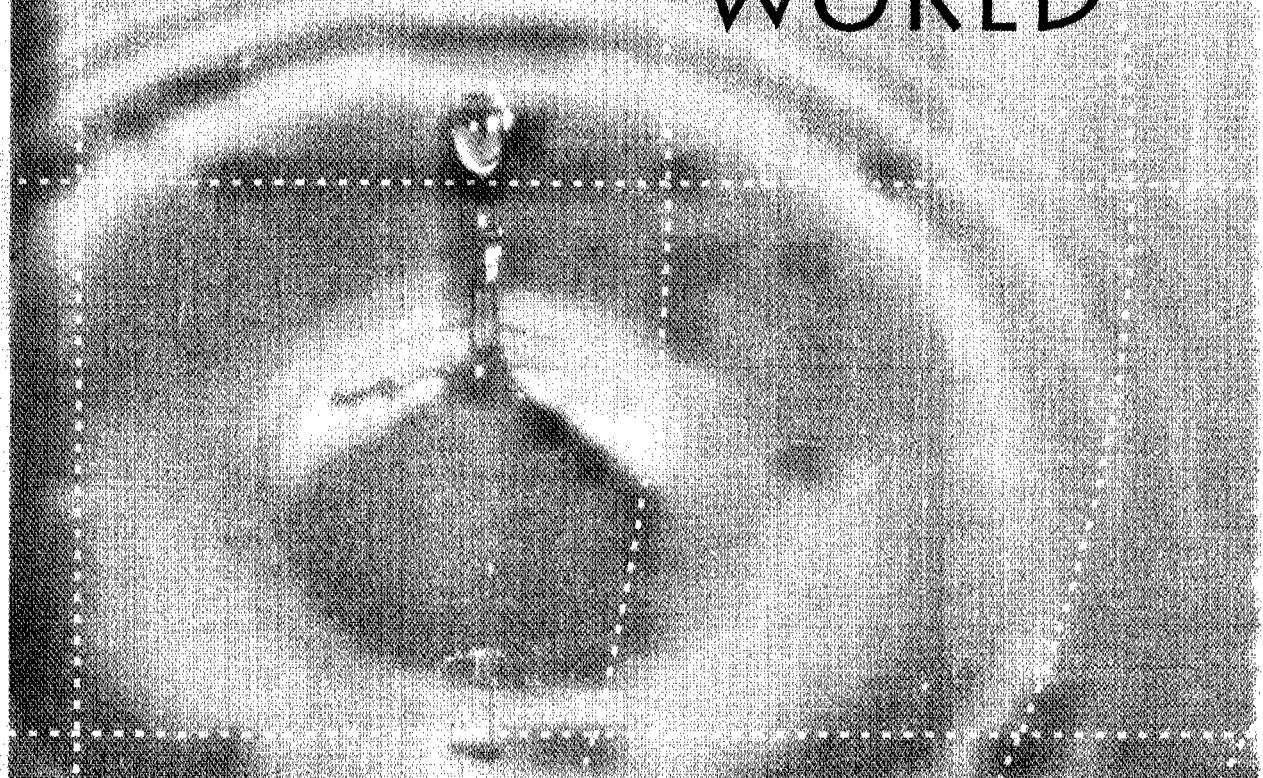
COMPREHENSIVE ASSESSMENT OF THE FRESHWATER RESOURCES OF THE WORLD



FRESHWATER AND GENDER, A POLICY ASSESSMENT

ANNA BRISMAR

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COMPREHENSIVE ASSESSMENT OF THE FRESHWATER RESOURCES OF THE WORLD

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FOREWORD

A rapidly growing demand on freshwater resources, resulting in increased water stress in several parts of the world, increasing pollution of freshwater resources and degraded ecosystems, made the UN Commission for Sustainable Development in 1994 call for a Comprehensive Assessment of the Freshwater Resources of the World. The final report (E/CN.17/1997/9), prepared by a Steering Committee consisting of representatives for UN/DPCSD, FAO, UNEP, WMO, UNESCO, WHO, UNDP, UNIDO, the World Bank, and Stockholm Environment Institute, is presented to the CSD 1997 and to the UN General Assembly Special Session June 1997.

Within the process of the Assessment a number of background documents and commissioned papers were prepared by experts with various professional background. The document *Freshwater and Gender, A Policy Assessment* is one of these. As a scientifically based document, any opinion expressed is that of the author(s) and does not necessarily reflect the opinion of the Steering Committee.

Stockholm, June 1997

Gunilla Björklund
Executive secretary
Comprehensive Freshwater Assessment

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EXECUTIVE SUMMARY

The main aim of the report is to identify and inform on the intricate interactions between human beings and freshwater, in the developing world. The discussion builds on a comparative analysis of the traditional gender roles of men and women, and their consequences in terms of responsibilities, activities and opportunities. The author illuminates the need for - and numerous benefits of - adopting a gender approach to freshwater issues, particularly those addressing the developing world.

This conclusion is based upon numerous reports assessing the prevailing conditions of the developing countries: a world where the majority of the populations inhabit areas characterised by significant natural and human-made freshwater constraints, in combination with widespread gender inequalities. Additionally, as the populations grow, the pressure on freshwater resources intensifies, thus further constraining the availability of freshwater per capita, accelerating the process of land and freshwater degradation, and undermining potentials for food and freshwater security.

The adoption of a gender approach to freshwater issues, addressed to regions characterised by aridity and gender inequality, can reverse the trend of resource degradation and enable an optimal use of the limited freshwater resources. Largely, it implies that policies, programmes and projects related to utilisation, management and/or development of freshwater resources are characterised by an understanding of and consideration to the traditional gender-specific roles of men and women, and their subsequent needs, interests and opportunities, in particular with regards to freshwater.

As products of their religious, cultural and social environment, women and men are attributed gender-specific roles and responsibilities, which direct and shape their everyday life, for example their needs and means of collecting, utilising and managing freshwater. However, prevailing sexually discriminating attitudes, customs and laws within the society further dictate the lives of men and women, by encouraging inequalities of status, power and opportunities between the genders.

Due to their inferior position within the household and society, women face limited access to societal resources and services, and thereby limited power to improve, for example the availability and quality of freshwater, and thus their families' living conditions. For the same reason, women are often the primary victims of natural disasters, such as floods and droughts, and their potential consequences: crop failure, famine and freshwater-related diseases. Yet, although the primary and direct effects of freshwater scarcity and/or pollution in general to a greater degree are suffered by women and children, men may also become afflicted, at least in the long run. In general, the personal impact is fundamentally determined by the individual's interests and needs, and means of finding alternatives and/or remedies.

Similarly, the activities of men and women may both be responsible for pollution of freshwater sources. Yet, women's power to minimise the impacts of their own and other people's activities is often minimal. In the same way, women in general have few opportunities, if any, to participate and contribute to improving and developing sustainable policies for freshwater utilisation and management, communally and regionally.

In conclusion, to achieve and secure an optimal use of the limited freshwater resources - through a full use and exchange of ideas, knowledge and resources - gender equality in all social dimensions is fundamentally required. In most, if not all, societies, achieving gender equality implies empowering the women, chiefly by increasing their status, skills, assets, opportunities and powers. Yet, such changes can only be attained by a joint female-male effort to modify the societal attitudes and

perceptions on women's actual abilities and importance - attitudes which are deeply rooted in cultural beliefs and encouraged through customary practice. New behavioural practices in the public sphere are also needed, in the form of increased involvement and participation of women in policy- and decision-making, as well as securing non-discriminating systems of legal and unwritten laws and regulations, institutions and economic structures.

At present, socio-economic and political changes are taking place, locally and globally, to enhance women's opportunities to participate, on equal terms and to an equal extent, in societal activities. Mainly attributed to increased access to education, bank credits, work opportunities within the informal sector, and to the success of women's groups, networks and movements, women are gaining increased status and power within the society.

However, altering gender-discriminating norms and customs is not done instantly, nor without objections or conflicts. As part of this process, the author calls for an assessment and gender sensitisation of present freshwater policies, programmes and projects, locally and regionally. The author also presents general requirements to attain gender equality and awareness, not only for the benefits of the women, but for the society as a whole.

ABSTRACT

Despite unfavourable hydroclimatic conditions, combined with a diminishing area of arable land, and inadequate technological and financial resources, the populations of the developing world continue to grow. As a consequence, the pressure on limited freshwater resources increases, to meet the escalating demands of households, municipalities and industry.

Meanwhile, in the developing world, widespread inequalities exist between women and men regarding their respective opportunities to influence and participate in activities within their society and to benefit from its resources. Due to their traditional gender roles, women are constrained - in time and energy - by the responsibility for meeting their families' basic need for freshwater, food, sanitation etc. Their low status and power, attributed to sexually discriminating laws, customs and attitudes in the society, further confine women's abilities to influence and improve their living conditions, including the availability and quality of freshwater. Women also face limited opportunities for education and work which undermine their chances of enhancing their personal quality of life.

In order to suppress further deterioration of the present natural resource base and to relieve human poverty and suffering, the competence and expertise within each society need to be optimally utilised. This requires the right for both men and women to participate - on equal terms and to an equal extent - in societal activities. In addition, it demands the acknowledgement of the assets of both men and women, and consideration of their unique interests and needs. In this way, not only is the life quality of women and their families improved, but also the prospects of sustainable freshwater utilisation and management.

However, despite a growing gender awareness worldwide, the process of attaining gender equality within all areas of societal life is only in its infancy. As part of this process, the author calls for an evaluation of the gender awareness of current freshwater policies, programmes and projects, whether local or regional. An extensive assessment of prevalent national and international policies, laws and practices, and societal attitudes is also proposed, with the aim of achieving a sustainable interaction between men, women and freshwater.

1 INTRODUCTION

1.1 Linkages between freshwater and gender issues

Life on Earth is completely dependent upon the presence of freshwater, in sufficient quantity and quality. However, in any region and at any one time, freshwater is limited in availability, and in usability and accessibility to man. These constraints are generally the results of a combination of human-made and natural conditions. The most severe constraints are found in regions characterised by a high evaporative demand, low and erratic rainfalls, poorly infiltrable soils, a high population density and inadequate financial and technological resources.

Freshwater is needed by human beings for a wide range of activities. These water-dependent activities can be defined as competitors of the limited freshwater resources; in addition, these user sectors have been identified as gender-specific. The reason for this is that men and women have been ascribed more or less implicit gender-based roles, the character and degree chiefly depending upon the particular socio-cultural and religious environment of which they are a part.

Due to their gender-specific roles, the lives of men and women differ in terms of responsibilities and activities, including those related to freshwater. Consequently, the needs and demands of men and women on the availability and quality of freshwater are different, as are their priorities regarding its use. Such differences in gender-specific needs and interests may cause water competition between female- and male-dominated activities (Figure 1.1).

Efficient freshwater utilisation and management are not only promoted by gender awareness, but also require gender equitable involvement in decision-making and equitable sharing of power and resources, which will require concrete social, cultural, economic, political and legal changes.

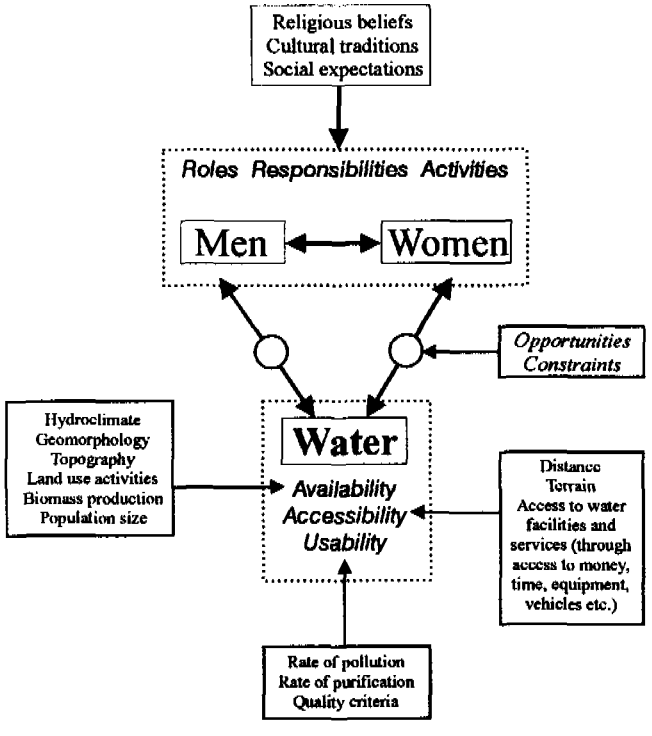

Figure 1.1 Men, women and freshwater in interaction

1.2 Past and present approaches to gender issues

There has been a great deal of variation in the amount and type of attention given to gender in water resources management, both in theory and practice (OECD/DAC, 1994). The first international attempt to integrate the aspect of gender into policies and programmes of natural resources management was made at the beginning of the 1970s. This approach, later to be referred to as *women in development* (WID), would prevail into the 1980s and be used by organisations such as the United Nations (Deshingkar, 1995; WRI, 1994). The main feature of such programmes was as a focus on women as a *separate* and *isolated* target group (Deshingkar, 1995). They also stressed the existence of gender roles, responsibilities and a division of labour, and argued that the latter made women particularly vulnerable to development policies and interventions (Joekes *et al*, 1996). Subsequently, WID identified and encouraged a need for a gender sensitivity in development (Joekes *et al.*, 1996).

However, although the WID approach was remarkably successful in changing donor policies and practices in many sectors (Joekes *et al.*, 1996), WID projects were rarely successful. The reason for this was their failure to integrate the issues of women into the full length of the programme. Instead, a section of women's issues was simply added onto the end of the programme - "like an afterthought" (Deshingkar, 1995).

Following in the footsteps of WID, the framework of *women and development* (WAD) tried to adopt a more holistic approach than the former. However, it was soon abandoned as it "failed to get to the root of the problem by not analysing the causes for the differences in the way men and women participate in the development process" (Deshingkar, 1995).

The gender approach which is presently dominating water projects, policies and programmes in the field of water resources development, management and utilisation, can be seen as a mixture of past approaches to freshwater and gender. However, its main features originate from the concept of *gender and development* (GAD), which at present, is believed to be the most appropriate framework for formulating policy and interventions (Deshingkar, 1995)[1] (see Box 1.1, below). Yet, similar to the mainstream of present gender approaches, in practice, GAD has not been sufficiently convincing and forceful in addressing and acquiring its aims.

Box 1.1 Gender and Development (GAD)

GAD is based upon a belief in gender discrimination "at all levels and in all forms of social organisation, ranging from property rights to legal processes, political representation, and education and employment" (Joekes *et al.*, 1996).

The household is seen as the basic unit of social organisation, characterised by both co-operation and conflict (Joekes *et al.*, 1996). Within this unit, men and women interact as distinctive social identities, with complex and diverse roles emanating in different responsibilities, use of resources and expectations (Joekes *et al.*, 1996; WRI, 1994). Men and women are also seen to interact with the environment in gender-specific ways, determined by their economical, social and cultural opportunities of control and ownership of resources.

In order to give women equality with the men, GAD proposes an increased understanding of the socio-culturally determined relationships between men and women, as well as a "fundamental re-examination of current social and political institutions". Moreover, GAD declares that development projects are only to succeed if relevant understanding of differences in opportunities, labour input and rewards is fully integrated into the project, programme or policy of concern (WRI, 1994).

[1] For further reading, see Rathberger, Ewa M. 1989. *WID, WAD, GAD: Trends in Research and Practice*. International Development Research Centre, Ottawa, Canada, p. 6.

1. 3 Weaknesses in current freshwater policies

Despite almost universal acceptance among scientists and practitioners of the *need to* integrate gender analyses into freshwater policies (SIDA, 1994b), current programmes on water resources management and development still reveal a lack of *understanding* among project leaders, planners and decision-makers, of the roles and responsibilities of men and women (OECD/DAC, 1994). The connection between gender roles, on the one hand, and men's and women's respective water utilisation patterns and overall opportunities, on the other, also remains to be fully acknowledged (Figure 1.2).

The failure to consider the gender dimension of freshwater issues is found at all levels of water resources management, i.e. from local to overall policy level. Particularly, development programmes designed for river basin, irrigation and wetland management display a lack of recognition of gender roles and realities (Hannon-Andersson, 1993a). Generally, gender approaches to water management tend to over-emphasise the domestic roles of women (OECD/DAC, 1994), namely their roles as carriers and managers of freshwater for use in household activities, such as cleaning, washing, and processing of food etc. The *economically* productive roles of women are largely under-estimated, which may have extensive negative consequences on their opportunities to contribute to and benefit from water projects, as these are increasingly valued in economical terms.

Moreover, attention to the gender aspect still tends to be given as an 'add-on' or 'after-thought', instead of as an integral part of the whole water programme or project (OECD/DAC, 1994). However, it must be stressed that there is considerable diversity of gender influence and consideration in different water sectors; some sectors have come further in the progress of integrating gender approaches in water resources management and development, particularly the water supply and sanitation sector, whereas in other areas, for example, hydropower and wetlands, there is still a lack of gender analysis and sensitisation (SIDA, 1994b).

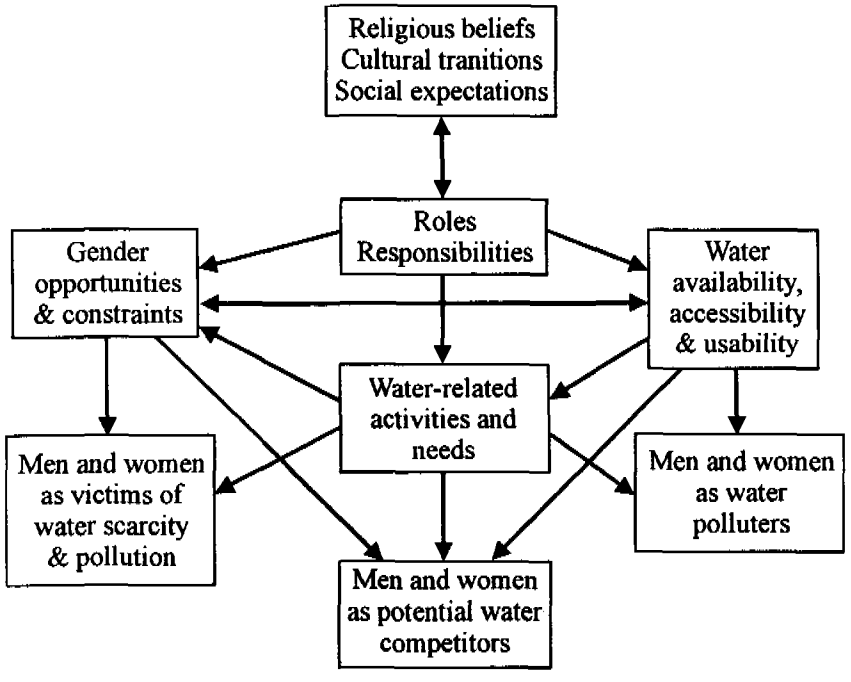

Figure 1.2 Linkages between gender- and water-related issues

In summary, inadequate consideration to gender inequalities are given by too many water policies, programmes and projects, *in spite of* obvious gender disparities at women's expense in most societies of the world, particularly in developing countries.

2 A GENDER APPROACH TO FRESHWATER ISSUES

2.1 Defining a 'gender issue'

A 'gender issue' is any issue that is analysed through a male *and* female perspective. Consequently, 'gender' is not just a women's concern, but a concern for both genders (Thomas-Slayter and Rocheleau, 1995). Issues related to gender commonly focus on the prevailing *differences* between the two genders, although existing *similarities* deserve equal attention.

Thomas-Slayter and Rocheleau (1995) define 'gender' as "a social construct through which all human beings organise their work, rights, responsibilities and relationships".

2.2 What does a gender approach imply?

In theory, a gender approach acknowledges the assets and opportunities of both men and women. Also, it encourages the involvement of both genders in societal activities, from decision-making to evaluation. In practice, a gender approach implies that all decisions regarding the design, localisation, management, use, development and assessment of freshwater resources are based upon a recognition of the differences between men and women, with respect to their needs, interests, opportunities and powers.

For example, water management and/or utilisation policies that are based upon gender equality promote equal rights for men and women to access, use, manage, own and control available water supplies. Similarly, in the context of water resources development, a gender-aware water project advocates equal opportunities for men and women to participate at all stages of the project cycle, as well as equal possibilities for making their respective needs and interests heard.

In any developmental process, not only men but women too should be utilised as 'resources' and 'active participants', and not simply viewed as passive recipients of change, or as an inherently vulnerable group, categorised alongside children, the handicapped and minorities (OECD/DAC, 1994).

2.3 What are the benefits of a gender approach?

The adoption of a gender approach, to issues related to the development, utilisation and management of freshwater resources, is accompanied by numerous benefits. In fact, in areas where men's and women's status and societal opportunities notably differ, and where a large proportion of the population suffer from insufficient access to freshwater, the need to adopt a gender approach to freshwater related policies, programmes and projects is crucial for effectivizing the use of and ensuring equitable sharing of the limited freshwater. Moreover, by building decisions on analyses of potential gender effects, and by acknowledging the interests of each gender, gender-related freshwater conflicts are more easily avoided.

Ultimately, a gender approach is the key to sustainable utilisation and management of freshwater, or as OECD/DAC (1994) states: "...[a] sustainable development cannot be achieved without involvement of both women and men".

A more successful freshwater project

A freshwater project that is based upon an understanding of gender roles and realities is more likely to achieve its specific objectives of functioning and usefulness (van Wijk-Sijbesma, 1985). Gender awareness should be found at all stages of the project cycle, i.e. from planning, design, implementation and management, to evaluation and monitoring, in order to ensure that the project "[does] not discriminate against any user groups" (SIDA, 1994). When there is no discrimination against any user group, project benefits are maximised.

For water projects aimed to improve the supply of domestic water, the women generally constitute the primary target group. Their particular needs and opinions, regarding the design and location of water points and adjacent facilities (e.g. for laundry and bathing) must be given particular attention, to guarantee optimal privacy and ease of operation and maintenance (van Wijk-Sijbesma, 1985).

Fundamentally, as the individual gender-specific experiences, know-how and skills of both men and women are mobilised and utilised, chances for a successful water project are enhanced. Whereas the men of the developing world generally have greater access to time, technology and skills of engineering in relation to the women, the latter often have a greater understanding for the natural variations in water availability, accessibility and quality, acquired through a life-time of experiences as primary carriers and managers of the domestic water sources. However, to encourage "the interest and willingness of the men to contribute to improve water supplies and installation of latrines" is also a crucial element of a successful water project (van Wijk-Sijbesma, 1985).

Lastly, because "a gender approach...facilitates an understanding of the causes of the subordinate and vulnerable position of women, and the difficulties they face in carrying out their economic and social roles" (OECD/DAC, 1994) (for example their ability to pay for and profit from water facilities and services) a water project that considers the constraints of women may better meet the needs of the target group.

Increased quality of the lives of women

Because women by tradition are the primary suppliers and managers of water for the household, and generally the most non-privileged group of the society, considering the specific needs, interests and abilities of women may immediately improve their life-situation.

For example, through consultation with the women as the main target group, the localisation of a new well can be chosen so as to better optimise its accessibility to the women as water collectors. Hereby, the amount of time and energy spent by women daily on collecting water may be further reduced. Gains in time and energy can subsequently be spent on more productive activities, such as household hygiene improvements, food production and processing, community development, and educational and income generating activities (van Wijk-Sijbesma, 1985; Curtis, 1986; Green and Baden, 1994). Similarly, the installation of a better pump device by the well can contribute to reducing the physical work load of the women, as well as the risk for back problems, general injuries, distortion of the pelvis and psychological stress. Van Wijk-Sijbesma (1985) asserts:

"Water collection is not only energy consuming, but may also have detrimental physical consequences. Carrying heavy water pots, for instance, is mentioned as a primary cause of pelvic distortion, which in turn may lead to death in child-birth."— "The risk is high of falling on slippery paths and steep slopes, while carrying food, water, and a baby."

Additionally, as contributors and participants of water projects, women will also be favoured in terms of strengthened self-reliance. In the longer term, benefits gained from the involvement of women in water projects may result in a positive upward spiral as women acquire more skills and income (by, for example, selling and manufacturing the pumps themselves) to improve their water situation further, for example through joint problem solving (Green and Baden, 1994; van Wijk-Sijbesma, 1985). Moreover, through access to independent sources of income and the ability to self-service the pumps, women's independence and status within the community are enhanced (Green and Baden, 1994).

An extended consultation with the women as user groups may also have indirect benefits; by improving the domestic water supply, and by liberating time for food production and processing, the general health and nutritional status of the children increase. Following upon this, women's work burden is further reduced.

A particular gender-aware project does not necessarily favour all women and households equally with regard to their economy, health and work burden. This is because each woman has an individual pattern of water management and utilisation that depends mainly on her age and position within the household, her socio-economic status, the water consumption pattern within the household, and prevailing environmental conditions (van Wijk-Sijbesma, 1985).

Improvements in the health and sanitation of the entire household

Most, if not all, additional benefits gained through the involvement of men and women in freshwater projects as well as in the formulations of policy and programmes will in the longer term come to favour the household as a whole. Men and women will serve as complementary agents of change: typically, men as the primary owners of time, skills and technology, and women as the primary driving agents and experienced managers, suppliers and users of the domestic water sources. In the future, however, women will hopefully be able to take a more prominent role as sources of skills, money and technology.

A gender-equitable involvement in freshwater projects, in particular supply and sanitation projects, is the most effective strategy for enhancing the overall health and sanitary level of the household. Following upon an increased accessibility and availability of domestic water, energy gains may be used by the women for child care, foetal development and breast feeding (van Wijk-Sijbesma, 1985). Likewise, time gains, for example, acquired through the installation of additional water points, or by making water transportation easier, can allow "more children [girls in particular] to attend school because their labour is required less at home" (Curtis, 1986).

When women are involved in the development of communal water supply and sanitation projects, the risk of diarrhoeal infections and worm infestations among children drops. This is due to the fact that "mothers are the most effective health workers through their practices of child care, education, maintenance of a hygienic environment and first-aid..."(van Wijk-Sijbesma, 1985).

Increased efficiency of communal and regional water resources management
Communal management of the public water supplies is favoured by an equal involvement of men and women in the planning, design, operation and maintenance of public water facilities, such as standposts, wells and water pipe-networks. According to SIDA (1994):

"...community management by men alone does not work equitably; and management by women alone can result in women doing the work but having very little real control, or a marginalisation of the issues. A true gender perspective which focuses on involving both men and women in an equitable manner is the most appropriate and effective approach."

SIDA (1994) also notifies that many current weaknesses in the sectoral approach to water service provision and local water management, due to inconsistencies between sectoral approaches and local needs, may be understood when considering differences between the genders:

"Understanding of gender issues in water use and management can inform those involved with sectoral and river basin planning about water users, their needs and the pressures they face locally. Gender awareness can thus be an important element in river basin planning and national water management strategies, to ensure services are designed for users and do not discriminate against any user groups."

3 GENDER ROLES AND RESPONSIBILITIES

3.1 The evolution of gender roles

The roles of men and women are not fixed, but in constant change, due to a dynamic interaction between men and women. The original idea of gender-based responsibilities was most likely to effectivize and ease the work load of each gender, and to make them more or less complementary. As environmental circumstances change over time, men and women continuously renegotiate their roles. Nevertheless, at any one time these will show signs of overlap (Thomas-Slayter and Rocheleau, 1995). Moreover, the roles of men and women are surprisingly universal, especially those displayed in rural communities. However, when comparing urban areas of developing versus developed countries, they may differ markedly.

Ultimately, the gender-defined features of the lives of women and men are by and large reflections of a society's historical, cultural, religious, socio-economic, legal, political and developmental conditions. The main difference between the gender situation of a developing compared to a developed country tends to be the way in which gender roles are *manifested*. Yet, the prevailing division of household tasks into male and female domains tends to be a more vital construct in the developing countries than in the developed.

3.2 Traditional gender roles and responsibilities in developing countries

The primary purpose of the presentation below is to serve as a simplified overview of the *traditional* gender roles and responsibilities of the developing countries. In reality, to make clear-cut distinctions between female and male roles and responsibilities is impossible, especially as the analysis is meant to concern the entire developing world. Furthermore, in some parts of the developing world, great changes are taking place, for example urbanisation, unemployment growth, and privatisation of land, and political, economic and socio-cultural changes attributed mainly to NGOs' and

women's movements. Such processes are seen to alter the traditional roles of men and women. As a consequence, the gender roles and responsibilities described in the text below should, more or less, be looked upon as *stereotypes*. Nevertheless, the main characteristics to be discussed still hold close correspondence to the *general* situation of the developing world.

Traditional female roles and responsibilities

The primary role of women in the developing world is to be the main domestic managers within the household. As a result, the women are faced with a wide range of different tasks or responsibilities which they are expected to carry out. One of these is to uphold the cleanliness and sanitation of the homestead (UNDP, 1995). This task not only relies upon a regular supply of water, but also on an adequate upkeep of the latrines and proper hygiene behaviour within the household. Women assist and educate the children in correct latrine use and the importance of hand-washing etc. (van Wijk-Sijbesma, 1985). Women also take care of refuse disposal and are usually responsible for cleaning the latrines.

Not only do women look after the hygiene of the children, but also their intake of food, nutrients and water. Their chances of education are primarily dependent on the total work load of the women. Children, particularly girls, are used as much as possible by their mothers and female relatives to help with various domestic duties. Not only the work load, but also the economic situation of women, limit the children's chances of an education. The mothers hold the major responsibility for buying clothes, school uniforms and school material, and sometimes even for paying the school fees. The well-being of the elder within the family is also normally looked after by the women.

Particularly in African developing countries, the woman is traditionally the major producer of food for household consumption, by contributing most of the labour required for cultivation of food crops on family holdings (Thomas-Slayter and Rocheleau, 1995). Some households have several parcels of land which are scattered at quite far distance (up to 30-45 minutes walk) from the homestead (Asamba and Thomas-Slayter, 1995). On these plots the women plant, hoe, weed, harvest, store and process the crops. The men, on the other hand, assist their women in the clearing of the land and turning of the soil (Rodda, 1994). Small-scale irrigation of the family farmland is also a woman's responsibility. The crop produce that is not to be used for home consumption is brought by the women to the local market, where it is sold often for a small penny.

Where and when it can be afforded, additional food stuffs that are not produced on the family farm are purchased, generally by the women. Collection of fuelwood for cooking and keeping the homestead warm is also primarily performed by the women, with the assistance of the children.

Often the most arduous of all women's tasks in rural, peri-urban and urban developing areas is the collection of water. This has to be done every day, and sometimes several times a day, if the water buckets or number of assisting women and children are small. As a result, women may spend between 3-5 hours a day carrying heavy water buckets and queuing by the water point. The collected water is to be used for various household purposes, namely drinking, cooking, washing of vegetables (etc.), personal cleaning, cleaning of the household, and sometimes washing of clothes

and other items. Watering the cattle and small-scale irrigation of the garden or farmland also require a steady supply of water.

"In many [developing] societies, women are involved in animal care, and also keep a few animals themselves to market and to supplement the family diet" (Wijk-Sijbesma, 1985).

In order to be able to serve the household with adequate food, household utensils, medicine and hygiene products, and the children with proper clothes and school materials, etc., women are engaged in income-generating activities. These include selling of garden produce, processed and prepared food, fish catch, and self-made handicraft items. Generally, women in wealthier households spend more time on economic activities and working for farmers, than those in poor households (Wijk-Sijbesma, 1985).

Generally, the proportion of women that participate in agricultural and service-oriented activities (as opposed to industry) is greater than the corresponding figure for men. This is particularly true in Africa and Latin America, where more women than men are involved in agriculture and service-oriented activities, respectively. African women predominantly operate on small- and medium-size holdings for the production of cash crops, but increasingly become involved in the management of smallholdings (Thomas-Slayter and Rocheleau, 1995). Yet, there are large differences between the three continents: Asian women participate to a much greater extent in industry than do African and Latin American women (UNDP, 1995).

Typically, many of the women's tasks are performed simultaneously, such as looking after the children while fetching water or grinding food grains - or washing clothes while cooking food. According to a study of rural women in Saint Lucia, more than three-quarters of household activities involved multiple tasks (UNDP, 1995). The numerous responsibilities of women imply a work burden that is time consuming, energy intensive, and even uniform. In the absence of alternatives, the same tasks have to be carried out every day, in order to secure the daily ransom of food and water.

In conclusion, the responsibilities of women are adjusted not only to their social, cultural and religious environment, but also to the particular needs of their families and the prevailing hydroclimatic conditions and economic opportunities etc.

Traditional male roles and responsibilities

Traditionally, in the developing countries, one of the primary responsibilities of the men is to defend the family against threats and danger, if they are not personally out at war. Religious observance, social and political engagement, and livestock husbandry are also traditional male activities (Curtis, 1986), as are hunting and fishing. Today, livestock husbandry is still largely performed by men, except for the husbandry of sheep and goats, which do not hold the same economic value on the market.

Income generation for family use has become one of the primary responsibilities of the men, making the man the main provider of income for the family. This is particularly evident in rural families where the men cannot find any work in the area, but are forced to migrate to the towns for work, and "[leave] behind a female headed household where all the tasks are carried out by women and children, unless remittances pay for some hired labour" (Curtis, 1986).

In rural areas, men who do find work often become employed in local petty trading, in construction works (e.g. building terraces) (Asamba and Thomas-Slayter, 1995), in

large-scale livestock breeding or as casual labourers on 'cash crop-plantations' (Curtis, 1986). Where mining industries or hydropower stations are closely located, these also attract male workers. Still other men, whose land-holdings are sufficiently large and productive, have no regular employment outside the farm, but can concentrate their efforts on coffee cultivation. Coffee production, however, is not strictly a male activity, but both male and female labourers may become engaged in manuring, pruning, picking and transporting of the coffee beans to the factory.

In contrast to women, men are rarely involved in *non*-cash farming, i.e. farming for home consumption, nor in soil conservation practices (Asamba and Thomas-Slayter, 1995). According to the Human Development Report (UNDP, 1995), men normally do not spend more than a quarter of their work time in unpaid activities. Yet, there are large variations to be found. In Venezuela, for example, only 13 per cent of the men's working time is devoted to non-waged activities, whereas in the Republic of Korea, it is estimated to be 44 per cent.

As the main provider of income for the family, the man is expected to pay the bills, for example the rent, electricity bills, toilet charges and sometimes also the school fees. Investments in the maintenance of the farm, including housing, agricultural tools and other facilities are also dependent upon the financial support of the man. However, as the authoritative decision-maker of the family, he not only controls his own income, but also the money earned by his wife. In addition, male members of a family make the key decisions regarding what crops to be cultivated, what land preparation procedures to be practised, the time of the harvest, how much of the produce to be sold at the market, and how to spend the earnings (Oduor-Noah and Thomas-Slayter, 1995). In other words, the male members have the major control over the key decisions undertaken within the household.

Men are often engaged in social and political activities, such as members of the village council and other decision-making bodies. The social engagement of men may vary widely, but in many African countries they often have the main responsibility of maintaining good relations with politically and socially important community and village members.

As a summary, Table 3.1 illustrates how the work load within the household is divided between the genders. Despite the fact that the data collection was carried out in the mid 1970s for African societies, it still demonstrates the reality of the majority of household in the developing countries, i.e. that the greatest share of domestic and agricultural work is performed by women.

Table 3. 1 Gender division of labour in Africa in the mid 1970s

Domestic and agricultural activities	Women's share %	Men's share %
Domestic work	95	5
Processing and storing crops	85	15
Weeding	70	30
Harvesting	60	40
Caring for livestock	50	50
Planting	50	50
Ploughing	30	70

Source: Olson and Seager, 1986; Rodda, 1994 (original source: UN Economic Commission for Africa). See also WRI (1994), p. 46.

4 FRESHWATER-RELATED ACTIVITIES OF MEN AND WOMEN[2]

4.1 Gender in freshwater collection and utilisation

In the developing world, men's and women's freshwater utilisation and collection patterns differ. Partly, this is a result of the prevailing gender division of labour within the household and partly of the general expectations on and opportunities of each gender in society. As a consequence, men and women not only use water for different purposes, but often collect water from different sources[3] and with different means. The time and energy spent by each gender on *collecting* water thus generally differ markedly (SIDA, 1994).

In real life, the distinction between female and male water utilisation and collection patterns is rarely clear-cut. A discussion on gender-specific water-related activities is therefore better conferred in terms of male- and female-*dominated* activities. In those terms, a more realistic analysis can be made. Nonetheless, certain water-dependent activities, at a particular place in time, may be attributed *exclusively* to women or to men, particularly in the developing countries.

The main purpose of the forthcoming discussion is to illuminate typical differences in the *purposes* and *means* by which men and women tend to collect and use freshwater in the developing countries.

Women's water needs and means of collection

Water utilisation patterns

In the developing countries, women are by tradition the main users of water for the household economy (van Wijk-Sijbesma, 1985). Women need water for a wide variety of domestic purposes, including agricultural activities, and even for handicraft activities carried out within the homestead. Brewing of beer for sale and brick moulding are also carried out by women, and may consume substantial quantities of water (Cleaver and Elson, 1993, in SIDA, 1993b).

Living as rural farmers in a developing country implies that most if not all activities on the farm are related to the agricultural season. Subsequently, not only the farming activities but also the pattern of water utilisation vary with the *hydroclimatic* season. For example, the use of water for soaking seeds before planting to improve germination is a *seasonal* activity. Perhaps a more unusual but yet seasonal activity is the preparation of food and drinking for hired labourers or neighbours working on family farms, which is performed by farming communities in Colombia and Bangladesh. In areas and times of water shortage, women's use of water is naturally restricted (van Wijk-Sijbesma, 1985).

Water collection patterns

As primary household managers, women are responsible for the collection of water for *domestic* water-dependent activities, independently of whom will be the actual *user* of

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[2]The discussion relates to the conditions of the *developing* world and, due to limitations in space, was unable to include a greater number of case studies, wherefore generalisations had to be made.

[3]Irrigation schemes, domestic activities, hydropower schemes and industries may in fact all be supplied with wsater from separate sources, since the water quality and availability criteria of each activity differ.

the collected water. The task of collecting domestic water is not necessarily distributed equally between all the women within the household. In polygamous households, the responsibility of water collection tends to be delegated to the *younger* women; in extended families, collecting water is primarily done by the *daughters-in-law* (van Wijk-Sijbsema, 1985).

Moreover, there are substantial differences between wealthy, intermediate and poor households, "which permeate all aspects of life and affect the type and amount of domestic work done by women, including water collection and amounts and purposes of water use." Most poor women have to spend between 30 minutes up to five hours a day on collecting water. In contrast, many wealthy women have their own private wells, which means that the same task is carried out in eight minutes, only (van Wijk-Sijbesma, 1985) (see Table 4.1 below).

Table 4. 1 Hours women spend drawing and carrying water, 1975-82

Region	Hours per week
Africa	
Botswana (rural areas)	5.5
Burkina Faso, Zimtenga region	4.4
Côte d'Ivoire (rural farmers)	4.4
Ghana (northern farms)	4.5
Mozanbique (villages)	
Dry season	15.3
Wet season	2.9
Senegal (farming village)	17.5
Asia	
India, Baroda region	7.0
Nepal (villages)	
Ages 5-9 years	1.5
Ages 10-14 years	4.9
Ages 15+ years	4.7
Pakistan (village survey)	3.5

Source: United Nations. 1991. *World's Women, 1970-90, Trends and Statistics*, p. 75, in UNDP, 1995.

Among poorer households, the daily collection pattern, for example the distance travelled on each trip, can vary significantly, depending on the locations of the nearest water sources. Also, the great natural variability in ground water levels (by day and season) makes it difficult to predict the number of water collection trips needed during the day. At times of low water levels, some women may be forced to fetch water up to four or five times a day (Green and Baden, 1994).

Women do not always consider the risks of collecting river water at a certain time of the day, nor at a place downstream from polluting riverine activities. Yet, some women choose to collect the drinking water in the *mornings*, before the upstream water polluting activities begin.

Selection of water sources

The selection of water sources is an intricate matter. Perhaps the most fundamental criterion given by the water collector is the qualitative *reliability* of the water, as judged by its clearness, colour, odour, taste and by its risk of daily contamination, for example by nearby latrines. The cleansing effect of continuously flowing or upcharging water has also been identified as an important selection criterion, in particular for drinking water (van Wijk-Sijbesma, 1985). Women thus select certain sources for

drinking water and other sources for washing, bathing and watering the cattle. According to van Wijk-Sijbesma (1985):

Generally, "women preserve the cleanest and freshest water (preferably from a spring) for drinking, personal washing, cooking, and washing drinking glasses, food, and flour grinding stones. Grey water is saved for washing and rinsing clothes and for watering plants. Water used for washing food is given to poultry and cattle, and water used for clothes washing is reused to clean floors and wash dishes".

Moreover, washing of clothes and cooking utensils is often done by women directly in flowing water, with no high demand on the water quality, if compared to drinking water. The task of washing is preferably carried out in a stream or river which has a steady flow of water, is located near to the homestead, and which gives good opportunities for social gathering with other women.

The *accessibility* of a water source is an important criterion for the selection of appropriate source(s) of water. The accessibility is largely determined by the *distance* to the source, the conditions of the *terrain* (availability of roads, pathways etc.), access to *transportation* means (car, bicycle, donkey etc.), and the *character* of the household's water source (indoor piping, well, standpost, stream etc.). As opposed to men, women often have poor access, if any, to vehicles and donkeys by which to ease and unload their work. The availability of time and energy is thus primarily considered, when selecting which water sources to use during the day.

The spiritual, aesthetic and cultural *acceptability* of a source may also be of importance. This acceptability can be based upon religious beliefs (e.g. fears of sorcery and poisoning), cultural traditions and/or social expectations. The selection of water sources can also be made on the basis of a wish to avoid conflicts with users of the same source. In some regions and cultures, the *price* of water is given highest priority, when buying water is an option (van Wijk-Sijbesma, 1985). Yet, for many women in the developing world, to purchase water from water vendors, or to pay for being connected to the local water network, are hardly options to consider. The legal position of the user may also play a part here.

In some villages, the women's choice of water sources for different purposes is very complex, for example in Ethiopia, Nigeria, India, Bangladesh, Thailand, Indonesia, Sri Lanka, Nepal and Mexico. According to van Wijk-Sijbesma (1985), the differentiation of source by use increases when women have a choice of several sources at competitive distances, as for example in communities in wet highlands. In others villages, women do not have specific water quality criteria for different uses, but instead use the nearest well for all purposes, including cattle watering. In these situations, the water quality is typically quite unhygienic.

A study of rural water quality in Tanzania (SIDA, 1979[4]) showed that choosing the appropriate water source with regard to its intended use may be crucial for avoiding unnecessary health hazards:

"Boreholes are clearly the best sources (from a bacteriological point of view). Rainwater collection systems and protected wells are the next best sources and treated water comes off as the fourth, mainly due to poor operation of treatment plants...Springs and piped impoundments are next in quality, while

[4]RWQP (1979). *Rural Water Quality Programme in Tanzania*. Brokonsult, SIDA. Sweden.

the lowest quality (and the most variable) piped sources are streams and rivers. The worst traditional sources are pits and open wells" (RWQP, 1979:2, in Drangert, 1993).

Also, water from roofs often contains coliforms from bird faeces; similarly, if mosquito gauze surrounds for inlet pipes are not maintained properly, storage barrels can support a variety of life, especially larvae of biting insects (White *et al.*, 1972).

Time and energy consumption

The time and energy spent by a woman on water collection depend on several factors: the rate of water use or consumption within the household; the current availability of water in the landscape; the distance to the water sources; the terrain to be traversed; the availability of facilitating transportation means; the number of people to assist in water carrying; and the queuing time at the source (Curtis, 1986). The Tanzanian woman, in the story in Box 4.1, must - on a day like the one described - spend about an hour fetching water, and her children several hours at this task. On a day when she does more house cleaning or washing of clothes, more water and thus more time are needed (White *et al.*, 1972). Regrettably, an increasing number of rural women have no other choice but to consume most of their daily energy intake on water collection.

Box 4. 1 Daily water chores for a mother and her children in rural Tanzania

"Consider a day in the life of a woman of Mkuu, a farming community on the vividly green slopes of Mt. Kilimanjaro in Tanzania. Just after sunrise she gets her four children out of bed. The two little girls she sends one kilometre up the mountain to a rural standpipe; they fill their small basins with water diverted from an upland stream and walk back, pans on their heads, down through the banana groves and gardens to the house, where the mother stores this water in a big wooden cask with a wooden lid. She has a larger 200-litre cask outside which collects water from her sheetmetal roof when it rains, but today it is dry. The stream running only 30 meters from the house she considers unsafe to use. While she is getting the morning meal ready her husband washes, and after they have eaten she washes the dishes. A bit later her husband and a visitor each take a bath, a process which uses about twice the amount of water she has used for the morning cooking and cleaning and empties the storage pot. The mother then takes a tin and goes off for more water, carrying the 18-kilogram load back from the standpipe on her head.

To start her noon cooking she drifts out water with an aluminium bowl she bought especially for this purpose, and realises that there will not be enough water for the afternoon, so she makes another trip. Her largest use comes at the evening meal, and in preparation she sends the children off after school to make two trips to the standpipe in order to fill the storage cask. Before they go they each get a drink, dipping the water out of the small clay pot where water is reserved for drinking only. She feels that this is clean and safe to drink without boiling."

Source: White *et al.*, 1972, p. 4-5

"Carrying a load uphill was found to be the most energy consuming task of a group of women studied in rural Guatemala." — "Women have been reported to carry as much as 18 to 25 kilograms weight of water on their heads or hips in a single journey."— "Carrying a weight of 3.5 kg is as energy consuming as the heaviest agricultural work done by women, although the total time spent in agricultural work tends to be longer" (van Wijk-Sijbesma, 1985).

The task of collecting water becomes most burdensome for single women, older women, poor women, and women within women-headed households, where no children or female relatives exist to help with the task and other household activities. In contrast, middle class women may be in a much better position. Thanks to the installations of private water facilities, or to servants employed to transport water and

to carry out other tedious water-related tasks, they do not need to fetch water themselves (van Wijk-Sijbesma, 1985).

For those households that lack indoor piping, the selection of a water source becomes a daily issue: shall the water be collected personally, bought from a porter, or shall a servant be employed for the particular task? (White *et al.*, 1972)

In contrast, "the housewife who can turn on a tap is freed from this concern. She still worries about unexpected interruptions in the services, distressing periods of low pressure, and how much water she can afford to use. If she has enough money for servants, she may complain that they provide her water free to all their friends, but in general providing water has little regulating effect upon her use of time, and a much larger supply goes into washing, cleaning, and, particularly, to lawn and garden watering in the higher-income sections of a city" (White *et al.*, 1972).

Just because urban settings in general means greater access to water points, in relation to rural settings, does not necessarily imply that less time and energy is spent on collecting water. In densely populated urban settings, a large number of water drawers sometimes have to share the same water source, with risk for the well to quickly run dry. Additionally, moving into a dusty or muddy urban environment, the work burden may in effect grow, as a result of the additional pressure imposed on the family members to stay well-dressed (especially the school children). Hence, more water must be put aside for washing of clothes (van Wijk-Sijbesma, 1985).

Men's water needs and means of transportation

Satisfying the domestic water needs

In the developing world, the fundamental needs of men and women are naturally the same, but not the responsibility for water collection, nor the particular water using activities. Due to the particular division of domestic labour, a majority of the men are liberated from the task of fetching water, for domestic and personal use. Instead, in rural areas of, for example, Tanzania and in Ghana, men bathe at home using water collected by their wives, whereas in cities, for example in Bombay, men use taps at railway stations, work places, shops and public hydrants (van Wijk-Sijbesma, 1985).

Because water collection is an activity particularly and traditionally reserved for women and children, "in many countries, for a man even to be seen collecting water would bring shame" (Curtis, 1986). "Since they are a rare breed, a man may feel embarrassed on entering the female scene if everyone knows that his wife is healthy at home. On top of that, other husbands might object to their women meeting this man at the water source". There are only few instances when men may be faced with the task of collecting *domestic* water, namely, when they are unmarried and live in a household absent of women; or when their wives are old, disabled or ill, and in need of their assistance (Drangert, 1993). An exception is Chinese men, who may collect water for household purposes (Schieber, 1996 *pers. comm.*). Distant or poorly reachable water sources are other 'culturally legitimate' reasons for men to (occasionally) assist their women in collecting the water (Asamba and Thomas-Slayter, 1995; van Wijk-Sijbesma, 1985).

From his study of Sukumaland, Tanzania, Drangert (1993) concluded that most of the male informants expressed a willingness to assist their wives. One male informant said: "As far as I understand it, a man may assist in fetching water if the mother or a small child is sick, or if the woman has too much to do." Yet, in the study it was rare

to find men who regularly fetched water for their wives; and when they did, they typically used a bicycle and went out very early in the morning (Drangert, 1993).

However, men do collect water for *business* purposes, for example small restaurants, bars, craftshops, and for selling as water vendors (Curtis, 1986). Water may also be collected for watering the cattle, for irrigation practices, and for handicraft activities (Cleaver and Elson, 1993, in SIDA, 1993b). Yet, in Africa, men would never collect water by foot, nor with the water containers on their heads or backs, as do women and children. Instead, the water is transported in jerry cans, on wheel barrows, animal carts, hand carts, bicycles, pick-up trucks, or other vehicles, depending on what can be afforded (van Wijk-Sijbesma, 1985; Curtis, 1986).

Men are to various degrees involved in *non-domestic* water-related activities. These may include irrigated agriculture, industry, shipping of cargo, and in some places hydropower generation. For such male-dominated water-related activities, the transportation of water is often facilitated by means of pipelines or channels. Hereby, men are relieved from the physical work of carrying water, as opposed to the great majority of women in the developing areas, who lack access even to the basic transportation means. In addition, these male-dominated activities often consume large amounts of water, particularly industries and large-scale agriculture, which is heavily dependent upon irrigation.

Some industrial processes, for example the production of paper and textiles, consume considerable quantities of water. Because as a rule, the industry is directed by male-dominated boards of decision-making, crucial decisions regarding the choice of technology and of industrial water consumption rates are based upon male-dominated perspectives and view points. The development of technology for industrial and municipal water utilisation is also generally led by a male dominated team. This is often chiefly the result of national educational programmes which do not equally encourage women to enrol in higher education in technology sciences, and of training programmes that do not facilitate female entries.

In developing countries, communal water agencies and committees are similarly dominated by male members. As such, men are indirectly involved in decision- and policy-making regarding the design, management and development of communal water infrastructure, and the transportation of public water within the community and drainage basin. Decisions are hereby primarily taken in order to benefit the *male*-dominated water sectors within the region, since these are the main users of water pipelines (for example industry) and channels and dams (for example large-scale agriculture).

Competition between gender-specific freshwater needs

When certain activities are dependent on or given user priority to the same water source, a potential situation of conflicts between male and female interests may arise. This is particularly true in areas where freshwater is already limiting men's and women's freshwater activities. Thus, in densely populated areas, during periods of drought, and/or when two gender-specific activities are dependent upon the same water source, the risk for gender-related water competition is high. Legal injustices and other circumstances, favouring one particular gender, may further aggravate the conflict.

Gender conflicts regarding control over and/or access to a water source can be triggered by changes in external environmental conditions (Joekes *et al.*, 1996). With the greatest opportunity and power to influence decision-making, typical male interests are frequently prioritised (Cleaver and Elson, 1993, in SIDA, 1993b).

In fact, in some communities, watering the cattle by the men is often given priority, while the urgent domestic water needs of the women have to wait. In Damot Gale, Wolayta, Ethiopia, a water source, used both for watering of cattle and the drawing of drinking water, was found to be a site of gender conflict, as well as a potential one for disease transmission:

"The issue of cattle watering was raised at a general community meeting. The existing well had no cattle trough, so every day there was a fight between women trying to collect water from the handpump, and men trying to water their cattle, also using the handpump. The surrounding area soon became very muddy, with pools of stagnant water ponding around the well. These pools became ideal breeding grounds for mosquitoes" (Davis and Garvey, 1993).

A recent study in Sukumaland in Tanzania revealed that it is the group of elders that usually decides on what water use restrictions to impose on each household, and that conflict resolutions are generally handled by the local formal leaders. Both of these groups are predominated by men (Drangert, 1993).

When a change occurs in the allocation of water within the community, according to SIDA (1994) this will have an *inequitable* impact on the water needs of respective gender:

"Women's livelihoods are often dependent on the availability of certain water services, such as domestic water supply and irrigation. Their dependence on earnings from agriculture and the informal sector means that there are special implications for women if priorities are changed between rural and urban supplies, or greater allocations are given to industry, commercial agriculture or power supplies."

The issue of gender-related water competition also highlights differences in *competitive forces* of men and women, which are discussed in Section 7.

4.2 Gender in freshwater resources management

The term 'water resources management' involves a certain set of managerial activities, that can be grouped as follows: (i) *assessment* of existing water resources; (ii) *planning* of water resources management and utilisation; (iii) *operation* and *maintenance* of water facilities (infrastructure); and (iv) *protection, monitoring* and *control* over water resources and facilities.

Women as water resources managers

According to SIDA (1994), "there is a very clear gender division of roles and resources in all areas of water resource management." In rural developing areas, women are the main managers of *domestic* water resources at the *local* level.

Yet, despite their comparatively small means, women play a significant role in the maintenance and operation of communal water supplies. Mobilisation of communal efforts, and the exertion of influence on male community leaders and owners of water sites are means by which women have become involved in water management activities (van Wijk-Sijbesma, 1985).

"Differences in traditional management and maintenance of water sources may occur within a relatively small geographic area". In some communities, for example

in Uganda and in south-west Burkina Faso, the maintenance of communal water supplies is the responsibility of specific women or women's organisations. In Sri Lanka, on the other hand, "maintenance [for example cleaning] of shared neighbourhood wells is carried out by the women and children in the household of the owner". At some places, Sri Lankan women are trained in water supply maintenance and are involved in the manufacturing and installation of pumps and production of spare parts. Some women also engage in the development of water treatment methods, for example filtration, straining, or treatment with alum, salt or clay. Furthermore, women have been noted to make an important contribution to the protection of water facilities from vandalism and "unintended or mischievous damage by children" (van Wijk-Sijbesma, 1985).

Although women have little time, money and technological assets with which to maintain and control their domestic water sources, they possess considerable knowledge regarding the reliability, location and seasonal variations of their water sources.

However, since women lack access to positions in formal decision-making boards and committees, they "are rarely involved in strategic decision-making structures and processes" regarding water resources management (SIDA, 1994). Instead, their managerial work is by tradition performed *informally*. Yet, in some communities, women are able to make *some* decisions regarding the maintenance of water supply and sanitation facilities. In Ghana and Bourkina Faso, for example, it is the women who decide when to build a new well (van Wijk-Sijbesma, 1985).

Because women's contribution to communal water resources management is not only performed informally, but also *locally*, their work therefore often tends to be overlooked at higher levels (SIDA, 1994).

Men as water resources managers

In the developing countries, men are - as opposed to women - to a great extent involved in the *formal* management of local and regional public water resources. In the capacity of male community leaders or supply owners, men are by tradition responsible for the supply of formal maintenance of public water sources (van Wijk-Sijbesma, 1985). As stated earlier, despite the fact that women are increasingly gaining influence over communal decision-making, men still predominate the communal boards and water committees. In practice, decisions regarding the design, operation and control of particularly the *pipeline network*, are therefore often taken exclusively by men. Similarly, with the majority of seats in political bodies and public and private firms, men are actively involved in the construction of water supply *facilities* (Green and Baden, 1994).

Men not only possess greater access to politically and socially influential positions within local and regional boards and committees, but also to money, time and technology. This gives them far greater opportunities and power than women, overall, to influence local and regional water resources management. Additionally, the legal framework of tenure and civil rights of most societies in the developing world tends to give men superior legal conditions, and greater control over and access to valuable land and freshwater resources.

4.3 Gender in freshwater development activities

Gender involvement and external projects

Water development activities commonly involve certain conventional stages, identified as follows: (i) identification of problems and needs; (ii) project selection, design and planning; (iii) resources mobilisation; (iv) implementation and control over the performance of the project (monitoring); and lastly (v) evaluation and follow up of the project.

It has been extensively documented that most of the stages of water-development projects are dominated by men. Yet, today, projects are attempting to increase the involvement of women at all stages of the project cycle, especially in decision making and design.

The degree of participation by men and women, respectively, at a certain stage varies with the aim and character of the project. The goal of a water project may correspond to one or several of the following categories: (a) to improve the water supply and sanitation of a village, and the overall health status of the villagers; (b) to upgrade or expand the water supplies of the village; (c) to expand irrigation for agricultural purposes; or (d) to improve the water sector (primarily urban) through increased technical assistance and institutional capacity building (Green and Baden, 1994).

In water-related projects with the aim to improve the health and sanitation status of the villagers, the women compose the main target group, as they as a rule are responsible for the health and sanitation within the household and constitute the main proportion of the working force within the community health sector. In health and sanitation projects, the needs and interests of women are therefore generally well addressed. Likewise, projects aimed to improve local water supplies commonly acknowledge the interests of women. In contrast, projects that aim to expand irrigation for agricultural purposes, or to improve the water sector by technical means, run a high risk of favouring the interests of men at the women's expense.

Variations in gender participation within the project cycle

The degree of participation by each gender, at each *stage* of the project cycle, is more or less dependent on the aim of the project.

Women normally have limited possibilities to participate in *decision-making* and *planning* of a development project. In the processes of *consultation* and *negotiation*, women are likewise often excluded (SIDA, 1994). As stated earlier, environments of decision-making and planning are male arenas, and even if women do participate in water committees, it does not always ensure the right to participate in decision-making (SIDA, 1994).

Resources *mobilisation* is also often steered by men. This is partly due to the fact that men have superior *access* to resources, as a result of their superior rights of ownership and control of land. The degree of participation by men and women at the stage of *implementation* varies. Whereas men typically *lead* the project and contribute with their technical skills and their knowledge of technical engineering, women participate as the main physical *workers* whose knowledge and experience are too little acknowledged and profited from. Overall, women tend to be involved in water projects on *informal* grounds, for example by washing of clothes, bringing food, etc.; however,

they are rarely included on the pay cheque (Schieber, 1996, *pers. comm.*). *Education* and the spreading of information to target groups are carried out either predominantly by men or by women, depending on the character of the project (e.g. top-down or bottom-up). *Evaluation* and *follow-up* of the project are often performed mainly by men, specifically those who have been in control of the project already from the start.

As a general conclusion, economically and technologically input-intensive, top-down oriented projects *tend* to favour the interests of men, whereas low-input, grassroots oriented projects with health improvement objectives *tend* to be dominated by female participants. Among the exceptions are certain projects that have been initiated on the request of women, independent of the financial and technical size of the project (Green and Baden, 1994).

Overall, projects that pay no or only limited attention to gender issues face the risk of favouring the interests of men, on behalf of those of women. The degree and nature of female participation are therefore being subject to extensive examination and mapping.

Fundamentally, improvements of water sources require the work of the people within the neighbourhood or community. It is the co-operation or lack of co-operation between these local men and women that chiefly determines if, when and how fast the water conditions are improved, and how they meet the needs of the user groups.

Gender co-operation in local water source improvements - the case of Sukumaland

In Sukumaland, Tanzania, the men are expected to perform the task of improving water sources. If they want a well constructed, female heads of household may engage male relatives or hire a well-digger. Certain associated work can also be done by the women themselves, such as to dig a pit in the river bed, but not to dig a well proper[5]. Also, women may take part in donor-driven water projects by carrying spoils from the excavation. In practice, individual opinions regarding *who* has the primary *responsibility* of developing the water sources differed. One of the male informants argued that to develop the water sources was clearly a man's task:

"My wife has said nothing, not because she cannot but because women have no horizon of the future. They cannot foresee tomorrow. Often they try to imagine, but since I am around to do all the things they relax and rely on me. One day I turn up with a drum for rainwater loaded on my bicycle. I tell them to clean the drum. They expect me to plan for tomorrow and the day after!" (Drangert, 1993, p. 203).

Meanwhile, "many female informants hinted that the men were not interested in doing the work entailed in developing water sources." [As stated by one of the informants,:] "It is difficult because water problems become women's problems. You may tell your husband about the problem, but he will not take action. He expects his wife to look for water everywhere, irrespective of distance. So long as he finds water at home the thought of digging for water is simply not there" (Drangert, 1993, p. 205).

In conclusion, the study showed that only some few men in Sukumaland *totally refused* to assist their wives in supplying the household with water. Some men actually *shared* the tasks of fetching water and developing new wells with their wives. Still, the

[5]"Digging a deeper well is not deemed possible, however, since a woman cannot climb a ladder with dignity" (Drangert, 1993).

most common male attitude was in line with the Sukuma norm, i.e. that "men must develop water sources but will not co-operate in fetching water except in emergencies" (Drangert, 1993).

4.4 Conclusion

In conclusion, the involvement of men and women, in activities related to the consumption, management and development of local and regional water resources, is determined partly by the gender division of labour, and partly by the cultural, socio-economic and legal opportunities available to each gender in the society. Despite the difficulty of making meaningful generalisations, a common feature of most societies of the developing world is the *superiority* of the men with regard to their *ability* to participate in, and *power* to influence, *formal* decision making and undertakings. This, despite that women's everyday experiences and contacts with the local water sources often exceed those of the men.

5 MEN AND WOMEN AS FRESHWATER POLLUTERS

5.1 Problems of freshwater pollution - a gender perspective

Most activities, whether caused by human beings or animals, have a direct or indirect impact on the freshwater quality within the drainage basin. The traditional gender division of labour in the developing world makes it possible to do a comparative analysis of the freshwater effects of male- and female-typical activities.

However, to identify the exact effects of a certain polluting activity is close to impossible, as these often vary in both time and space. Also, because pollutants in the water easily are dispersed in the landscape with overland and ground water flows, the effects of a certain polluting activity are often diverse, simultaneous and sequential in character, and some may not be visible until years or decades later, or even more.

A more motivated assignment is therefore to identify the *activities* by which men and women pollute freshwaters. Since a water-related activity rarely is *exclusively* male or female, the various water polluting activities within the drainage basin will here be discussed in terms of male- and female-*dominated* activities. As such, pollution may stem from both domestic and non-domestic activities, the latter which here encompass industry, agriculture, forestry, municipal activities, traffic, and livestock breeding[6]. Pollutants may reach and contaminate freshwater resources through wet and dry deposition from the air, by surface flow to downstream water courses and bodies, and/ or through soil infiltration to ground water aquifers.

5.2 Domestic activities and freshwater pollution

In various ways, activities performed within and around the household sphere are directly or indirectly responsible for the spreading or leakage of polluting compounds and pathogens into freshwater courses and bodies. Some of these activities are almost exclusively performed by women, whereas others are carried out by both men and women, and still others primarily by men. Some activities are *direct* sources of water pollution, whereas other activities *indirectly* cause the addition of compounds into waterways, for example air pollution through the combustion of fuelwood.

A direct source of water pollution here implies the site at which water pollutants are released directly into a freshwater course or body. An example of a direct source of water pollution is the site at which the domestic task of washing dirty clothes and

cooking utensils is carried out, such as the stream bed, a task which has been attributed to the women.

Collecting and handling drinking water

Similarly, the task of drawing water can be a significant cause of 'direct' contamination of water sources. A study of household water development in Sukumaland, Tanzania, gives a clear picture of how this may occur:

"Before drawing water the woman dips her bucket to clean its inside with her palm and she throws the waste water to the side. This polluted water may leak through the cover of the shallow well or seep back into the spring or dug well. She then fills the bucket by sinking it into the water in the pond, well or spring. If the bucket is dirty on the outside, such a practice will contaminate the water, for instance, by bringing chicken droppings and the like from the home yard. A few informants were well aware of such dangers but most of the men were taken by surprise when they realised these routes of contamination and they were prepared to advise their female household members about it" (Drangert, 1993).

To avoid contamination of the water source while drawing water from a pond may be close to impossible, especially when a stepping stone is missing. The drawer is then obliged to wade into the shallower end of the pond to fill the vessel with water. In order to reach for the purer and cooler water from the deeper section, to avoid stepping into the water is even more difficult (Drangert, 1993).

A study of a refugee settlement in Eastern Sudan points at the difficulty of avoiding contamination while *handling* of the drawn water. In the settlement the water, which was pumped from a borehole to an overhead tank and supplied from tapstands, was found to have been of very good quality. Yet, due to the difficult procedure by which it was drawn from the tapstands, the collected water was contaminated:

"Water was transported from the tapstands to the household pots in large rubber bags carried on donkeys. Short plastic pipes trailed from the taps to fill the bags. When not in use, the pipes would hang from the taps and rub against the donkeys, and even fall on the ground. The pipes, therefore, contaminated the water when the bags were filled" (Davis and Garvey, 1993).

In a study by Nyangeri (1986)[7] of a settlement in Kisii, Kenya, it was found that as more households used the same well, the number of coliforms in the drawn water increased. This was explained by the fact that each family used its own rope and bucket for lifting the water (Drangert, 1993).

In the homestead, the drinking water risks further exposure to pathogens. Even though the drinking water is stored in a container, which frequently is covered by a lid, the Tanzanian study by Drangert found that one and the same cup was used for both *drawing* the water from the pot, for drinking *and* for water removal. Even when the smaller children were not allowed to draw water, it was difficult to keep them away from the pot at all times during the day (Drangert, 1993).

Disposal of human and animal excreta

In the developing world, latrines are significant sites for disposal of human excreta, as may be ponds, streams, forests and bush land. In some places, children and even adults

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[7]Nyangeri, E.E.N. (1986). *Rehabilitation of Hand-dug Wells and Protected Springs in Kisii, Kenya.* M.Sc. Thesis. Tampere. Tampere, University of Technology.

are allowed to urinate and/or defecate directly into flowing water courses. This behaviour implies a serious health hazard for downstream water users.

To empty latrines on the ground or even in nearby water sources, instead of in pre-dug holes, may eventually lead to pollution of water sources and risk for human health. At times of heavy rainfall and when the site of disposal is not covered, pathogens may be washed into nearby water sources by overland water flow from the latrine area (Drangert, 1993).

Depending on the husbandry practice, some cattle and sheep owners allow their animals to defecate and urinate directly into flowing water courses, whereas others keep the animals in enclosures. Yet, taking more precaution, the latter solution does not fully guarantee that pathogens associated with the excreta do not dissolve in surface waters, and leak with the soil water into ground water aquifers, by which it may be transported to sites for human water use and/or withdrawal. Watering the cattle in water bodies and courses also imposes a risk on human health, particularly if the cattle is infected with transferable diseases. Watering the cattle may be conducted by men or women, depending on the culture, type of cattle etc.

Handling of domestic waste water

In places where adequate sites for disposal of waste water are missing, waste water used by the women at home for cleaning and washing is sometimes emptied on the ground. During consequent rainfalls, potential chemical compounds and pathogens, from the emptied water, may be transported as surface run-off and discharged into streams and rivers. In the water, these pollutants may spread considerable distances downstream in the landscape, with the risk of exposing water drawers and users far away from the original source of contamination. Likewise, domestic activities performed upstream may pose a threat on the quality of downstream water and limit the *range* of downstream activities.

Bathing, whether done in a stream or in a bucket at the homestead, involves the use and contamination of freshwater. This activity is necessarily carried out by both men, women and children although, as stated earlier, African women and children - when and where possible - normally choose the stream bed, instead of the homestead, as a site of overall body washing, as opposed to the men.

Cooking and heating with fuel wood

The use of fuel wood by women for cooking and heating may also ultimately contribute to water pollution. As the coal is combusted in the fire, carbon oxides (and possibly other compounds) are released into the air as gases, and, at a later stage, washed to the ground as acidic rain. Acidic soil water can cause the leakage of certain inorganic compounds from the soil, compounds that eventually may reach and contaminate the ground water aquifers.

Health effects of wars and natural disasters

In poor and crowded human settlements, such as refugee camps in, for example, Zaire and Tanzania, the means by which waste and excreta (by human beings and their livestock) can be properly and safely disposed of are often highly inadequate, despite great efforts, both by the people themselves and, in this example, external aid workers. The women still hold the primary responsibility for the hygiene and sanitation of the

household, whether it may be at a refugee camp in Zaire, or in the hometown of Rwanda. Thus, despite greater inconveniences, water still has to be fetched by the women from a nearby source; and waste water and excreta still have to be disposed of as safely as possible. With the greater burden of work and responsibilities, the women (and children) must be seen as the primary victims of war, with respect to the reduced means for upholding sanitation and health within the household.

Similarly, when natural disasters, such as droughts and floods, reduce the means by which water can be found and supplied in adequate quality and quantity, the living conditions and health of women and children are particularly at risk.

5.3 Non-domestic activities and freshwater pollution

Non-domestic activities here refers to all activities performed outside the homestead, such as industrial activities, livestock breeding, agriculture, forestry, crafts, etc. For convenience, agriculture performed at a smaller scale on family farmlands has also been included in the following discussion, since only the degree and not necessarily the character of the pollution by large- and small-scale agriculture differ. Common features of non-domestic activities are the employment of *waged* workers and the generation of produce or services that are intended to be sold at the market. Moreover, the majority of non-domestic activities are primarily performed by male workers. In fact, in the developing countries, the majority of people engaged in "market-oriented" economic activities are men (UNDP, 1995).[8]

Agriculture, forestry and industry

Agriculture and forestry, for example, may be considerable sources of freshwater pollutants, especially when managed on a large scale. Cash-crop plantations, for example, cause large quantities of fertilisers and pesticides to seep through the soil profile into the ground water aquifers and eventually to downstream surface waters. In Africa, cash-crop farming is dominanted by male workers, particularly at the level of decision-making, although large-scale sowing, weeding and harvesting of plantations is often carried out by men, by means of more expensive and technically advanced equipment (tractors, ploughs etc.). Women workers in farming are generally unpaid, self-employed workers, who cultivate food crops for family consumption. However, the surplus that is here generated is as a rule sold by the women at the market for cash, if it is not paid in kind (Rodda, 1994). In other words, part of the women's farming may be defined as *non-domestic* activities.

Even when agriculture and agroforestry are operated only on a smaller scale, such as on private farmlands, they increasingly involve the use of various artificial fertilisers and pesticides, that eventually find their way to the ground water aquifers, on and off site. In developing countries, as stated earlier, family farms are often in practice managed by the women of the household, although the men as a rule has the primary decision-making power over the farm. However, on family farmlands artificial additives are generally used only to a limited extent. Nonetheless, agricultural practices in general do alter the conditions of the soil cover; on sloping farmlands, they

[8]According to the Human Development Report 1995 (UNDP, 1995), whereas men spend about 75 per cent of their working time in economic market-oriented activities, the corresponding percentage of time for women is only 34 per cent.

may induce surface run-off, sedimentation and the subsequent accumulation of nutrients and pollutants in downstream waterways.

Industry, for example the mining industry, is responsible for heavy pollution of surface, soil and ground waters. Depending on the particular type of industry, the total staff of the industry has a certain gender composition. Asian women participate much more in industry than African and Latin American women. However, despite women's worldwide struggle to gain more influence in processes of decision-making, at present industrial enterprises are still normally directed by *male*-dominated boards. In contrast, women as employees instead constitute the main part of the *labour* force.

5.4 Conclusion

Ultimately, the main differences between female- and male-dominated polluting activities are the circumstances by which these are performed. Due to the gender division of labour, domestic water polluting activities are almost exclusively carried out by women, whereas the men may be held primarily responsible for pollution by male-dominated non-domestic activities.

Unfortunately, despite personal awareness of the health and environmental risks involved, most women and men in the developing world are incapable of or impeded from abandoning water polluting practices. This is because most people, especially the women, lack sufficient access to sanitary facilities, money, skills, equipment and/or time. Inadequate financial and technological conditions of many poor communities of the developing world also make impossible or undermine the operation and maintenance of sustainable water infrastructure and systems of waste water treatment.

6 GENDER IMPACTS OF FRESHWATER SCARCITY AND POLLUTION

"Water is essential to man, animals and plants and without water life on Earth would not exist. From the very beginning of human civilisation, people have settled close to water sources, along rivers, besides lakes or near natural springs. Indeed where people live, some water is normally available for drinking, domestic use, and possibly for watering animals. This does not imply, however, that the available source of water is convenient and of sufficient capacity, nor that the water is safe and wholesome. On the contrary, in many countries people live in areas where water is scarce. Often it has to be carried over long distances, particularly during dry periods. Scarcity of water may also lead people to use sources that are contaminated by human or animal faeces, and are thus dangerous to human health" (IRC, 1981).

When freshwater sources within a community or region are exhausted or polluted, any person dependent on the affected sources may be affected, irrespective of gender. Yet, the individual impact on the people in the area may differ, depending for example on the personal access to *alternative* freshwater sources, skills, equipment, time, money and services by which the water availability or quality can be enhanced. As a result of current gender inequalities with respect to responsibilities, opportunities and power, the overall individual effects on men and women of water scarcity and pollution more or less differ.

6.1 The impacts of freshwater scarcity

Causes of water scarcity

The term 'water scarcity' here refers to lack of freshwater for human use, domestic or non-domestic. The freshwater shortage may be *temporary*, for example during the dry season, or prevail on a *permanent* basis, for example in arid regions.

In arid regions of the developing world, lack of water is for many people the result of a *combination* of poor rainfalls, a high evaporative demand, *and* little or no provision of water infrastructure, facilities and services (Cairncross and Satterthwaite, 1990). Particularly in the rural areas, with poor provision of public wells, standposts, indoor piping etc., shortage of water in individual households is an everyday reality. In fact, inadequate water supplies are often reason enough to make lack of water a more or less *permanent* condition.

Adoptive and preventive measurements

As a consequence, and if possible, households in arid regions normally develop various kinds of private water security systems, for example water storage tanks, often accompanied by roof-catchment installations. Where such water tanks are missing, drinking water is either borrowed or purchased from neighbours, or it may be drawn from the village dam (Rocheleay, Schofield-Leca and Mbuthi, 1995). For richer urban households, water vendors and tank deliveries are other alternative domestic water supplies when the local wells run dry.

Practical implications of water scarcity

Today, a large proportion of African and Asian urban households live with inadequate water supplies. A survey made during 1986-87 of 660 households in Dar-es-Salaam, showed that 47 per cent of the households *lacked* piped water, while 32 per cent *shared* piped-water supply. Of the households without piped water, 67 per cent bought water from neighbours, while 26 per cent drew water from public water-kiosks or standpipes, and the remaining households (7.1 per cent) bought water from water sellers. As a result, each person had to do with only 23.6 litres per day on average (Cairncross and Satterthwaite, 1990) .

Where standpipes do exist, in many places they are few in numbers so that long queues of tedious waiting develop.

"This acts to cut water consumption below volumes needed for good health. In addition, piped water systems in many tropical cities function only intermittently for a few hours each day, which makes it especially difficult for households relying on communal taps. The water in piped systems is often of doubtful quality due to the risk of contamination in old and leaky distribution pipes by ground water and sewage" (Cairncross and Satterthwaite, 1990).

In Dar-es-Salaam, shortage of water thus affected most people living in the city and their activities; however, potential differences between the effects on men and women, respectively, are based on the individual's needs and demands of freshwater:

"Everyone is affected in some way by lack of water: the women are responsible for providing water to the household, both men and women are responsible for livestock watering (depending on household circumstances), and men, women and children suffer from health problems caused by contaminated water" (Rocheleau, Schofield-Leca and Mbuthi, 1995).

The water source and related impacts

Water scarcity due to lack of rainfall generally has the widest range of possible effects on human activities, as opposed to, for example, water scarcity that exclusively results from inadequate access to water facilities. Hence, the following discussion of potential impacts on men and women will be based on a presumed *hydroclimatically* induced water scarcity. Therefore, the expected consequences are: reduced water flow of *surface* water courses, reduced *soil* water content and retarded *ground* water recharge. It is of crucial interest to consider the particular *type* of the water source, because this is of significance to the kind of activities that potentially may become affected.

Impacts of surface water pollution

When the flow and level of water in streams and rivers are reduced, this has consequences for the various activities dependent on such water. For example, fishing activities and the transportation of people, cattle and cargo in/on river water are hereby threatened. Likewise, when water flows in rivers used for hydropower generation are reduced, industrial and municipal activities dependent on the generated electricity may be put at risk. Industries, various enterprises, public water companies, and ultimately private households that rely upon the extraction of surface waters from lakes and rivers are similarly imperilled.

On the household level, as water flows in streams and rivers are reduced, washing clothes and cooking utensils etc. in water courses may provoke problems. Not only does the difficulty of washing in scarce water arise, but also the question of which activities in the stream should be prioritised. If no alternative streams with sufficient water levels can be found, washing of clothes and cooking utensils, body parts and bathing must be done with well water - at the expense of ordinary well-dependent uses.

Impacts of soil water pollution

A longer period of little or no rainfall not only reduces surface water flows, but also the infiltration of water into the soil. Lowered soil water content, in turn, constrains the productivity of the land, and thus the growth of trees, crops and other plants. In order to avoid crop failure, the farmland has to be irrigated by water taken from rivers or wells, which in the latter case may emanate in well water conflicts, for example between female- and male-dominated activities (see Section 4.1). However, if crop failure does ensue, it will have inescapable effects on non-irrigated farmlands, which are typically managed and cultivated by the women in the household, whereas the productivity of irrigated farmlands, which normally are operated by male farmers, is not necessarily put at risk. Ultimately, crop failure may lead to food shortages, which will hit (first and) most hard on the primary food suppliers and caretakers of the household - the women.

Impacts of ground water pollution

As ground water recharge and flow decline, water levels in wells and water pressures in standposts begin to drop, affecting both domestic and non-domestic activities dependent on the source. Ground water generally holds the highest quality, wherefore in the household, it is primarily used for drinking, cooking and, when affordable, personal hygiene. As a consequence, lack of ground water may ultimately lead not only to dehydration, but also to the ingestion of contaminated water, and the infection of

water-washed diseases (see Section 6.2 below). In fact, "quantity, rather than quality of water [is] found to be the main determinant for good health of children over three years of age [and adults]" (Curtis, 1986).

Another consequence for households, when local wells run dry, is the increased work burden for the water collectors. As the primary water collectors for household purposes, women are forced to spend additional time and energy searching for new sources, waiting in line, and carrying heavy loads of water. Especially at times of food shortage, women risk detrimental health effects of carrying heavy loads of water long distances, as they have higher energy deficiencies (and more so than men) (van Wijk-Sijbesma, 1985).

Impacts of wars and natural disasters

At times of war, water pipelines and large-scale dams used for irrigation, industry, municipal activities and ultimately household consumption, are prime targets for destruction by the enemies. If not destroyed, poor maintenance and repair, due to shortage of manpower and financial and technological resources may render the water infrastructure both inefficient and insufficient, with consequences permeating the whole society, from economic losses to impoverished human health.

One of the most serious effects of water scarcity within the household is an increased rate of water-related diseases, due either to ingestion of contaminated water (as safe water is lacking), or to insufficient use of water for upkeep of the personal hygiene. The subsequent gender-related impacts are treated in Section 6.2 below.

6.2 Gender and water-related diseases

Water-related diseases are diseases that in some gross way are related to water in the environment or to impurities within the water. The water-related diseases may be divided into two groups: (a) *water-related infections*, caused by a pathogen (for example a virus, bacterium, helminth, or protozoan); and (b) *water chemistry-related diseases*[9], which are caused by some chemical substance in the water (IRC, 1981; IWES, 1983). Water-related infections are "some of the greatest causes of disease and death in the developing countries, for instance diarrhoeal diseases and malaria". A common feature of these infections is their transmission mechanisms, which in some way are dependent upon the presence or absence of water.

In the 1970s, Bradley's classification system was developed, which identified the four main transmission mechanisms by which water-related infections are transmitted (Box 6.1).

Not only physiological, but also mental symptoms, can develop as a result of contamination of a domestic water source; as children and other close family members fall ill, the women are primarily responsible for meeting their basic needs of nutrients, water and comfort, as well as potential needs for medicine. This not only adds to their work load, but - as the 'birthgivers' and the main caretakers - can cause considerable mental stress.

[9]An example of a water-chemistry-related disease is fluorosis, which is linked to high fluorid levels in drinking water; and infantile methaemoglobinaemia, related to high nitrate levels in drinking water. "These water-chemistry-related diseases are only of major public health importance in certain areas of some countries and, in developing countries, they are totally overshadowed by the water-related infections (IRC, 1981),

Box 6.1 The four transmission mechanisms of water-related infections:

Water-borne transmission

Water containing a pathogen is drunk and ingested by a person or animal, which may then be infected by the disease. Water thus functions as a *passive vehicle* for a virus or bacteria. Examples are cholera, typhoid, bacillary dysentery, infectious hepatitis, and gastro-enteritis. As stated above, "*all* water-borne diseases can also be transmitted by any route which permits faecal material to pass into the mouth" (IWES, 1983).

Water-washed or water-scarce transmission

Diseases are transmitted from one person to another, due to *lack of adequate amounts* of water and poor personal hygiene. In other words, such transmissions depend on the water *quantity*, rather than its quality (IWES, 1983). With too little water for washing oneself properly, or for cleaning food utensils and clothes, various infections can more easily develop and spread from one person to another. Diseases transmitted in this way are: (i) *intestinal* or *faecal-oral*, e.g. cholera and bacillary dysentery; (ii) *skin or eye infections*, e.g. scabies, fungal infections, trachoma; or (iii) infections carried by *lice- or mites*, e.g. louse-borne epidemic typhus and louse-borne relapsing fever (IRC, 1981; IWES, 1983).

Water-based transmission

Transmission of a pathogen which spends part of its life cycle in an aquatic intermediary host, commonly a snail or crustacean. After development in the intermediary host, infective parasite larvae or eggs are shed into the water. Through skin contact or ingestion of the water, disease may be transmitted to an individual, for example schistosomiasis and guinea worm (IRC, 1981; IWES, 1983).

Water-related insect vector transmission

Insects (e.g. the tsetse fly) that breed in the water or live and bite near water transmit a disease vector, which may cause, for example, malaria, yellow fever or river blindness.

Sources: White *et al.*, 1972; IRC, 1981; IWES, 1983; Cairncross *et al.*, 1985; Cairncross and Feachem, 1993.

Water is not only a prerequisite for life but has become a cultural and social liquid, in the form of tea, coffee, beer or other kinds of beverages, around which socio-cultural institutions develop. These institutions can also position men and women differently in relation to water.

Risks of exposure to water-related diseases

Because of their gender-related activities, men and women come into contact with potential sources of water-related diseases in more or less gender-typical ways.

During the day, women continuously come in contact with children, sheep and goats, latrines, and spots of waste collection. Women are hereby *indirectly* exposed to various water-transmitted diseases, for example when nursing an infected child. The daily chores of women also create numerous occasions for *direct exposure* to disease transmissions. A significant site for potential transmissions is the river bank. While washing cooking utensils and clothes, and bathing of the children and themselves in the water, women risk exposure to water-breeding vector-containing insects and harmful aquatic organisms. According to Seager and Olson (1986) women are predominantly affected by illnesses, such as malaria, river blindness and elephantiasis, acquired while drawing water. Additional possible water-related infections are trachoma, guinea worm, other skin-infections (Falkenmark, 1982), and many excreta-infections, shed in the urine or faeces of an infected individual.

The task of drawing water may also impose a risk of disease transmission. As water drawers on their way to the source, women may pass areas that function as habitats

for disease-bearing insects. Box 6.2 below gives an illustration of the various risk factors characterising a poor woman's day in rural Africa.

Certain environmental conditions, for example certain temperatures, may foster the presence of diseases in the environment, such as viral or bacterial diarrhoea: "In those settings where there are wide seasonal variations in temperature, the incidence of the bacterial diarrhoea and typhoid tends to peak in the warm season, whether it is wet or dry. The viral diarrhoea peaks in the cold season" (Cairncross, 1995). In conclusion, "it is the village where one lives, not the water one drinks, which affects the risk of disease transmission" (Cairncross, 1995).

Box 6. 2 An African woman's daily exposure to water-related diseases

"An African housewife gets up in the morning and soon begins to fetch water. She walks through the thicketed savannah to the water source. This is the habitat of tsetse flies and she is exposed to their unpleasant bites and the risk of sleeping sickness. She reaches the water source in a valley bottom and has to wait her turn. This is the habitat of disease-bearing mosquitoes and of a different tsetse fly more efficiently transmitting sleeping sickness. The stream contains snails transmitting bilharziasis if it is sluggish, or breeds the vectors of onchocerciasis if it is rapid, or may contain guinea worm larva if it is a mere muddy hole. She collects the water, which today bears a highly diluted load of human excreta and may contain typhoid bacilli or hepatitis virus. She returns, past the tsetse flies, to her home. As a result of her trip she has been unable to do any digging for the past hour and fewer crops are grown. She prepares the family's main meal. The scarcity of water discourages the washing of hands before the meal and makes washing-up after the last meal perfunctory. Some decayed food may be left on the utensils. Some unboiled water is drunk by her thirsty family, who pick up the germs from it. Two days later the father falls sick..."

Source: White *et al.*, 1972, p. 152-53

6.3 The impacts of domestic water contamination

Pollution or contamination of domestic water supplies may occur at any stage between the source and the mouth, or even before the time of collection. The source may be a well, standpost, stream, river, rainwater storage tank or any other source from which water is taken. Pollution of water intended for domestic use has various implications on people's lives. The personal impact chiefly depends on whether the person is *directly* affected, for example through ingestion of contaminated drinking water, or *indirectly,* for example when another household member is infected.

Contamination risks of drinking water

Even though the quality of water at the source is important, still it does not give any certain information about the quality at the moment of consumption (Drangert, 1993). A careful choice of source for drinking water, as well as the practice of boiling of water suspected of being contaminated, are everyday ways of ensuring that the water is safe enough to drink. Nevertheless, in poor rural and urban areas, water is often contaminated between the source and mouth, while drawing and handling the collected water. The main reasons are poor hygiene and sanitation practices, and the relative difficulty of the task.

Ingestion of contaminated drinking water - risks and effects

The *individual risk* of becoming infected by a water-related disease - through drinking of contaminated water - depends on the particular circumstances: the choice of

drinking water; the procedure by which the water is drawn and carried, the handling of the water supplies, and whether or not it is boiled before drinking. The drawers of water often have little influence over the availability of alternative water sources (particularly in poor settings), and in some areas they do not even have a choice of source selection.

Any person who drinks and ingests biologically contaminated water may become exposed to a pathogen and develop symptoms of the disease. Children and weaker and elder household members are particularly susceptible. However, other household members may hereby be adversely affected, too. The indirect impact on each household member depends largely on their respective roles and responsibilities, and their relation to the infected person.

"Degradation of water quality affects women and men differently. Women are particularly affected because of their roles in household health and hygiene, and their responsibility for securing domestic water" (SIDA, 1994).

"It is women who collect, cook with, and wash family and home using local water. If the water source is far away, unclean, or in short supply, it is primarily women who suffer from the resulting fatigue and disease. And it is women who are held responsible for the poor health of their families when polluted water and inadequate sanitation make the practice of good hygiene either difficult or well-nigh impossible" (Seager and Olson, 1986).

Moreover, "on account of their roles as carers within the home, women are not only exposed to communicable diseases when other household members become ill, but often feel the weight of their responsibilities very heavily, adding to an already stressful life" (Songsore and McGranahan, 1996, on women in Accra).

In other words, having one's children fall ill implies a considerable mental stress for and suffering by the women. Furthermore, as the primary caretakers of the ill (both husbands and children), diseases within the family means additional work for the women. It is the mother who takes the children to health care providers, and physically nurses them. The time and energy required to care for the ill must be taken from other activities. If the water is already contaminated at the well or standpost, added to the daily chores of women is the need to search for alternative sources of safe water, possibly even further away.

Despite awareness of the risks involved, many poor households lack the means by which drinking potentially contaminated water can be avoided, in particular the women. With limited or no right to dispose of the family income, yet with the primary responsibility for household expenditures, most poor women face little chance (if at all) of affording to buy alternative beverages to water, such as soda and beer.

Women who live in richer households do not face the same impact of contaminated water sources, since they can more easily afford to be supplied from alternative water sources. For example, they can buy water from water vendors, or be supplied by tank deliveries. Servants can even be employed for the task. In addition, richer households are likely to inhabit areas with a higher standard of water infrastructure and services, of which they can benefit (at a certain cost).

Men are also affected by pollution of domestic water. However, the impact is not necessarily of an exclusively negative kind. For example, men who work as male vendors may be positively affected by pollution of water sources; scarcity of safe water implies an increased number of water customers which, in turn, enables the vendors

to augment the price of water. In other words, a situation of domestic water pollution may result in new opportunities for profit-making by water vendors.

Men who are forced to collect the domestic water themselves, because their wives are sick or disabled, or because they lack female household members, will be affected in a similar way to women: their total work burden may increase, as may the stress from worrying about not being able to meet the basic water needs of the day.

6.4 The impacts of non-domestic water pollution

Non-domestic water sources, i.e. those intended for activities outside the household sphere, are used by men to a greater extent than by women. Hence, the primary effects of non-domestic water pollution fall predominantly on male-dominated activities.

An example of how pollution of non-domestic water sources may adversely affect a male-dominated activity is when fishing waters are polluted by a harmful substance or organism. As the fish population and subsequently the fish catch subside, the economic situation of the fisherman is threatened. The fisherman may not only lower his profit makings, but even lose his job; as a man with the responsibility of income generation, this may fall heavily on his self-esteem. Depending on how he chooses to spend his money, it may even affect the entire household. In some societies, by tradition, women too engage in fishing, although fishing by women is commonly not performed exclusively as an income-generating activity, but as a way of supplementing the family with proteins. The particular nature of the *purpose* of a water-dependent activity may thus be a crucial determinant for how men and women ultimately are affected by water pollution.

Overall, the impacts of non-domestic water pollution are not as clearly related to the genders as are the effects of domestic water contamination. Partly, this is because the responsibility of the operation and continuation of most non-domestic activities are shared by a group of people, in the capacity of a company, association or society, etc.

7 GENDER-SPECIFIC OPPORTUNITIES AND CONSTRAINTS

This section touches upon the most central issue related to the interaction between men, women and freshwater: the inequality between men's and women's respective abilities to influence and contribute to decision- and policy-making in societies of the developing world. This prevailing gender inequality affects and constrains not only the management and development of communal and regional freshwater resources, but also the capacity of the households to effectively utilise local freshwater sources.

The section goes on to examine how the ascribed roles and responsibilities of men and women, respectively, and gender-discriminating attitudes and practices within society, define and limit the status, powers and opportunities of each gender to improve their personal and their family's and community's water-related conditions.

7.1 Knowledge and skills

The ability to predict changes in water levels and flows, whether caused by hydroclimatic fluctuations or generated by changes in human land-use practices and water uses, can help people make optimal use of the limited freshwater resources within the drainage basin. Such hydro-ecological knowledge is mainly based upon personal experience, but can also to some extent stem from formal education and information.

Likewise, to be informed of the relation between health and water quality and quantity, respectively, is essential for sustenance of good hygiene and sanitation

practices within the household and hence good health. Therefore, education primarily for the women on hygiene and sanitation matters ought to be of crucial interest for the society, as women function both as the primary health care *providers* and *informers* within the households. Also, general education on how to read and write increases women's confidence and self-respect, as well as their status within the household and community (Thomas-Slayter, Rocheleau and Kabutha, 1995). Education hereby opens the door to more job opportunities for women, and to a more versatile participation in communal activities, enabled by social networks, non-governmental organisations and development projects.

Yet, in almost all areas of the world, and in developing countries in particular, women's combined *primary* and *secondary* enrolment ratio, level of education, training and literacy rates are below that of men (WRI, 1994). In 1992, the combined enrolment ratio for women was 60 per cent, compared to 75 per cent for men, in all developing countries combined, despite increases for both genders (UNDP, 1995). The gap between male and female participation tends to increase the higher the level of education (see Table 7.1).

Table 7. 1 Female and male enrolment ratios in 1970 and 1990

	Enrolment ratio (Index: males = 100)					
Country	**Primary school**		**Secondry school**		**Tertiary school**	
	1970	**1990**	**1970**	**1990**	**1970**	**1990**
Arab States	63	92	47	77	34	65
East Asia	87	96	76	79	53	73
Latin America and the Caribbean	101	98	91	98	96	70
South-eastAsia and the Pacific	60	75	43	60	30	48
	90	97	74	95	62	73
Sub-Saharan Africa	72	85	60	72	34	46
Least developed countries	61	84	43	67	25	42
All developing countries	79	88	68	78	49	70

Source: UN 1994 (UNESCO), In UNDP, 1995 (p. 68)

Almost nowhere globally do women match men on the university campus (Seager and Olson, 1986). In 1990, the *tertiary* enrolment ratio for women and men in the developing countries was only 8 and 15 per cent, respectively. In the same year, only 45 per cent of the women in the developing world and 65 per cent of the men were literate (UNDP, 1995). This implies that, in 1990, approximately 34 per cent of the world's women (601.6 million) were illiterate, compared with roughly 19 per cent of the men (346.5 million) (WRI, 1994), this, despite a halving of the gender literacy gap during the period 1970 to 1990, increasing the female rate from 54 per cent to 74 per cent of the male rate (UNDP, 1995). The greatest difference between male and female literacy rates is found in parts of Africa and Asia, where the relationship is almost 2:1 (WRI, 1994).

The high percentage of illiterate women is due to "the legacy of women's relative confinement to domestic and private life, and the widespread prejudice against educating girls" (Seager and Olson, 1986):

"In many developing countries, girls are withdrawn from school earlier because parents, foreseeing the day when their daughters will marry and leave home, do not expect them to make an economic

contribution to the family. Regarded as being more important for family sustenance than are boys, girls are kept at home to perform household work" (WRI, 1994).

[In Africa,] "they are forced out of school. Forced out by...tradition-bound parents, forced out by an indifferent, insensitive male-dominated society determined to assign girls, and women in general, a permanently inferior status...The problem has to do with more than just education. It has to do with the position of girls and women in African society - both traditional and present. The combination of traditional African gender discrimination and new forms brought about by colonialism, Christianity, and Islam [has] deepened the problem" (Ng'weno, 1994, in Thomas-Slayter and Rocheleau, 1995).

The gap between female and male literacy is generally greater in urban areas, where men have more opportunities - often at work - to learn how to read and write. Women's low participation at university level often stems from their lack of money, lack of confidence in their own capabilities, and the absence of encouragement for succeeding academically (Seager and Olson, 1986).

In conclusion, "females are disadvantaged at all levels of education in terms of access, participation, completion, and performance" (Thomas-Slayter, Rocheleau and Kabutha, 1995). Nevertheless, women still have an important role to play as participants and as leaders in local learning systems, by sharing of their knowledge on, for example, the location and reliability of communal water sources (van Wijk-Siijbesma, 1985).

However, increased education for women is still needed, on all levels. As is pointed out by Asamba and Thomas-Slayter (1995), "the more highly educated the woman, the more likely she is to participate in major decisions affecting the household" and the community. Because, "even where women are able to attend meetings [in the village, etc.], often they do not speak the national language and feel restricted because of their lack of education and because of cultural barriers" (van Wijk-Sijbesma, 1985).

7.2 The economic situation

The accessibility of cash and credits increases men's and women's purchasing as well as influential powers, with which to *improve* the water-related conditions within the household, and by which to *escape* direct and indirect adverse effects of water scarcity and pollution. For example, investing in toilet facilities may benefit the sanitation standard within the household, and thus reduce the risk for 'water-scarce' transmission of water-related infections. Willingness to pay for such improvements is also a critical issue. However, in the developing countries, women's willingness to pay for improvements of the domestic water supply is rarely matched by their ability to pay.

The economic situation of men and women, respectively, depends on various circumstances: (i) their *engagement* or *time* spent in an income-generating activity; (ii) their degree of *control* over personal and/or family *income*; (iii) their degree of *control* over family-owned *property* (as land, cattle and machinery may be sold to generate cash); and lastly (iv) their level of household expenditures, such as school fees, electrical bills and medicines, in other words, how these are divided between the genders.

Regarding the personal engagement in waged work, according to UNDP (1995), in the developing countries women spend on average as little as 34 per cent of their total work time on income-generating activities. Rural women tend to be slightly more engaged than urban, i.e. 38 per cent versus 31 per cent (UNDP, 1995). Thus, a very large part of women's work is non-waged, and does not contribute to strengthen their

ability to pay for water-related investments and services. In contrast, an average of 76 per cent of the men's work time is income-generating, with variations ranging from 56 per cent in the Republic of Korea to 87 per cent in Venezuela (UNDP, 1995)[10] (see Table 7.2).

Table 7. 2 Shares of men and women workers in non-wage employment (1989-1991)

Country	Year	Men	Women
Bolivia	1991	42	70
Cape Verde	1990	42	54
Egypt	1989	46	74
El Salvador	1991	28	48
Ghana	1989	69	92
Indonesia	1989	70	79
Korea, Republic of	1991	38	43
Pakistan	1992	66	77
Peru	1991	39	55
Tanzania	1988	84	95
Thailand	1989	71	76
Tunisia	1989	36	51
Turkey	1991	55	80

Source: ILO, various years; World Bank Data, in World Bank (1995), p. 73

The constraints on women of *time* could not be overestimated:

"[Women] may be unable to raise the cash from undertaking income generating activities on their own account because they are caught in a vicious circle - without improved water supplies they have no spare time for income generating activities, but without the income they cannot pay for new facilities. Even if this circle could be broken through provision of credit to pay for the improved water supply, women might still face difficulties in turning liberated time into cash because of lack of other complementary resources" (Elson and Cleaver, 1993, in SIDA, 1993b).

In the developing world, women, as a rule, receive a considerably *lower average wage* than men. "The average female wage is only three-fourths of the male wage in the non-agricultural sector in 55 countries that have comparable data" (UNDP, 1995). The first potential reason is a justifiably lower salary, based upon the type of job and the skills available (educational level), causing a higher rate of women in the low-paying job sector:

"First, women are less proficient in marketable skills because of biases against women in education and skill training. Educational biases are severe in Asia and the Middle East and significant in Africa, but insignificant in Latin America and the countries of the former Soviet bloc. Second, women often face a narrower range of job opportunities, and so attain worse labour market outcome than men with the same endowments."—"Weaker labour market opportunities produce weaker incentives to educate girls; this creates a vicious cycle, since less educated women are much less likely to educate their daughters" (World Bank, 1995).

The second plausible reason is simply a discriminating salary, which gives women lower wage for similar work, despite equal qualifications. Fundamentally responsible for such wage discrimination are the attitudes and expectations on women maintained within the community:

[10]For further reading on methodological ways of estimating and distinguishing between justifiable and discriminating wage differences, see World Bank (1955), p. 45.

"Men's greater power in most societies affects whether women participate in the labour force - when men prefer that their wives do not work outside the household, for example. Discrimination in the workplace, stemming in part from cultural norms, is widespread. And there are many associated institutional and legal factors that tend to reduce demand for women workers, especially in formal jobs - for example, paternalistic discrimination may prevent women from working in "dangerous" occupations or at night" (World Bank, 1995).

In conclusion, the subordinate economic situation of women, in relation to men, is manifested as unequal access to better paying and income generating jobs, to bank credits[11], and to control of family income and property; and is fundamentally the result of their lower status and power in the family, maintained and reinforced by the socio-cultural gender attitudes within the community.

Women's access to cash and credits also depends on the level of wealth in the household. However, having a wealthy husband does not guarantee adequate hygiene facilities and water supplies, as women's and men's respective willingness to pay for investment in facilities etc. rarely differ:

"Women may be unable to raise the cash from their husbands because water is regarded as women's responsibility; and because husbands place a lower value on saving women's time and effort than do women themselves" (Elson and Cleaver, 1993, in SIDA, 1993b).

In other words, men and women have different priorities regarding how to spend personal and family income and wealth. Hence, when an opportunity arrives for investment in water hygiene and/or supply facilities, the choice of whether or not to undertake the investment will depend on *who* has the primary control over family financial resources. By tradition, the financial command lies in the hands of the husband (World Bank, 1995). Hence, the profits that women as managers of the family farm make, from commercial crop production such as coffee and cattle, remain largely in the hands of the men, although today's decisions involving larger sums to an increasing extent are made jointly by husband and wife (Asamba and Thomas-Slayter and Rocheleau, 1995).

Because women's sales are usually on a small scale (Oduor-Noah and Thomas-Slayter, 1995), their personal earnings are seldom large enough to be spent on investments in, for example, equipment and materials for developing the domestic water supplies. When married, women tend to spend their earnings to satisfy immediate domestic needs, particularly the family diet (Rodda, 1994).

7.3 Availability of time

An important factor regulating an individual's possibilities to improve the water conditions of the household, and to participate in decision- and policy-making regarding communal water resources, is the availability of time. Women, due to their numerous and time-consuming domestic tasks, are often short of time.

In general, women's work tends to be more labour-intensive as it often involves simultaneous and unrelenting tasks which have to be carried out every day of the week (see Figure 7.1). Tied up in daily routine-like tasks, that can not be postponed for later

[11]Low-income women have greater difficulties than men in being granted loans from banks, which mainly is a result of their lower access to money, originating from a lower access to better paying jobs in the formal sector (World Bank, 1995), underpaid salaries and poorer conditions for property rights.

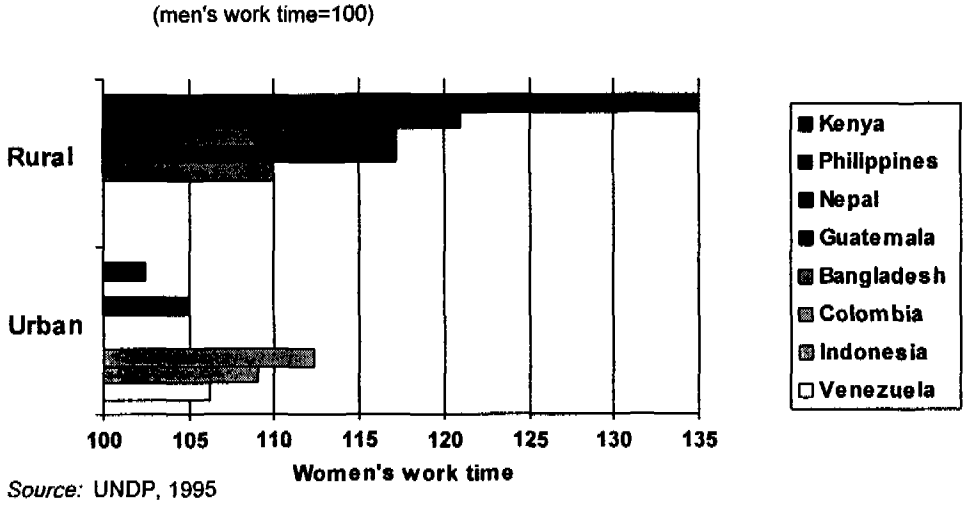

Figure 7.1 Women work more hours than men (Source: UNDP, 1995)

occasions, women have difficulty in setting time aside for other activities (Thomas-Slayter and Rocheleau, 1995). For example, the task of bearing and raising children consumes much of women's time, at the expense of opportunities to improve access to and quality of the domestic water. "Especially when lives are relatively short and fertility is high, women tend to be tied to home-based activities for a significant fraction of their working lives" (World Bank, 1995).

Whereas childbearing and rearing, together with other inescapable domestic tasks, impose a constant constraint on any mother's time, income generating activities are time-consuming only for those women actually engaged in such activities. However, these women tend to work longer hours than men in nearly every developing country (UNDP, 1995).

Gaining access to information and consultation is also partly a matter of time affordability.

"In many cases, procedures are such that, in practice, women can make less use than men of ...mechanisms for information and consultation, in spite of their roles as future users, primary caretakers, protectors of family health and educators of the new generation. In the attendance of meetings, women are hampered by lack of free time. Their limited access to information on village affairs means that they are also less well informed about projects or project meetings" (UNDP, 1995).

By and large, men in the developing countries have a more flexible daily schedule compared to the women, and "are more free to move and to pursue other life options" (Thomas-Slayter and Rocheleau, 1995). Men thus have greater ability to invest time in activities that, indirectly or directly, could improve the community's and especially the family's accessibility and supply of water, for example by travelling into town to purchase raw material and equipment with which to construct a pump closer to the homestead. In practice, for women to free time for water-improving activities implies heightened intensity of work.

7.4 Legal and unwritten rights, land tenure systems

"The starkest reflection of the low status accorded to women is the discrimination against them in the law. In many countries, women still are not treated as equal to men - whether in property rights, rights of inheritance, laws related to marriage and divorce, or the rights to acquire nationality, manage property or seek employment" (UNDP, 1995).

Ideally, men and women should be able to use and develop their local water resources on equal terms and to an equal extent. However, as acknowledged by UNDP (above), in many developing areas, the prevailing legal and unwritten *laws* and *regulations* place women in a subordinate legal position to men. The most important of all human rights is the *ownership* of land, as it in many parts of the world is the key to survival (Seager and Olson, 1986).

Historically, although without control of land, women were still guaranteed user rights by community tradition of the common lands, which used to be a relatively large area (Asamba and Thomas-Slayter, 1995). However, with the privatisation of land and the introduction of land titles (e.g. in Kenya), women are increasingly being deprived of their user rights, as well as of common land on which they are heavily dependent (Seager and Olson, 1986; Thomas-Slayter and Rocheleau, 1995). The private land is held in the name of the head of the household, which in all but a few cases is the husband. This is typically the result of the laws of inheritance (Asamba and Thomas-Slayter, 1995). Such inheritance laws, dictating that women cannot inherit property or wealth or cannot do so on equal terms with men, are found in a great number of countries, globally. In fact, this is true for most of the northern countries of Africa, including Kenya, Somalia, CAR, but also in Zambia and Zimbabwe; in India, Malaysia, Indonesia, Peru, Bolivia and Paraguay; and in the countries of the Middle East, except Israel. The Islamic code limits a daughter's inheritance to half of the son's share (Seager and Olson, 1986).

As a result, throughout most of the developing world, men today own most of the private plots and formally control the public lands (Thomas-Slayter and Rocheleau, 1995), as women are not permitted to either *own* land in their own rights or to *control* the use of the land, as well as its water and livestock resources, without the permission of a male relative (Seager and Olson, 1986; WRI, 1994; Elson and Cleaver, 1993, in SIDA, 1993b). In addition, most women also have little knowledge of their legal rights to land and its use (Thomas-Slayter and Rocheleau, 1995). For various reasons women's opportunities to make decisions regarding communal resources are thus constrained.

In many developing countries[12], where women are born and married without (equal) rights to land property, they are also divorced or abandoned without any rights to the land. Instead of being divided between the spouses, the land is accorded to the divorced husband (WRI, 1994). If a woman is widowed, she may hold the title and thus the legal right to her husband's land, but this situation normally only lasts temporarily until the widow's sons come of age (Asamba and Thomas-Slayter, 1995).

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[12]In the 1980s inequality between the gender regarding rights to land existed in, for example, the following countries: Libya, Niger, Nigeria, Burkina, Togo, Ghana, Liberia, Gambia, Ethiopia, Kenya, Uganda, South Africa, Botswana, Zimbabwe, Burundi, Iran, India, Sri Lanka, Nepal, Bangladesh, Indonesia, Malaysia, Brazil, Bolivia, Chile, Peru, Equador and Haiti (Seager and Olson, 1986).

The lack of land property rights not only limits women's access to and influential powers over the communal resources, but often it also indirectly prevents women from borrowing money (Deshingkar, 1995; Thomas-Slayter and Rocheleau, 1995). In many developing countries, credit regulations are such that they demand land property as a security for the bank. With no access to bank credits, women may not be able to afford to pay for long term investments (WRI, 1994). In addition, owning property can also be a criterion for co-operative memberships and other benefits (Thomas-Slayter and Rocheleau, 1995).

Regarding *water* resources, owner and user rights range from *private* ownership and *exclusive* use (for example to an open shallow well localised within the farm territory) to free *public* access to communal water resources (for example hillside springs and flowing rivers); and in between, *user* rights to *shared* water resources, such as water from shallow dug wells in river beds (Rocheleau *et al.*, 1995). Despite having user rights to public and/or family owned water resources, women generally still lack the right to dispose and control of these resources. The distribution of ownership and control between the genders has an ultimate importance as it can determine whether local soil, trees and water resources are managed sustainably or allowed to degrade (Joekes *et al.*, 1996). Women and men may therefore require different types of legal protection to establish and maintain their rights (OECD/DAC, 1994).

7.5 Gender involvement in policy- and decision-making

To be represented in political bodies of decision-making, whether on local, regional or national level, gives men and women the possibility to participate in decision-making regarding public matters. For example, participation in village councils, boards or committees concerned with the infrastructure of water pipelines, roads and buildings can secure that the decisions taken on the matter correspond to existing public and individual needs.

[Yet,] "despite the fact that it is mainly the women who suffer from the lack of availability of water, it is the men who discuss water matters in villages. Male members of the village decide where to locate and construct water facilities. Any applications for communal taps etc. are made by the men, for women rarely have direct contact with water authorities" (*pers. comm.*, Nikki Moteaux, ISER, Grahamstown, in Deshingkar, 1995).

In other words, when meetings are held by local councils, these are often restricted to men, especially since most community representatives in local governments tend to be men (Wijk-Sijbesma, 1985).

"The absence of women at local meetings and on governing bodies means that information and decision-making is a men's affair, even on issues of which women have special knowledge and interest." Even when women are present, the men occupy the most prominent seats closest to the visitors, whereas the women sit in the rear of the meeting place, where they are not able to hear and see everything (Wijk-Sijbesma, 1985). It is men who are primarily addressed and consulted by community education staff, the water committee representatives, community organisations etc. (Joekes *et al.*, 1996). So, even though women actually are represented at the community level, they do not necessarily have a say in water projects (Wijk-Sijbesma, 1985).

Furthermore, in no developing country do women have a representation higher than 30 per cent in the decision-making positions at the *national* level. In fact, in the

developing countries, only 10 per cent of the parliamentary seats are occupied by women, and only 6 per cent of the cabinet positions. "In 55 countries, there are either no women in parliament or fewer than 5 per cent. These countries range from the very poor (Buthan and Ethiopia) to reasonably affluent..." (UNDP, 1995).

Men not only dominate decision-making positions in communal and national political bodies of developing countries but also in research institutions and external development programme committees, particularly the technical and managerial positions. "This may influence the level of interest in research and development on women's roles in water use and management" (SIDA, 1994; van Wijk-Sijbesma, 1985).

The reasons for women's under-representation in bodies of decision-making and lack of access to political meetings are multiple, and often deeply rooted in traditional gender-discriminating attitudes and customs, for example the tradition of male ascendance in state institutions (Thomas-Slayter and Rocheleau, 1995). The male heads of households are supposed to represent the family, and it is often assumed that women are informed and influenced by their husbands. At village meetings, women are expected only to be passive listeners. As a result, women have little experience in public debates. Men, in contrast, are more encouraged to speak and express themselves freely and frequently, and to travel more widely on business and attend political and religious meetings (van Wijk-Sijbesma, 1985).

Opportunities for women to act as consultants are not only constrained socially, but are also often inconsistent with women's livelihood patterns, in terms of location and timing aspects. Moreover, participation in decision-making presupposes access to information, education and training, which women do not have to an equal extent (OECD/DAC, 1994).

As a consequence, women rarely see themselves as having a role in modifying the formal systems of resource access and use to benefit their communal needs and interests (Thomas-Slayter and Rocheleau, 1995). In fact, those excluded from easy access to water tend to be the more marginal households who have less adequate water facilities and little influence (Elson and Cleaver, 1993, in SIDA, 1993b).

7.6 The importance of networks and associations

"All too often excluded from the decision-making levels, women have developed their own informal approaches to solving problems."—"In almost all countries, women's networks constitute a natural mechanism for community-based actions. Often it is the women's organisations, large or small, that are finding the new solutions women need" (Rodda, 1994).

Participation in informal networks and formal associations is proving a valuable strategy for increasing the abilities of individuals and households, especially women and the poor, to access services, credit and other resources within the community (Thomas-Slayter and Rocheleau, 1995). It has also shown to increase individuals' opportunities to exert an influence on policy- and decision-makers and other significant community members. Social networks and associations can also work as safety nets (Thomas-Slayter and Rocheleau, 1995). Networks such as these may range from national decision-makers and political leaders, to water committee members, service-oriented formal associations, to women's groups.

Formal as opposed to informal groups and organisations have an explicit structure and a clear purpose, for example women's organisations. Women's organisations can work as promoters or as representatives that speak on behalf of the women (van Wijk-Sijbesma, 1985). Participation in a women's group may be used as a facilitator for obtaining access to common property, including resources such as water (Thomas-Slayter and Rocheleau, 1995).

[Moreover,] "women's associations may organise credit schemes for generating cash income, rotating allocation of funds among members. They may establish mechanisms for providing and managing collective goods and services, such as water tanks and delivery systems..." (Thomas-Slayter and Rocheleau, 1995).

Informal networks, such as grass-root organisations, have few links with the formal national development systems, but play a great role in serving the poor from the countryside and city slums (Rodda, 1994). Ultimately, participation in formal associations and informal networks can develop into co-operation, reciprocity and exchange. In some instances it may lead to increased equity or democratisation; but other times to increased social stratification and marginalization (Thomas-Slayter and Rocheleau, 1995). Still the same, participation in networks and associations may be used by either gender as a strategy for expanding their respective assets and influential opportunities.

As a summary, Figure 7.2 below illustrates the connections between an individual's roles, rights and opportunities. As is suggested by the figure, equal status and power of men and women in the society can only be attained by counteracting and abolishing gender-discriminating attitudes, laws, regulations and practices within the society.

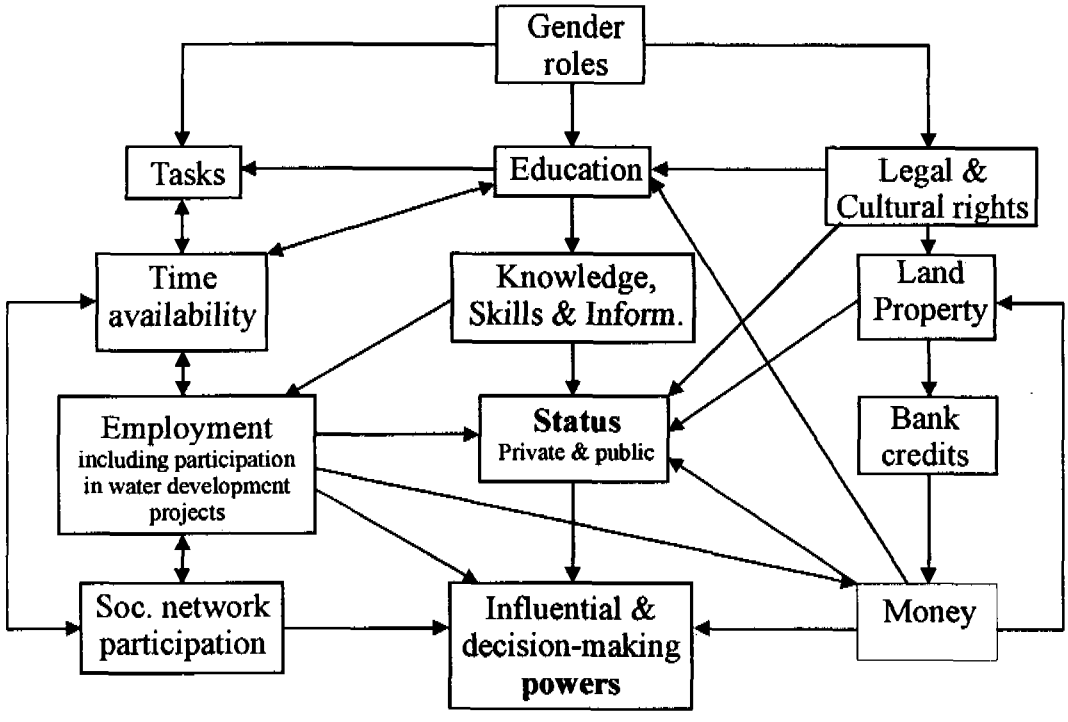

Figure 7.2 The figure shows how the gender roles and responsibilities of an individual will shape his/her powers and opportunities to influence and participate in decision- and policy-making within the society

8 GENDER IMPACTS OF UNIVERSAL CHANGES OR LACK OF SUCH

As the populations in the developing countries continue to grow, food, fuelwood and freshwater per capita become increasingly scarce. Overgrazing, deforestation, erosion and pollution are today 'normal' aspects of the lives of a large part of the developing world's population. However, there is a growing awareness that the burdens of *natural resource destruction* fall most heavily on women, especially in poor households (Thomas-Slayter and Rocheleau, 1995). Women already devote more than 10 times as many hours to fuelwood and water collection than men - 9.7 hours compared with 0.9 hours. Even "girls spend more than 7 times as many hours as adult males in these activities and 3.5 times as many hours as boys" (UNDP, 1995).

As poverty and unemployment spread in the rural areas, urban towns and cities become attractive with their greater supply of food, water facilities, job opportunities etc. However, male-out migration to urban areas gives rise to a large number of poor rural female-headed households. Where the gender roles remain unaltered, urbanisation has shown to increase the burdens of women. This is especially true in households, where the men have not succeeded in finding a job. The women are hence forced to take over the role as the main income provider, a role that they see "more in terms of an increase in the pressure on their labour time than an increase in their power over men" (Songsore and McGranahan, 1996).

The *modernisation* and *privatisation* of industry and agriculture have also proven mainly to favour the male population.[13] As women still mainly become employed within the informal sector, increased investments and job opportunities within the formal sectors rarely benefit the women (van der Veken and Hernandez, 1988). Nevertheless, in several countries in East Asia, Latin America and Sub-Saharan Africa, the female wages have increased and wage differentials between the genders have been reduced; yet, the employment segregation remains largely unchanged. In other words, economic growth has proven a slow instrument in changing the status of women (World Bank, 1995) .

The impact on men and women of changes in the socio-economic and natural environment depends largely on *if* and *how* the traditional gender roles and tasks are allowed to change *accordingly*. Social and economic practices are to some extent being adopted to urbanisation-driven changes in family structures (Thomas-Slayter and Rocheleau, 1995). Yet, changes in legal systems, land tenure and various other regulations have still not been modified accordingly. In fact, the disjuncture between the women's legal status and their responsibilities is growing (Thomas-Slayter and Rocheleau, 1995). Women's subsequent economical constraints limit their ability to sustain productive farming practices and improve the health and future prospects of their children.

Nevertheless, today, women *are* gaining larger influence within the household. This progress can partly be attributed their increasing enrolment in higher education, greater participation in informal economic activities, and advancing economical importance and independence. Fundamentally, it has been "activated by the growing power of women's movements and associations which are creating a consciousness of

[13]For further reading on the impact on women of urbanization, economic change and national politics in Sri Lanka and Thailand, see *Gender and Slum Culture in Urban Asia*, by Susanne Thorbek (1994).

the need for greater gender equality" (Ashworth, 1996). *Informal networks*, *PRA* and *NGOs* are also playing crucial roles in strengthening the status and power of women in relation to men.

9 POLICY RECOMMENDATIONS

To achieve and secure an *optimal* use of the limited freshwater resources - through a full use and exchange of ideas, knowledge and resources - gender equality in all dimensions of society is fundamentally required. In most if not all societies, achieving gender equality implies *empowering* the women, chiefly by increasing their skills, assets, opportunities, and status. Yet, such changes can only be attained by a joint female-male effort to modify the societal *attitudes* and *perceptions* on women's actual abilities and importance - attitudes which are deeply rooted in cultural beliefs and encouraged through customary practice.

"The attitudes and behaviour of men and women within the private sphere help determine the relations, and power imbalance, between men and women in the community, the work place and political spaces" (Ashworth, 1996). Therefore, the required changes in attitudes should at best be made simultaneously within the *households* and the rest of *society*. New *behavioural practices* particularly in the public sphere is needed, in the form of increased involvement and participation of women in policy- and decision-making, as well as securing non-discriminating systems of legal and unwritten laws and regulations, institutions and economic structures. (Box 9.1)

Box 9. 1 General requirements to attain gender equality

1. **Employment** of women, enabled through:
   - legislational reforms, to secure non-discriminating wage systems and credit systems, as well as equal employment opportunities, land property rights, and land tenure;
   - facilitation and promotion of increased education for women, on all levels;
   - training programmes, in e.g. leadership, managerial skills, construction, as environmental and health educators, and in other areas of interest to the women;
   - social benefits and financial support, to facilitate women's opportunities of education, employment, bank loans etc.
   - positive discrimination measures to overcome women's lack of self-confidence
2. Changing societal **attitudes, perceptions** and **expectations** on women's actual abilities and importance:
   - of *community* members, especially males, within both the private and public spheres;
   - of members of national and local policy and decision making *boards* and *committees*; and
   - of *external* development policy makers, development workers, and researchers, to further integrate gender into water policies and programmes, in theory and practice, at the earliest stages and at the stage of evaluation.
3. Increased **involvement** and **participation** of women:
   - *in* influential *user associations and informal networks;*
   - in local, regional and national governmental bodies of *decision* and *policy* making, on general issues, and on water issues related to the utilisation, management and development of freshwater resources at communal, 'river basin' and international scale.
   - *in external water-related* development *projects, programmes and policies.*
   - *through increased* gender awareness *and* sensitisation, PRA methods *and* NGCO support.

Sources: Ashworth, 1996; Deshingkar, 1995; Green *et al*, 1994; Hannan-Andersson, 1995a; IRC, 1994; Joekes *et al*, 1996; Lee-Smith, 1994; OECD/DAC, 1994; Poluha, 1993; van Hooff, 1994; WHSDP, 1995; van Wijk, 1993; and WRI, 1994.

However, altering gender-discriminating norms and customs is not done instantly, nor without objections or conflicts. Yet, every process on the way is worth the struggle, not only for the benefits of the women, but for the society as a whole.

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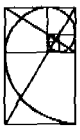

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