

THE IMPACT OF NEW TECHNOLOGIES ON WOMEN

by

Jennifer Francis
(edited by: Dick de Jong)

IRC International Water and Sanitation Centre

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Abstract

Faced with their responsibility of household chores, farm work and earning cash to supplement incomes - tasks which often add up to a 16 hour day - rural women in many of the developing countries see the lack of time as a major constraint on their ability to improve family welfare. When one considers the multitude of tasks that rural women perform and the limited tools they use in performing these tasks, it is obvious that the introduction of new technologies holds out the promise of considerable benefits - not just to the women but to their families as a whole.

With respect to water supplies and sanitation there is a range of technologies that can help with the problems of collection, storage, purity of water, health and hygiene. These technologies should in theory, be very beneficial in respect to releasing women's time from unproductive tasks - time that can be diverted into income-generating activities, better child care and a general increase in the well-being of the whole family. But does the use of such technologies by women actually result in improved health, food production and greater cash incomes? In practice, a number of factors can prevent the potential benefits from being realised. Taking into account different categories of people with different interests in and control over the use of technologies for different purposes, as well as its effects, this paper calls for a gender-balanced approach to sustainable use of water supply and sanitation technologies.

TABLE OF CONTENTS

	page
I. Introduction	4
What is technology	4
II. Current Situation	4
(i) water collection and the division of labour	4
(ii) time and energy spent in water collection	5
III. Technologies Relevant to Women's Tasks in Water Supply and Sanitation	6
IV. Impact of Technologies on Women's Tasks in Water Supply and Sanitation	8
(i) time saved by new technologies in water supply and sanitation	9
(ii) major problem areas	10
V. Involving Men and Women - A Gender Approach	11
VI. A Gender Approach Towards Technology	12
VII. Conclusion	13
VIII. References	13

I. Introduction

What is technology?

Technology is often associated with a tangible element such as a device or machine to carry out certain jobs. In essence however, it implies knowledge that can be used to produce a good or service (Chatterji, 1991). Aase (1991) indicates that technology is the process a team of people adopt, using tools to solve certain tasks. A tool has no meaning if it is not related to people and is not used to solve specific problems. The use of equipment requires competence and skills that usually can be obtained through theoretical study and training (Olsen, 1989, cited in Chatterji 1991). The relation between tools and tasks generates a tangible or intangible product, that has been produced because the team had a fundamental reason to solve a problem or comply with an assignment to reach a specific goal.

The technology (team, tools and tasks) is an instrument that needs to contribute to the social and economic development of a country. In this respect, technology development, transfer and promotion are not aims in themselves, but utensils in the development of a society. Few people realise however that technology comprises a related structure, a social, organisational and mental base on which it is built. The technique is thus the top of a pyramid that needs to be largely in place to make it work.

II. Current Situation

(i) Water collection and the division of labour

Water is a woman's issue. In developing countries women are the ones who are most involved in drawing water for household use, transporting it home, storing it until it is used, using it (for cooking cleaning, washing, watering household animals). Women are also generally the main guardians of household cleanliness and the caretakers of the sick. They are the principal teachers of hygiene behaviour to their children.

From the age of about six, girls begin to help with the daily task of fetching water. In societies in which women are occupied within the household and economic activities, such as trading and agriculture, or in which they are not permitted to be seen in public, young girls may contribute quite substantially to water collection.

Boys may be involved when they have no other productive tasks. However, in general they assist less, possibly because attendance at school is considered to be more important for them than for girls, who may be kept at home as soon as they reach an age when they can help their mothers.

Water collected by children may constitute a substantial share of the total amount collected. In southern Tanzania children collected 40 percent, in Sierra Leone 60 percent of all domestic water. Such collection habits are a serious impediment to their school attendance. Girls in particular are seriously restricted in their development by their double limitation of age and sex.

As soon as boys get older or go to school, collecting and carrying water become female tasks. In the total package of daily activities, this may well be one of the most time-consuming domestic chores.

Apart from the small number of single men who must collect water for their own households, men collect water mainly for business enterprises, for example, small restaurants and bars, or to sell. They may help women to collect water when sources are far away or hard to reach. However they then usually have some type of transport such as carts, donkeys, wheelbarrows or bicycles.

(ii) Time and energy spent in water collection

Collecting the daily water needs can take a quarter of a woman's working day and more than a quarter of her daily food intake, leaving little time and energy for her many other tasks. The time and energy involved in water collection involve tasks such as: walking to the water source, waiting, water lifting and water carrying. Estimates for time and energy involved in water collection vary widely according to location, season, terrain, and available technology. In Kenya, it is estimated that 3 million women spend an average of three hours a day collecting water; in other areas of the world that figure may be as high as 6 to 8 hours. Quantities carried vary also greatly, but the WHO usually sets 18 - 20 litres per person per day as the maximum acceptable. This would mean 108 - 120 kilos per day for a family of six! The expanded on this task may consume a third of daily calorie intake - not negligible in populations where malnutrition is already a threat.

Some studies attempt to give an overview of the range of times involved in water collection (Burgess, P. and Prynne, P. 1985):

East Africa:

A detailed study by White et al of 280 households in twelve rural areas shows a range in water collection times of 11 to 84 minutes per day with a mean value of 46 minutes per day. Evidence from Warner indicates an average time, in villages with unimproved supplies of 146 minutes per day. Times in poorly served arid areas such as Singida region, Tanzania - are in excess of 3 hours per day.

Ethiopia:

In the Dongore area, the minimum distance from villages to water during the dry season is 5kms. Assuming that women carrying water walk at 4km/hour a round-trip will take over 2 hours. A study of the Gurage region indicates that in the lowland areas, 53% of households spend 3 to 4 hours and 21% of households more than 4 hours on a single journey to collect water during the dry season.

India: According to the WHO report published in 1974, 90,000 villages (16% of the total villages in India) in 1969 had no water within 2 km or had wells more than 15 metres deep. Assuming a walk speed of 4kms/hour, this implies a minimum round trip of 1 hour.

In terms of a number of trips made per day, a study in Kenya found that women and children make anything from one to nine trips for water for each household per day. The number of trips per day is drastically reduced in the dry season when the water source is at a greater distance. Fewer studies give an indication of the loads carried on these journeys, the use of any transportation aids, or the effect of terrain on time and energy expenditure.

The Kenya study indicates that the average load of water is 20 litres amounting to 25 kg in weight. Carrying weights of this magnitude accounts for a high expenditure of energy. When walking up steep slopes (a common circumstance in many rural areas) energy requirements are further increased. One study in East Africa estimates that to take account of a 10 degree uphill gradient, energy costs are 4 times greater as when walking in level ground.

III. Technologies Relevant to Women's Tasks in Water Supply and Sanitation

When one considers the multitude of tasks that rural women perform and the limited tools they use in performing these tasks, it is obvious that the introduction of new and improved technologies holds out the promise of considerable benefits not just to women but to the rural families as a whole.

With respect to water supplies, there is a range of technologies that can help with the problems of collection, storing and purity of water. Wells can be drilled nearer to villages or can be dug manually on a self-help basis. Streams can be diverted and water piped to villages. Hydrants can be inserted in streams to pump water to hillside villages. Underground catchment tanks can be built to collect and store rainwater, or water can be collected from roofs and stored in various types of containers. Such devices save considerable time and energy involved in pulling up bucket after bucket of water from a deep well. Water drawn from a well will normally be much purer than that taken from a muddy river or stream. The water from a fully enclosed well with a pump will be purer still since, the chances of contamination from refuse and dirty buckets are eliminated. Thus, the introduction of a well and a pump to a village will generally improve the quality of water available for drinking. In cases where water is still collected from contaminated sources, simple water filters made from traditional clay pots and containing layers of pebbles, sand and charcoal can get rid of many of the impurities. To all of this, still further technologies can be added that help rural women. Pit latrines and soak pits can make the women's tasks of keeping the home clean and hygiene much simpler.

Technology options for improved water supply and sanitation

Water sources

Groundwater

Groundwater is water which lies below the surface, in some cases only a few feet below, in other cases much deeper. The best way of extracting ground water, if it is not too far down, is

by means of a hand-dug well as it is less liable to contamination. Generally the advantage of a hand-dug well is that the community can dig it by itself.

Spring water:

Spring water is usually fed from a sand or gravel water-bearing ground formation (aquifer), or water flow through fissured rock. Where the underground flow of water is blocked by solid clay layers, the water is forced upwards and can come through the surface. The water emerges either on land as a spring, or invisibly as an outflow into a river, lake, stream or the sea. Where the water emerges as a spring, the water can be easily tapped. It can be enclosed in a spring box from which a pipe leads down conveying the water to the point of delivery.

Rain Water Harvesting

In some societies, particularly in tropical islands and semi-arid areas, rainwater harvesting is a necessary means of providing water for domestic purposes when groundwater resources are unavailable. Reasonable pure rainwater can be collected from corrugated iron roofed, roofs made of tiles, aluminium or asbestos cement sheeting. After harvesting, storage can be at ground level in vessels or surface reservoirs or below in underground reservoirs. Vessels of wood, cement or clay can be used as small storage containers.

Lifting water

Some means are necessary to lift and transport water from streams lying beyond a village or from wells. The most useful technology here is the pump.

Rope pump

Pulling up a bucket full of water is hard work and the sides of a well may get damaged by the rope rubbing against them. The improved technology for lifting water is the rope pump which lifts a greater quantity of water more quickly than can be done by a single bucket. The rope pump uses discs or knobs of suitable local raw materials to lift water through a pipe and discharge it via a spout at the surface.

Handpump

Handpumps are generally considered the most useful technology for lifting water from streams lying below a village or from wells. Handpumps lifting groundwater which can be operated and maintained by village men and women are estimated to be an appropriate technology choice for many people living in the rural and urban fringe areas of developing countries.

Transporting water

The greatest promise for the rural poor can come from either improved traditional methods or technologies that have been specially designed for the use of rural areas. These technologies can be carrying aids, wheelbarrows, handcarts, animal transport, and others.

Two-wheeled handcarts

In two-wheeled handcarts, the weight is carried directly by the wheel, so larger loads can be pushed or pulled over longer distances. The prototype "small farm transport" is a more efficient form of a wheelbarrow. The wheels carry the major part of the load and are large

enough to negotiate rough ground. The two-wheeled handcarts found in China come in many designs and involve a well developed technology.

Piped water supply

A pipe water system can offer the good, effective, sustainable supply of larger quantities of water that are so important for the work of women and the health of the family. "Piped supplies" cover a range of water supply systems with different degrees of sophistication. They differ from "point source" systems in that water is conveyed from the source by pipes over some distance to one or more distribution points.

Water Purification

Treatment of raw water fit for human consumption is till unusual in many countries. There is obvious need for reliable and simple water treatment systems which can be maintained by local technicians with major assistance from external sources.

Slow sand filtration:

Filtration is the process by which water is purified by passing it through a porous material or "medium". In slow sand filtration a bed of fine sand is used, through which the water slowly percolates downward. The main purpose of slow sand filtration is the removal of pathogenic organisms from the raw water, in particular the bacteria and viruses responsible for spreading water-related diseases.

IV. Impact of Technologies on Women's Tasks in Water Supply and Sanitation

The benefits of better water supply begin with convenience - of having nearby, saved time, less effort - and enable women to make choices. Time saved from carrying water can be used for the family's cooking, or helping the children with their homework. Women can also choose to enjoy leisure or they can rest.

In the Kitui region of Kenya, improvement of water supplies lessened the burden for women in water carrying over long distances and some women began to use time saved for income generating projects. Others made additional trips to collect water for better hygiene. The women also took on tasks previously carried out by their daughters, thus enabling a large number of young girls to go to school.

The choices are many. Time saved from carrying water can be used for productive work, for example an income-generating activity which can bring in a supplementary income however small. The most economic and health benefits known so far, stem from having sufficient quantity of water nearby.

With respect to better quality of water, it has generally been found that improved water supplies by themselves do not lead to any noticeable health improvements, since there is also a need for general hygiene and better medical facilities. There is little hope of making

headway with better hygiene and home improvement programmes while women are overburdened with the whole range of farm and domestic chores.

(i) Time saved by new technologies in water supply

Information available on time implications of improved water supply technologies are available but the evidence on impact is mixed.

Statistics on amount of time saved by putting new water supplies are of little value since they are so site-specific and tend not to indicate if they are averages for the year (as opposed to for dry season only) and whether they take account of all aspects of water collection (lifting, waiting at the well etc.) or only the actual journey time. For what they are worth, the time savings recorded in a number of Africa based case studies show a quite large range - varying from insignificant amounts in places such as East Zomba, Malawi, where villages had many available and reliable open wells, to nearly two hours a day in places such as Mozambique and Zaire where traditional sources of water have been limited or situated at great distances (van Wijk, C. 1985).

Although the obvious factor limiting the amount of time saved is that of proximity of traditional water sources, other causes have been identified. One factor is poor maintenance service which increases waiting time at taps. Another relates to the cost of the new supply versus the traditional one. In one Indian community, the introduction of a piped water supply with metered house connections has not reduced the heavy burdens of water collection for women servants because all water for purposes other than drinking is still fetched from the free traditional wells.

One more consideration concerning time savings is the diluting effect of having the total amount of time divided between several family members who have responsibility for the task. Especially in polygamous households, even a saving of 100 minutes per day comes down to very little per person and can become difficult to trace through into alternative uses.

The relationship between time saved in water collection and increased time on domestic chores, income generating activities, social, educational and leisure activities is easier to establish.

Women in Lesotho were found to spend almost all released time on social and leisure activities. Those in a study in Mozambique reallocated time primarily to rest and other household chores. In Tamil Nadu women were found to reallocate time released from water collection to firewood which was becoming scarce. Use of released time in this way is without its benefits. A study from Asia has shown how mothers with more free time raise children who are better nourished, because they can give more attention to food preparation and feeding their children (Feachem, R., et al. 1978 and Cairncross, S. 1987).

Working out the costs and benefits of improved water supply technologies is difficult because of the non-quantifiable nature of many of the benefits. One example of an attempt at economic analysis was found: Time savings in water collection in Ghana states that “where

disposition is genuinely a constraint to income earning activities, the benefit-cost ratio for investment made in labour-saving technologies related to water carrying has been of the order of 3:1 when time saved is entirely reallocated to the new activity (Feachem, R et al. 1978).

(ii) Major problem areas

Although the introduction of clean and conveniently located water supply technologies would seem to be a priority in almost every rural village, - from the point of view of both releasing women from the daily drudgery of collecting and carrying water and improving hygiene, health and nutrition - the potential beneficial effects are not always forthcoming.

Limited impact

Decision-making on the choice of technology

Wells often run dry after a few years and pumps frequently break down after a few months, so that women must resort to the traditional more distant water source. Although it is the women who stand to lose most if the water system breaks down, they are rarely involved in the construction of wells or trained in the operations and maintenance of pumps.

A project in the Upper Volta dug wells to inadequate depths because only men were involved in its designing and implementation. Village women were not consulted, although they were responsible for collection of water from the well and had better knowledge of the depth to be dug to retain water year-round.

Access and control to resources

Women usually do not have the cash to pay for pumps to be repaired and often the men do not feel that repairs are their responsibility. A recent study in Lesotho stated that "drawing water is a woman's task" and men are under little direct pressure to carry out repairs (Feacham et al, 1978). As a consequence, the number of non-functioning pumps in Africa at any one time exceeds the number that are in working order.

Access and control of benefits

Even when the new water system is fully operational, there are still factors to be taken into consideration. For example, if there are not suitable facilities provided at a well for bathing and washing clothes, the women will still find it necessary to travel to a more distant water source. In addition, if a significant amount of the women's time is released from collecting water, this time may be diverted into doing more work on their husband's field rather than into income-earning activities of their own or better childcare. A study in Ethiopia revealed that over 50 percent of the men in villages awaiting improved water supplies expected that any time savings realised by their wives would be reallocated into helping them with their work (Ahmed, I. 1985).

Other factors involved and related to the above include the lack of planning for income-generating schemes along with the introduction of labour-saving technologies to enable women to have their own money to pay for or hire services or repairs; lack of training for women to allow any released time to be put to productive use; lack of orientation of men

regarding exactly what is involved in women's responsibilities in terms of time and income so that they become more supportive of measures aimed at helping them.

Limited dissemination and access of information

As in the case of the impact of technologies, a major factor limiting the dissemination of many improved technologies is that the great majority of rural women are completely unaware of the existence of most of the improved technologies that can help them. When information does filter down to the village level, it is usually the men who receive it, either because the extension workers are men, or because it is only the men who have time to sit around at organised meetings where such information is given out.

Women who are frequently the potential users of technologies are rarely consulted at the design stage. As a consequence much effort is expended in designing technologies that relate to very low-priority needs and have little chance of being accepted. Much research and development work is wasted on new technologies that are socially and culturally unacceptable to women or that in their view would make their working conditions worse rather than better.

Improvement in the access of the rural poor to goods and services has often been emphasised as a fundamental pre-requisite for a more equitable sharing of the gains from rural development. Therefore from the technological perspective it is equally important to ensure greater access of women to various inputs (physical, capital, skills and material) needed to generate or adopt innovation within the "traditional sectors".

V. Involving Men and Women - A Gender Approach

Gender roles as opposed to sex, which is a biological difference, are the result of a socialisation process which assigns certain roles, responsibilities, work and authority to men and others to women leading to certain forms of behaviour, attitudes, roles and responsibilities for each group. Gender is a changeable difference between a woman and a man in a particular social situation.

It is a dynamic concept, as work and position of women and men are not inflexible but changeable over time within certain cultures and among classes of people. Technology projects have impacts on these changes as for other developments.

The gender aspects of drinking water supply and sanitation usually regard the role of men as the decision makers and emphasise physical work as the role of women. In this role, women collect water, dispose of waste and preserve hygiene. This emphasis on physical work such as water collection see women as the main, but passive beneficiaries.

The underlying reasons for adopting a gender approach are that in a community when men and women are the agents of their own development, women are usually in a subordinate role and can be denied an active role in development, so that the self-determination of the community may become the self-determination of the men.

In a gender approach, attitudes, roles and responsibilities of women and men are taken into account. It recognises that both sexes do not necessarily have the same access to resources and that work benefits and impacts may be different for both groups. The gender approach requires an open-mindedness to aim at the fullest possible participation of both men and women.

A gender approach ensures that women can participate in decisions and functions that men - husbands, fathers, brothers and sons - as well as village leaders and technicians and the women themselves must come to recognise. A gender approach is working together of women and men.

VI. A Gender Approach Towards Technology

Every project introducing a technology as in water supply goes through several stages to ensure the smooth progress of the project and good results.

Project identification:

What is to be done, where, how and with what goals and objectives are crucial decisions at this initial stage. In initiating a project both men and women should be involved in the project team. Important issues to be taken into account are:

- the needs and priorities of both men and women;
- participation of both men and women in all phases of the project including planning, decision-making, roles and skills development as well as management training;
- benefits expected for men and women;
- the division of labour between men and women;

Project feasibility:

This usually means a visit by the project team to the project area to assess what type of water system is needed and how it can be adequately maintained, managed and used.

It is at this stage that women's and men's traditional knowledge and practises in rural water management and hygiene should be taken into account. Other points to note are gender differences in the demographic and socio-economic situation, existing water supplies and their uses by men and women; existing sanitary practises by men, women, girls and boys; local health education activities and the scope for better hygiene practices including the different roles of men and women in access, replicability and division of work.

Needs assessment:

A needs assessment gives the project team the chance to know the views of men and women in the community about improving their living conditions and enabling them to become aware of each other's priorities and needs. Men and women must both be given the opportunity to express their views. Each have different priorities and these must be taken into account so that they can be shared.

Defining project objectives:

In defining objectives we often speak of communities or villagers although the community is made up of individual men and women with separate needs. Project objectives should

therefore be carefully defined to ensure that benefits will reach all men and women. Project objectives should specify what they want to achieve for each group. Gender aware project objectives will see that women share in the planning and taking decisions; for example in selecting appropriate technology and choosing water sites. Women should also be encouraged to take part in operations and maintenance and have access to developing their skills and knowledge not only in operations and maintenance, but as managers of finance as well. Most importantly men in families should be encouraged to support women to perform their roles in planning, management and implementation of water projects.

VII. Conclusion

Gender and class differences in interests and power underlie many disbalances in work, control and benefits. If water supply and sanitation services through the introduction of improved technologies are to remain sustainable, be equitable and contribute to broader development, projects and programmes must pay attention to such differences.

In the years to come, specific gender expertise will be necessary for investigation, documentation and information and the development of human and organisational capacities. It may be considered that in getting nearer to more gender sensitive projects we may always consider the following questions while also looking at class, age, ethnic and religious groups:

Who has information to technology: men or women or both?

Who does the work in introducing technology: men or women or both?

Who makes the decisions about technology: men or women or both?

Who has access to the benefits of technology (water, training, jobs) : men or women or both?

Who controls the benefits of technology (service, income, training): men or women or both?

If answers to these questions is only “men” or only “women”, you can be assured that water and sanitation programmes will not be sustainable, nor have the wanted health improvements.

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Jennifer Francis
IRC, International Water and Sanitation Centre
P.O. Box 93190, 2509 AD
The Hague, The Netherlands
Tel: (31) 70-30 689 54
Fax: (31) 70-35 899 64
email: francis@irc.nl