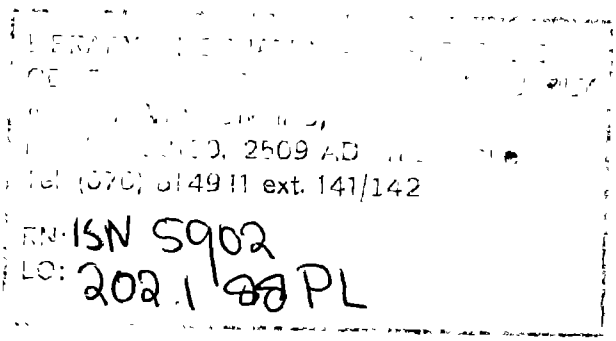
Agricultural Extension and Rural Development Centre

Reading University

A Planner Manager's Guide to the Socio-Economic Issues Involved in Rural Water Projects in the Third World.



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INTRODUCTION

This dissertation will analyse some of the important socio-economic issues which need to be taken into account when planning and managing rural water supplies in the Developing World. The first chapter will consider the issue of identifying the real benefits of water supplies, why this needs to be done in terms of planner manager understanding, of the possible impact a project may have, and the difficulties of establishing whether benefits are consequential to the intervention. In chapter two the issue of women and water will be explored, how they are linked with water, what hardships and constraints they face and the relevance of water to them, and how by not involving women, projects have failed to reach objectives. Chapter three then extends this subject and looks at methodologies for making women visible to planner managers, by listening to women and involving them in the planning, management and implementation of water projects. Chapter four follows on from the first three chapters, by looking at an assortment of planning and management problems for rural water supply projects and programmes in the Third World.

The concept of the planner manager will recur throughout the chapters, this person could be the planner of a water project or he/she could be the manager. More than this however, I want to get across the idea that the planner should be thinking like the manager; that is to say that he/she should put him/herself in the position of the manager and take into account the day to day problems which are likely to occur during and after a project. Planners should think as far as they can into the future, and try to predict

such problems as they may see arising, as far as ten or fifteen years after the completion of the project. In reality problems expected ten years after project completion may well occur in a fraction of that time; sustainability must be at the back of the planners mind. The manager likewise has to think like a planner and not a mere implementor of policy, he or she must be able to adapt the course of the project as circumstances dictate.

By coupling the role of planner and manager however I am also trying to bring in the notion of interdisciplinary responsibility that both planners and managers must bear. Robert Chambers touched on this when he said that,

"Management is a discipline or profession which has yet to make its major contribution to rural development" (Chambers, 1983 pp.183).

The planner manager does not need to be an expert in all the fields of social, economic, political, health and technical knowledge, but as the planner and manager he or she must take responsibility for these roles and view the project accordingly, bringing in help from any one of these disciplines, if and when it is needed. The planner manager of a water project, who is often a technical engineer, must at the same time be a generalist.

Another theme which will recur in the text is the issue of women and their role with water. In the third world women are absolutely fundamental to water projects, both in terms of their role as the principle users and drawers of water and therefore main benificiaries, and in terms of their involvement with water projects.

Women at a protected traditional well Senanga West, Zambia

(Illustration by Carey Mathew)

"In developing countries, women are the main collectors of water. They not only do the work, but also decide which water sources to use....how much water to use, and how to transport it"(Wijk-Sijbesma, 1986 pp.13).

Two chapters have been devoted to this topic because of its importance, but the reader should not be surprised to see women and water issues raised elsewhere. As the intended benificiaries, women and their importance should be an issue which runs throughout much of the planning and management of a water project. Many failures of water schemes in the past, have been because women have been ignored and marginalised by the planning and management, this is a topic which will be investigated further.

We are now in the last quarter of the United Nations International Drinking Water and Sanitation Decade (1981 - 1990), which has since 1981 given a global focus to the Developing World's lack of safe water supplies and sanitation facilities. However by 1985 despite the spending of US$10 billion, an estimated 65% of the rural population of the developing world had no access to safe water supplies and an estimated 75% had no access to adequate sanitation, (Churchill, 1987). Safe water supply is likely to remain one of the most pressing requirments of the developing World for some time to come. This paper seeks to address the issues which have dogged water projects; and offer some solutions.

CHAPTER ONE

IDENTIFYING BENEFITS FROM RURAL WATER SUPPLY

Chapter one will look at the issue of identifying the real benefits of rural water projects and programmes in the Developing World: how such projects have often not reached the expectations of their backers, and why this has happened; the difficulties of attributing health benefits to water projects; what the benefits of water projects are, and how they can be measured; methods of ensuring water projects produce benefits.

The need, first, to question the identification of benefits of rural water projects stems from the requirement of the project planner and manager to understand not just what the project hopes to achieve, but what it has a realistic chance of achieving. There is a need to put water into its correct context as being just one of the factors which is required to improve life in the rural third world, and not of itself a single technical answer, which has all too often been the norm. Once this is understood there is then the necessity to appreciate the other factors: economic, social cultural and political, which make up the universe in which rural populations live. These other socio-economic-cultural factors must be taken into account because they are the ground rules which the water project will have to respond to and interact with, if the project is to succeed and the people gain real benefits.

By not taking these factors into account in the past, planners and managers of water projects have run into major difficulties and projects and programmes have failed. This was illustrated in a recent World Bank publication.

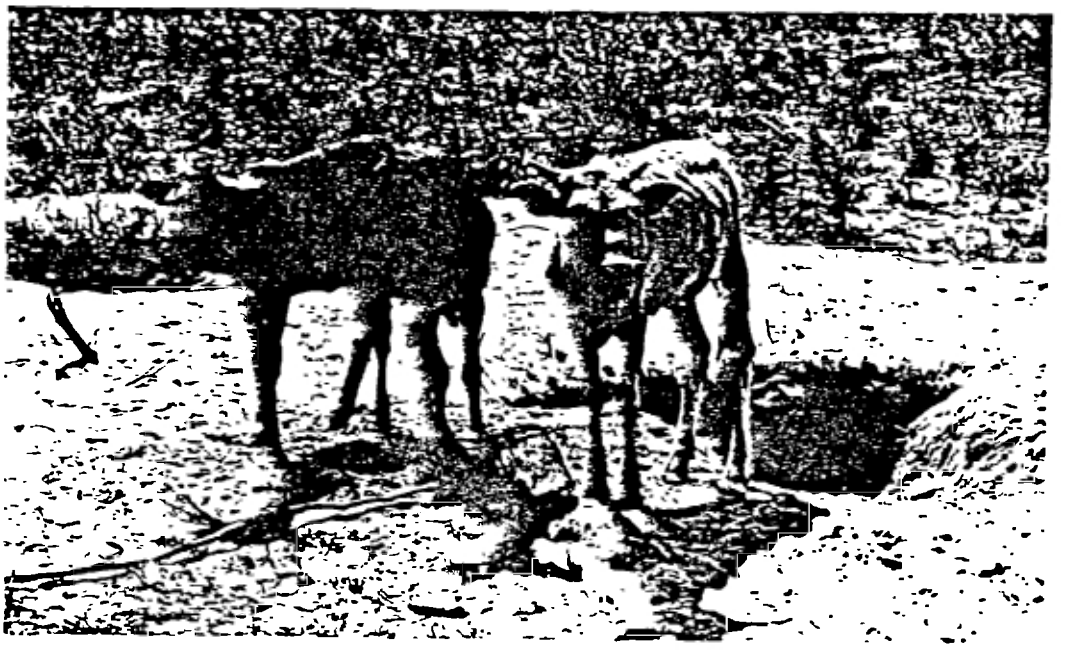
"In country after country (water) systems are going out of operation almost as fast as they are being built. Such failures make the international aid community understandably wary about continuing to lend money for programs that not only have little to recommend them in terms of returns for the dollar, but also simply do not work" (Churchill, 1987 pp.3).

Christine van Wijk-Sijbesma, in her 1985 book,"Participation of Women in Water Supply and Sanitation", states: "Water and sanitation related diseases are responsible for most of the morbidity and mortality in developing countries" (Sijbesma, 1985 pp.3). This being so it would appear to be common sense to assume that water and sanitation improvements are needed in order to remedy the situation. This much is true; where planners have fallen down in the past however, has been that they assumed that water and sanitation projects were all that were needed to remedy the situation. This inability to realize the effective limits of water and sanitation projects has been one of the contributory factors that has led to failures, and hence disillusionment with the impact that water and sanitation projects are having.

"Current strategies for meeting rural water supply and sanitation needs are not living up to expectations..... progress remains slow compared to the growing challenge posed by rapid population increases and disappointing outcomes from past investments" (Churchill, 1987 pp.19).

When reading the literature on rural water supply, which often refers to expected benefits of such programmes, the disillusionment with the actual results achieved is not hard to understand. It is however important to consider the evidence that is available, to obtain a deeper understanding of what water projects can and have achieved.

Woman (below) and boy (above) collecting water from open traditional wells, Senanga West, Zambia. (Photo Brian Mathew)



Domestic animals, pigs(below) and cows(above) in close proximity to traditional open wells can cause a serious health hazard.

Senanga West, Zambia. (Photo Brian Mathew)

A review of the conclusions of studies since 1950, of the effectiveness of water and sanitation interventions on the incidence of diarrhoeal disease morbidity, nutritional status, and early child mortality was written by Steven Esrey and Jean-Pierre Habicht in 1986. In this extensive report ninety six papers were examined in possibly the most complete review of world literature on the subject. The report states that most of the investigations into the child health impacts of water and sanitation interventions, "have provided contradictory and often confusing results and conclusions, many of which are due to methodological deficiencies"(Esrey & Habicht, 1986 pp.117). Indeed it went further and said that, "No study reviewed was considered to be flawless according to the criteria for an experimental study to assess quantitively the probability of causal associations"(Esrey & Habicht, 1986 pp.120). The reasons for this situation are rooted in the complex universe within which water and sanitation projects are attempting to make a positive impact. Factors such as: other health considerations, the socio-economic position of target communities, and the political situation, may be having not only a more profound impact on measurable health conditions than the area water project, but may also be creating an analytical fog through which it is difficult to isolate specific project impact. In other words, when trying to establish the hypothesis that a water project is it self having a beneficial effect, there are threats to external validity, or other factors which may be playing an equal or more important role than the intervention itself.

Three examples of such threats to external validity are breast feeding, (Butz WP, Habicht J-P, DaVanzo J, 1984), income (Yee, 1984), and education, (Meegama, 1980); all of which fall within the social context and are difficult to measure.

Looking at the case of breast feeding first. Young children are very vulnerable to diarrhoea from drinking polluted water. If these children are breast fed they feed and drink from their mother and thus avoid consuming contaminated water; they also acquire through drinking their mother's milk a degree of natural immunity to diarrhoea. Children who are not breast fed do not have the benefit of this; they are liable to contract diarrhoea from swallowing contaminated water, used in the preparation of powdered milk.
Let us consider the case of two villages in similar poor rural circumstances, one where breast feeding is practiced and another in which breast feeding is not. The introduction of a water and sanitation project is likely to have a far greater impact in terms of decreased diarrhoea morbidity and mortality on child health within the community which does not breast feed than on the one which does. This is quite simply because the children of the second village are at greater risk from the environmental factors around them than are the children where breast feeding is the norm (Butz WP, Habicht J-P, DaVanzo J, 1984). Awareness of such vulnerable groups by the planner manager is important since it may influence where a project is targeted and what strategies are to be used. This also demonstrates the need for a health education dimension to water and sanitation projects; in the case of the second village, breast-feeding would be a useful topic to be raised. The planner manager should take a broad "holistic" approach and involve him/her self in matters outside his/her formal training such as health, economics, and social issues. In the situation on the ground in the third world, if the planner manager does not look at these other vital areas it is highly probable that no one else will. As is noted in "Small community water supplies", I.R.C. Technical Paper 18: "When water supplies are developed without complementary improvements in

personal hygiene, food handling and preparation, and in general health care, they are unlikely to produce the expected health benefits" (Huisman, Netto, Sundaresan and Lanoix, 1981, pp.13).

Income and education are also threats to external validity in the better water supply = better health argument. The people with more wealth, in a rural community, are often able to take greater advantage of water and sanitation interventions than the poorer people (Yee, 1984). More educated people may, through greater understanding, be more motivated to take advantage than less educated people (Meegama, 1980). These factors may be interlinked because the more educated people are often also the more wealthy.

The factors: breast feeding, income and education, although presented as threats to validity in a simple search for a causal relationship between improved health and water and sanitation projects, are important issues in themselves and should be taken into account by the planner/manager of any such scheme. From gaining an understanding of the wider situation in health and other spheres, which make up the universe within which the project is operating, the inclusion of other interventions, such as oral rehydration (Oberle et al, 1980), immunization (Feacham & Koblinsky, 1983), health education, or indeed women's wealth creation schemes, should be considered. These may represent more cost effective strategies in improving the standard of life in the target area, than the simple provision of improved water facilities. Single issues however, may also be important in project planning, for example if child health is the principle goal of the project, then sanitation is frequently a more important determinant of child health than water supply (Mayling, 1984).

The problem of seeking scientific health evidence to justify a water scheme is indeed difficult to do. In World bank discussion paper 18 the authors recommend that, "The best that can be said is that these services (rural water supply and sanitation) may be necessary, but not sufficient, to achieve any tangible effects on morbidity and mortality. The complex chain through which disease is transmitted does not lend itself to simple interventions"(Churchill, 1987 pp.ix).

Some level of justification is however usual, and for this base line surveys are important, since they can give some idea of the change in health status during a project. For example: simple upper arm width measurement, weight for height measurement, or weight for age charts(Warner & Bower, pp.25.9 - 25.16), can be used with children in a "before project and after", or "with project and without" survey. This being especially useful in an emergency situation. Actually attributing noticed improvements in health over the installation of a water project is very difficult to do, because of the multitude of other factors at play; however such a link should not be denied because of this difficulty. As Esrey and Habicht point out:

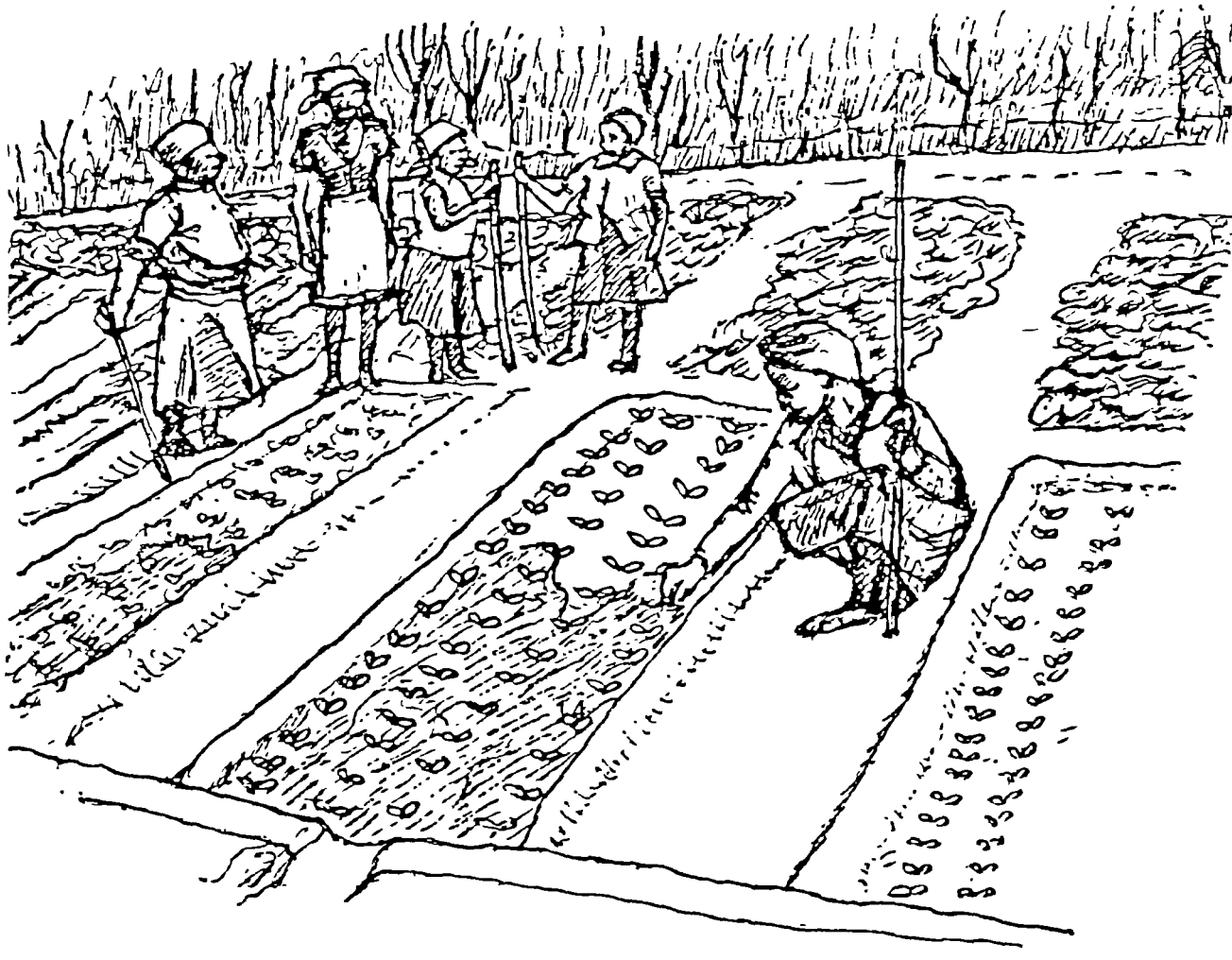
"Despite the lack of studies, one can infer from current literature beneficial health impacts follow improvements in water and sanitation" (Esrey & Habicht, 1986 pp.125).

Perhaps one of the best methods to establish benefits, is to talk with the women in discussion groups and record their comments. In sociological terms, "focus Interview"(Kumar, 1987 pp.vii) techniques could be used, with "open-ended"(Feuerstein, 1986 pp.76) and key questions being used to stimulate not answers but discussion. The results being used for the dual purpose of, building up a picture of the peoples universe, and the incorporation of issues raised into project policy . On the face of it this may not appear to be very objective or scientific, but if a real discussion materializes then the thoughts and opinions of the women involved will come to the surface. This will give all kinds of clues as to how the people are benefiting from an improved water source: what the continuing problems are, whether the facility is being used properly, and even some comparison of life before the project and life afterwards. Questionnaires in these circumstances can often also be useful, but cannot compare to the quality of information which conversation and discussion can bring to the surface. I might also add that it is far more stimulating for the researcher to be involved in such discussion, than filling out endless questionnaire forms with their inherent danger of creating repetitive answers of dubious value, through the inappropriate wording of questions.

School children are a useful source of information especially when recording the quantity of water used in households and what water is used for. Experience with a Norwegian funded project in Western Province, Zambia found that teachers and pupils alike were delighted to participate in a survey of household water use. Education services in third world countries are often starved of resources, and the provision of some pencils and paper for such a

(above) Women's Meeting for consultation over a proposed water project. Senanga West, Zambia. (Illustaration By Carey Mathew)

(below) Women's Vegetable garden Cooperative, irrigation water pumped by hand from new supply. Matebele-Land, Zimbabwe. (Illustrated by Carey Mathew)



survey gives the children useful and interesting work. This helps to educate them in the importance of water, and at the same time can yield valuable information for the project.

The debate over whether to plan for water of better quality or greater quantity is one which has divided both planners and managers of water projects. It is crucial to policy because a scheme which aims to provide 100% pure water will have much higher costs than a project whose main aim is to provide more water, and may accept a continuing degree of contamination. Thus where funds for water supply are limited, a project which does not go for 100% pure water, but instead has a design aim of greater water availability, will be likely to benefit a much larger number of people.

Esrey and Habicht come down on the side of quantity, "The emphasis on water quality may be questioned..... except in certain more economically advantageous areas that have a high covering of sanitation facilities" (Esrey & Habicht, 1986 pp.125). An argument in favour of more rather than better water goes along these lines: Sufficient quantities of water allow for personal and environmental hygiene, while, however uncontaminated a water source may be, the water all too often becomes contaminated in its transportation and storage (Shiffman et al. 1978 pp.143-50) (Rajasekaran et al. 1977) (Feachem et al. 1978). So the initial engineering goal of an uncontaminated source can become an expensive insignificance in the effort to improve health.

The discussion should not really stop here; since just as with the quality case, the initial engineering goal is often to provide water in

sufficient quantity at source. The distance the water then has to be carried before it will be used, and how this can mean that no dramatic increase in water consumption actually takes place, is often overlooked (Cairncross, 1987).

Recent studies from Mozambique show how domestic water consumption plateaus off at 16 litres/capita/day when the water source is under a 30 minute return walk away (approx 1kM), and only increases from this plateau when the source is in the yard or house(see graph), with then a rapid increase consumption, by as much as four times,(Cairncross, 1987). This information which is now referred to as the "Cairncross Curve"(see fig 1), is useful in that it shows that there are patterns of consumption which are related in three basic levels to the distance people have to walk to a water source. There is the poorest situation where water is over half an hour's walk to fetch, in which case water consumption per capita per day is likely to be below 15 litres and may fall off to less than six litres per person per day (lcd), with a return journey of an hour. Next there is the stage where water consumption is fairly static at about sixteen lcd. with a less than thirty minute return trip. The last stage is where water is available in the yard or house, water consumption as a result goes up rapidly. This is useful to the planner manager to know about since it can be used as a planning tool to ensure resources are allocated to create the maximum benefit. The level of assistance in terms of funds available could in part be allocated according to this distance factor; Village communities with a greater than thirty minute return journey for water being targeted first, the next move in terms of supply facilities possibly being yard or household units.

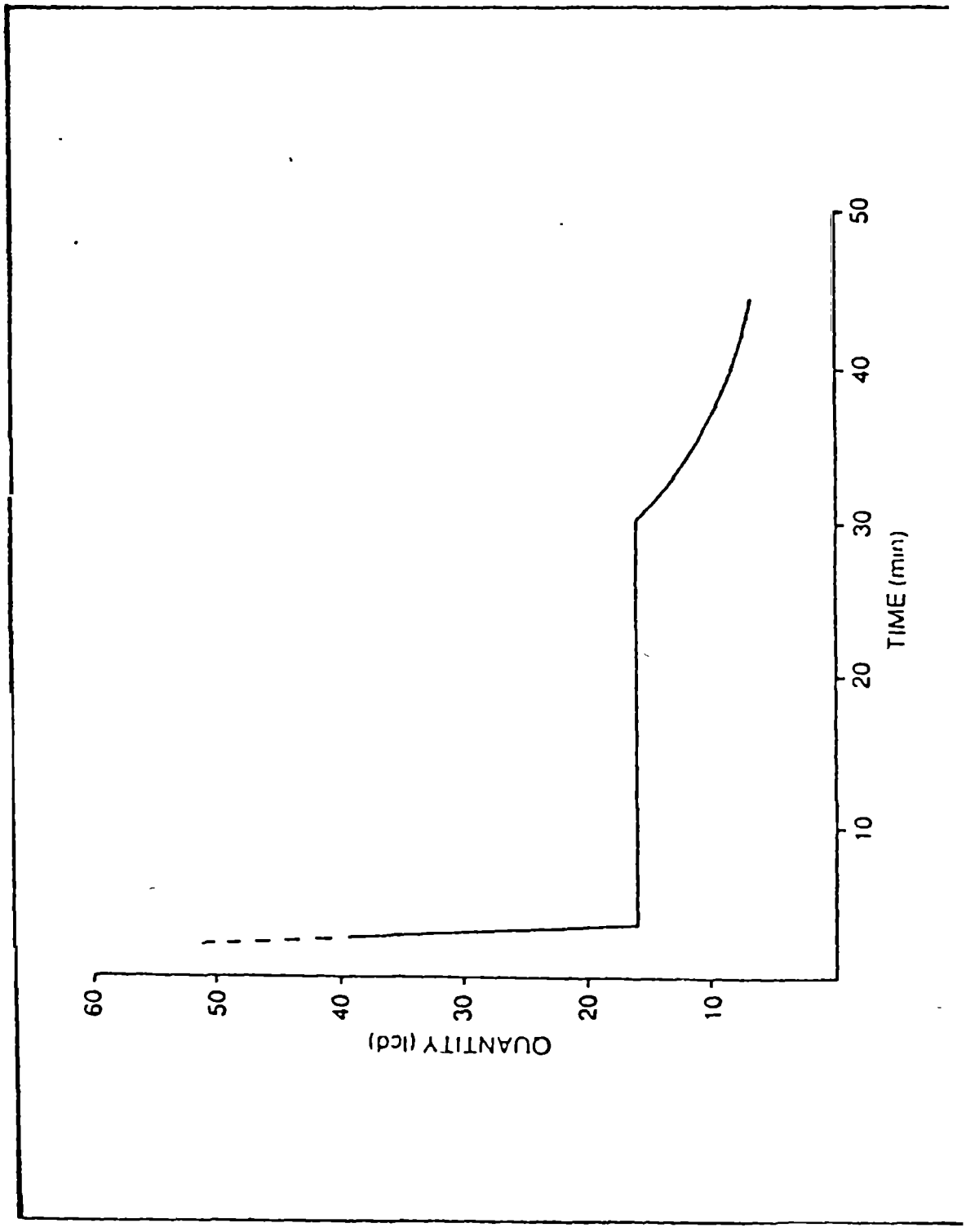


Fig.1 Graph relating water consumption to time taken for collection.

(Source: Cairncross 1987. pp.31)

Distance is therefore an important constraint to the increased use of water. One idea tried out in Zimbabwe by Lutheran World Federation was to install laundry facilities along with a new well. This means that women do not have to take water home to wash their clothes, thus clothes can be washed as often as the women want or need to do the washing, and the constraint of time and effort involved in obtaining the necessary quantities of water to do the laundry is substantially reduced. The reader may point out that women tend to take their washing to the water source as it is, but it is worth pointing out that the provision of a laundry tub and block not only makes this job easier but avoids the danger of gross contamination to the well, when the washing is done on or beside the well top. Some sort of communal personal washing facilities might also be considered, but as with the laundry block this needs to be worked out and discussed with the community and especially with the women. The success or failure of such interventions, and the creation of benefits, will depend on how new facilities are utilized by the local population. This utilization in turn rests on how the population (again, especially the women) regard, understand and accept the new installation. Involvement in the planning and installation of new facilities by the women and the rest of the community is a good way of ensuring such understanding, proper use, and acceptance.

One of the principle non-health benefits of improved water supplies mentioned in the literature, is the amount of time saved by having a new water source closer to its point of use than the old source. The less time spent on return trips to fetch water has two main benefits. Firstly daily water use is likely to go up, thus reinforcing the effectiveness of more water as a

required commodity, and secondly there will be more time for people to be involved in other activities.

The following results from a study of two villages in Mozambique show this. In village A, a water collection trip took five hours while in village B it took just fifteen minutes.

Table 1: MEAN DAILY WATER USE IN TWO MOZAMBIQUEAN VILLAGES, IN LITRES PER CAPITA PER DAY (LCD)

	Village A (Itanda)		Village B (Namaua)	
Water collection journey time:	5 hours		15 minutes	
Water consumption:	lcd	%	lcd	%
Drinking	0.21	6	0.36	3
Cooking	0.67	21	1.93	16
Washing dishes and food	0.50	15	1.36	11
Bathing	0.80	25	4.75	38.7
Bathing children	0.04	1	1.23	10
Washing clothes	0.54	17	2.64	21
Other (animals etc)	0.48	15	0.03	0.3
Totals	3.24	100	12.30	100

Source, Cairncross 1987 pp.31 and Cairncross & Cliff 1987 pp.52

As a result of the less time spent collecting water in village B, the quantity of water used per person for bathing and the washing of clothes was over 600% more than the quantity used in village A. This effect, as might be expected, could have had an impact on health problems caused by water washed diseases (diseases caused by a lack of water, see Huisman et al. 1981 pp.10).

The incidence of trachoma was found to be twice as high in the village A, where water took five hours to collect, compared to village B, where water took only fifteen minutes to collect, Cairncross and Cliff(RR2Ua).

Other benefits which occur, when people need to spend less time traveling to collect water, result from the ability to change the household time budget. Cairncross and Cliff's work in Mozambique again serves to illustrate this.

TABLE 2: AVERAGE TIME BUDGETS FOR THE WAKING DAY OF ADULT WOMEN IN ITANDA (VILLAGE A) AND NAMAUA (VILLAGE B), IN MINUTES.

Activity	Itanda (A)	Namaua (B)	Difference
Fetching water	131	25	-106
Housework	126	161	+35
Grinding	84	98	+14
Agriculture	154	160	+6
Rest	385	433	+48
Totals	880	877	-3

Source, Cairncross and Cliff, 1987 pp.52

Because the women of Namaua spend less time collecting water, they are able to arrange their time differently to the women of Itanda. The availability of time to do other things than water collection allows:

a) Extra time for productive activities (pp.51).

b) Time for educational activities (pp.52).

c) Time for community activities (pp.53), Cairncross & Cliff, 1987.

d) More time for mothers to spend with their children, thus encouraging happier and healthier children.

e) More freedom for women to organise their time and to spend it as they want to. As Cairncross and Cliff put it, "... an increase in women's free time constitutes a benefit in itself, however that time is spent" (pp.53).

The results of interventions are not easy to predict however: the provision of a new water point alters the situation for women in different ways. One impact which was noticed in Kenya was that children especially girls, who commonly help their mothers collect water (Curtis, 1986 pp.8), gave their mothers less help to collect water. This was usually because the mother who had less distance to go for water, would free her children from this responsibility, so they could go to school (Jahan & Azharia 1977), resulting in a mixed but broadly positive benefit. This illustrates how the impact of a water project may be felt in areas which may at first seem quite unrelated to water.

As we will see in chapter two, the unequal constraints, hardships and discrimination faced by women in the third world are a major burden and hindrance to their development. Any effort which helps in the liberation of women from some of these constraints, must be considered beneficial, and should be included in the planning process.

CHAPTER TWO

WOMEN AND WATER

In this section we will focus on the issues of women and water. Chapter two will look at the need for this focus, and chapter three at what solutions can be adopted in order to make water projects more responsive to women and thus more successful and appropriate.

In order to explain the need to focus on the issues of women and water, I have divided this section into three parts: The first looks at women as the principle collectors and users of water. The second looks at how women have in the past been excluded from water projects and the results that this has had in terms of project failures. The third looks deeper at the issue of women in the rural third world, their role as often the principle family supporters, the recognition of the constraints which women face and the consequent need to relieve rather than increase this. There are however other issues which will recur throughout the text because of the interrelated character of the overall subject.

WOMEN AS THE PRINCIPLE COLLECTORS AND USERS OF WATER

Women are the principle collectors and users of water in the rural third world. Indeed the collection of water for domestic purposes is almost universally associated with women. Val Curtis in her book on women and the transport of water states: "Water collection is an activity particularly reserved for women and children; in many countries for a man even to be seen collecting water would bring shame" (Curtis, 1986 pp.8). In a study of the

USAID's experience with women and development 1973-1985, gender division of labour was noted to have the most variation in the agricultural sector, and the least in domestic water and fuel supply (Carloni, 1987 pp.26); which suggests the world wide nature of the situation, where women almost exclusively collect water and fuel.

Further evidence of this division of labour comes from figures produced by the F.A.O. in 1984, which show the percentage of time spent by men and women in rural Africa on various tasks:

Table 3 Percentage of total time in accomplishing specific tasks

	Men	Women
Clearing forest, staking out fields	95	5
Turning Soil	70	30
Planting seeds, cuttings	50	50
Hoeing, weeding	30	70
Harvesting	40	60
Transporting crops home from fields	20	80
Storing crops	20	80
Processing food crops	10	90
Marketing the excess	40	60
Carrying water, fuel	10	90
Caring for domestic animals	50	50
Hunting	90	10
Feeding and caring for the family	5	95

Source: FAO, 1984 (pp.71-79)

Women collecting water from a concrete ring well, constructed under a self help scheme. Senanga West, Zambia. (Illustration Carey Mathew)

Along with the processing of food crops and feeding and caring for the family, the collection of water is a job done 90% of the time by women. This fact reflects the position of women in societies where they are regarded as being subordinate to men. Women perform certain jobs that it is beneath the dignity of men to do. Men are prepared to collect water if it is for their businesses or they are going to sell it (Curtis, 1986 pp.8); in which case they usually make an investment in some form of transport technology in order to do this, seldom head loading or back loading the water (Curtis, 1986 pp.8). Women who are frequently marginalized from control over family resources, would find it hard to make a similar investment.

The trend in much of the third world has been that where technologies have been introduced they have been male dominated. In effect a male monopoly of technology has developed which has excluded women ([1]). Thus water technologies have often been monopolised by men rather than the principle users. It is important that the water planner manager has a grasp of this so that he/she does not perpetuate the imbalance. This is especially important in water development because the success of any rural third world water project rests on acceptance and understanding of the technology by the people, who are going to use it. Therefore it is important that women are educated about the use and maintenance of the technology, and that they are freed from the widly held self assumption that such work is some how above or beyond them. This is not an easy process because women's access to resources, technology and literature is often restricted by culture, tradition, the attitude of

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[1]: see next section for the ways in which this "monopoly of Technology" is also promoted by development agencies.

their men folk, and lower literacy and education levels than the men (due to restricted access to school when children).

WOMEN AND WATER PROJECTS, WHERE THEY HAVE BEEN EXCLUDED.

In many cases water projects have had little or no involvement of women, in the implementation or planning phase. Of eighteen USAID water and sanitation projects taken by random selection in Carloni's 1973-1985 survey of A.I.D.'s experience with women in development over that period, the following results emerged:

TABLE 4: Number and Percentage of USAID Projects by Type of Project and Sector

Sector	Women-Only		Women's Component		Integrated		TOTAL
	No.	%	No.	%	No.	%	
Agriculture	5	41.7	3	50.0	32	40.0	40
Education	5	41.7	2	33.3	12	15.0	19
Employment	2	16.7	1	16.7	8	10.0	11
Energy	0	0	0	0	10	12.5	10
Water/Sanitation	0	0	0	0	18	22.5	18
TOTAL	12	100	6	100	80	100	98

Source: Carloni, 1987 pp.26

These figures show two things, firstly they show the fact that the water and sanitation projects included in the USAID report had a very low level of women's involvement, a criticism that could be leveled at many aid agencies. Secondly that they had the shared lowest level of women's involvement of all of the sectors surveyed along with the energy sector. When this is then compared with the previous table, where in the traditional sector the

collection of water and fuel is considered to be a 90% female occupation, an interesting fact emerges; that as soon as a sector becomes technical it is taken over by the men. In addition it would seem that this process has been helped rather than hindered by the activities of development agencies. As in other areas of development, especially agriculture, women in water development are all to often "invisible" (Goldey, 1987) to the eyes of governments and international agencies alike.

The Carloni report does mention that a strong positive correlation was found between women's level of participation and the achievement of project objectives. Where women were involved, projects were highly successful and where they were not, projects failed to reach their objectives(Carloni, 1987). In this case women became involved in some of the projects, despite not being included in the initial project designs.

Other examples of the failures of water and sanitation projects to achieve objectives, resulting from the non involvement of women are numerous.

One such was a water and sanitation programme in Tonga; this project which claimed to be based on "community involvement" principles only involved the men. The project initially failed, but when women were involved, success followed (K.P.P. & I.D.R.C., 1985 pp.13).

In a similar project in Indonesia, women were excluded from the planning of a water scheme but were involved in the implementation (ie did the labouring). Here too the project failed, in this case the design of the water supply system was unsuitable to the needs and cultural habits of the women

IDRC (K.P.P. & I.D.R.C. 1985 pp.70). Had the women been involved or at least consulted at the planning stage, then these difficulties could have come to light, and the investment in new facilities would not have been wasted.

An example from Iran also shows this need for the involvement in the design of additional washing facilities. In this case in rural Khuzistan new communal laundry facilities were built with large rectangular sinks which rose to adult waist height. Iranian women however traditionally wash clothes in a squatting possition and as a result the new laundry basins were not used (Jahan, 1975).

In South India, a village level maintenance scheme for hand pumps on deep wells was initiated. Two years after the project began 620 young men had been trained as caretakers. However problems resulted because the women did not know who the caretakers were, and as the young men themselves did not collect water they did not know when there were problems to sort out (Yansheng & Elmendorf, 1984).

Development projects can also act directly against the interests of women. In the case of a chicken farming project in Zaire; the project failed to recognise that water was scarce, that a great deal of water would be required and that it was the women's job to collect the water. Thus the women had several hours of additional water-carrying added to their daily duties (Von Harder, 1975). This example, though not directly of a water project, illustrates the pitfalls that a project can encounter if women are not considered, consulted or involved in the planning.

THE CONSTRAINTS, HARDSHIPS AND DISCRIMINATION WHICH CONTRIBUTE TO WOMEN REMAINING INVISIBLE IN THE PROJECT PLANNING PROCESS.

The figures given in table 3 of the percentage of total time spent accomplishing specific tasks, give an interesting insight into the lives of rural African women. Of the jobs listed, 59% on average of each of the tasks are done by women. These figures match the statement in Maitrayee Mukhopadhyay's book on women and development in India, "Silver Shackles", that:

"Although women represent fifty percent of the worlds population and one third of the Official labour force, they perform nearly two-thirds of all the working hours, receive only one tenth of the Worlds income and own less than one percent of World property"(Mukhopadhyay, 1984 pp.2). Woman is indeed the "Niger of the World" (Lennon, John 1972).

Women in developing countries face a larger work load than men. Schoustra van-Beukering's daily time study of the lives of Bangladeshi women showed that men worked shorter days than the women. After work the men had time to smoke, play cards or go visiting while the women still had household duties to perform (Van-Beukering, 1975). In Kenya, Val Curtis asked women to describe a typical man's day and men to discribe a typical woman's day, this revealed "....that women got up an hour earlier than the men, went to bed an hour later and had only a few hours rest during the day (when they would play with the children). It was considered that times were hard if men had to work for the whole morning" (Curtis, 1986 pp.6).

Women have much work to do in their daily lives and this places a severe constraint on the time they have for new occupations. If they have the inclination to join those social development schemes which are sometimes on

offer, they may well find that they have not got the time or the energy to take part, let alone to look after their children as they would like to. It is not often realised that broadly the possition of women in the third world is getting worse, not better (Mukhopadhyay, 1984). The social development schemes offered by the governments of developing countries are often irrelevant to the real needs of women, confinining women to home economics and handycraft classes, conceptually clositing them in the unrealistic outsider notion of the "household", a "cage" in which women's real role as farmers, producers, and family supporters is ignored (Nijeholt, 1980). Water schemes can be an important way of breaking through the problem; this will be discussed in greater detail in the next chapter.

Women in the third world face discrimination and hardships from an early age. Dey's study from South Asia in 1975 showed that female children were four to five times more likely to suffer from protein deficiency than boy children (Dey, 1975); a similar state of affairs exists in many countries. While in Honduras during 1985 I visited the Save the Children Fund's Malnourished Childrens Unit at Santa Barbara and was told how it deals almost exclusivly with baby girls. In Honduras girls rank below boys in importance and thus when food goes short, as it does before the coffee season each year, the little girls are the first to suffer.

Educationally girls also lose out, Jahan noted that only 21% of rural girls in Bangladesh were registered for school while 46% of rural boys were registered (Jahan, 1979). This unequal access to education is common throught the third world and is yet another constraint on the development of women as an underprevileged group.

In addition to this direct discrimination, women have other loads to bear, they are often the heads of households. Figures for the percentage of female headed households vary from 33% in Kenya, Botswana, Lesotho (Carr, 1981 pp.4), to 35% in parts of India, and as high as 50% in parts of Latin America (OXFAM, 1985 pp.44); an FAO study in 1984 estimated that 60% of families in Sub-Saharan Africa were headed by women (FAO, 1984). Female headed households, because they only have one bread winner tend to be the poorest, hence the poorest of the poor.

This brief look at the position of women, is to emphasise the need for recognition of the constraints, hardships and discrimination which women face, and the need to relieve rather than add, through project interventions, to the burden. This is especially so in water development where it is assumed that the principle benificiaries are, as constantly stated throught the literature, the women.

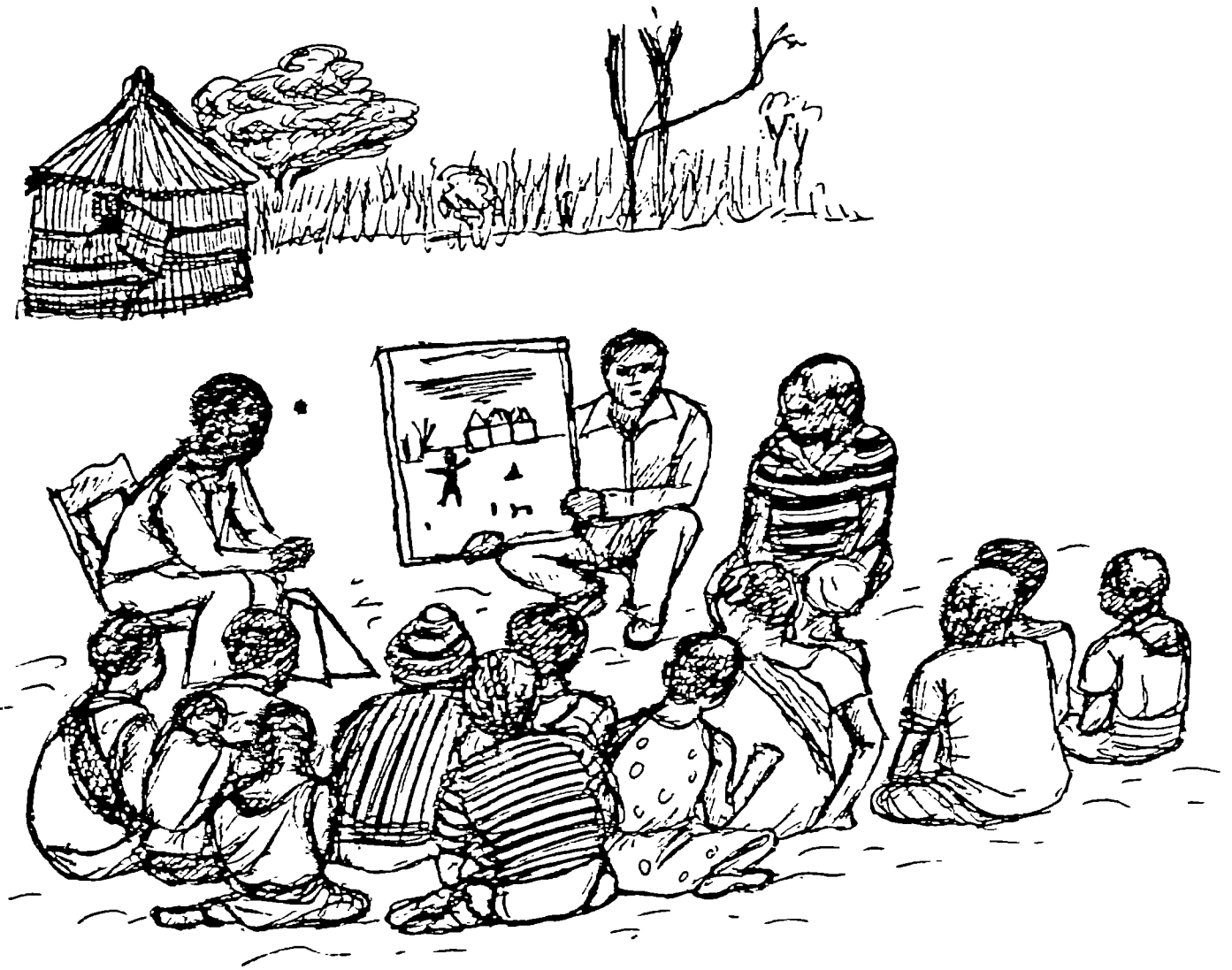
CHAPTER THREE

WOMEN AND WATER - APPROPRIATE SOLUTIONS

The last chapter looked at how women have been left out of water development projects and how as a result the projects have often failed to reach their objectives. The chapter also looked at the position of women in general and how they have been left out of development, invisible to the eyes of planners and managers. I hope in doing this I have managed to establish that there is a pressing need for development to take proper account of women and for water development in particular to do this. Chapter three will now look at what solutions can be adopted in order to make water projects more responsive to women and thus more successful.

This chapter will cover four main topics: firstly, listening and talking with women on water projects, an investigation of methods which have been and could be used; secondly, how women have been involved in water projects, the issue of female labour; thirdly, village water committees; fourthly, the need for female project staff, and the concerns which arise.

Listening to women is an extremely important way of finding out how they think, and thus how they will react to an intervention like a water project. It can take time, just as technical surveys take time, but it is time well spent. In chapter one I mentioned how talking to women was a good way of establishing if a project was benefiting its target population. This is so at all stages of a project, and is especially useful at the project appraisal stage, or when the project is being set up. The Sondeo method (Hildebrand,



Community organisor and health assistant at a women's meeting.

Senanga West, Zambia. (Illustration Carey Mathew)

1979) although initially applied to discover the agro-socio-economic situation of predominantly male farmers in Guatemala, is one of the methods which could be adapted to discover more about women and water. In this case a multi disciplinary team of ten people, made up of anthropologists, sociologists, economists, agricultural economists and engineers, operated in rotating groups of two interviewers. There is an emphasis on interdisciplinary research, with specialists of various areas straying onto one another's turf, or areas of specialism. The interviews are carried out with groups of villagers and with individuals, the format of these interviews are essentially open ended, key questions being used to initiate discussion rather than obtain answers. At the end of each day during the Sondeo, the researchers get together and discuss their progress, they then change partners or rotate, and continue their research. The Sondeo should take at least a week and end with joint report writing (Hildebrand, 1979). This method, one of several which comes under the title "Rapid Rural Appraisal", is part of the current trend towards qualitative rather than quantitative research. Another example of this type of research approach is Farming Systems Research; this is an attempt to look at all the activities which a peasant farm is involved with. It has been described as a holistic approach (USAID, 1982) to research, and could be adapted to identify the likages between appropriate interventions and women's work.

The term "Rapid Rural Appraisal"(RRA), covers a range of different techniques and methods which tend to have in common the following:

1. greater speed compared with conventional methods of analysis
2. working in the "field", whether it be a farm, a refugee camp or an urban

slum

3. an emphasis on learning directly from the local inhabitants
4. a semi-structured, multidisciplinary approach with room for flexibility and innovation
5. an emphasis on producing timely insights, hypotheses or "best bets" rather than final truths or fixed recommendations

Source: Conway, Gordon, et al, June 1988 pp.3

Much of the literature on RRA approaches, however have not been specifically applied to research with women; the efforts, till now have tended to concentrate on the family unit. I can see no reason why such techniques could not be used with advantage by the planner manager, in researching the position of women in the project area. Christine van Wijk-Sijbesma, mentions how most accounts of the involvement of women concern isolated projects, there has been little research done with women using standardized methods. She thus saw the need for a systems approach to researching the involvement of women in water supply and sanitation.

Check lists are a useful way of listing the "Key questions" and should be thought about in interviews and surveys, One of the best ones that I have seen for water development is to be found in Christine van Wijk-Sijbesma's book, and I am listing it here:

1. Do women and men have a felt need([2]) for the project? What are their respective priorities and expectations?

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[2] - I take "felt need" to mean a need which the people would tell you about if you spoke with them, ie not a need created or imagined by an "outsider expert".

2. Is the community willing and able to participate fully in the project, including social-economically weaker groups, such as women heads of household?
3. What forms of control have women over continued and adequate functioning of the project facilities?
4. Is the design acceptable for all categories of women with regard to:
   * water quality (colour, taste, odour, etc.), quantity, and reliability
   * access to water points, latrines
   * ease of use and upkeep
   * aesthetic and cultural acceptability?
5. Are additional public facilities required for:
   * washing
   * bathing
   * watering of small livestock?

   If so who is to be responsible for:
   * design
   * construction
   * maintenance
   * management?
6. Are conflicts likely to occur over use of facilities between and within groups and households?
7. How can women make economic use of water, waste and time and energy gains resulting from the new facilities:
   * dry season gardens
   * tree nurseries
   * composting

* education

* women's groups?

Do they have a need for support? Who will benefit from additional economic activities?

Source: Wijk-Sijbesma, 1985 pp.47

Where much work has been done in listening to and involving women has been with what may be described as non-formal health education ([3]). These methods are valuable to the planner manager not just within the confines of health education, but as tools to understand what the women of a project think of the project, and the impact it is having on their lives. By using such methods it is possible to interest people to the point that they lose their inhibitions of the outsider, and talk quite freely of what they think.

One account of this work from Kenya, by Patricia Bifani looked at how women peasants, pastoralists and peri-urban women understood water problems. Photographs of women involved in water collection and water carrying were used to promote discussion of the issues. The direction the discussion took, varied according to the background of the group of women involved. One photograph showed a woman collecting water from a pool, from which cattle were also drinking. The response from the peasant women, circled around the issue of water scarcity and contamination. "Rivers here are seasonal and when it gets too hot they dry up. During such a period a woman walks long distances and when she finds it, it is very dirty." "The area is very dry and that is

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[3] - That is experimental health education methods, outside the usual teacher pupil scenario.

why the woman has to use the same water the animals and cattle are drinking." "Any type of disease can be found in the water since the cows pass many dirty places before reaching here"(Bifani, 1986 pp.16). The pastoralist women's comments were rather different and concerned the cattle, their condition and who owned them. "The woman is thinking of how God has been great to her to have provided a river for her and her cattle". "These cows are not hers because they do not look like African cows; these are European cows. The Maasi do not have this type of cow. These are high grade cows"(Bifani, 1986 pp.17). The problem of water carrying was also mentioned, "The woman is thinking of the heaviness of the drum and the distance that she will have to carry it" (Bifani, 1986 pp.18). Another picture of a woman climbing a steep hill while carrying her baby and a drum of water raised universal sympathy, "She is coming from the river, drawing water; she looks very tired, weary and exhausted. She is carrying a baby in front (on her stomach) and a mutungi(water carrier) on the back." "Imagine carrying a baby and water up that hill!" "If she falls she is going to hurt the baby." "When she gets home, she might even get sick or feel too tired to do any other work." " It would be better if her husband helped her to get water on his bicycle"(Bifani, 1986 pp.18). These comments came from the women's own experience, the peasant women suggested the organising of "harambee" or local self help efforts to solve the problems in the photographs, they also exhibited their own knowledge of water conditions throughout the year. This sort of knowledge is vital to the planner manager of a water project and can only really be obtained by talking with and listening to the women of the project area.

Pictures can also be used in group discussions, these can be "spot the

problem" pictures, where participants are invited to point out what they think is a problem. This sort of scheme I used in Zambia as part of a community organisation process, three pictures being used to promote discussion in women's meetings over how a village could improve it's water situation. The first picture was of a dirty well, the second of a clean well, and the third picture shown, gave an impression of what the project's concrete wells would look like, the choice of what to do and whether to build a well being left up to the village. At village water committee (health education) workshops, which took place after construction, we took on the ideas of the newly formed health education section at the Western Province Department of Water Affairs. These methods, pioneered by Dr. Joanna Harnmeijer, consisted of games and exercises. One exercise called, "Why mother gets tired", consisted of a series of pictures (see illustrations in appendix 1, and over page), of what a typical mother does during the day. The participants put these pictures together to tell their own story. At the workshops both men and women were involved, though the exercises were done in single sex groups. At the end of the exercise the men and women got together to discuss what they felt were the important issues raised during the exercise. At a memorable workshop one of the village women remarked, "In our culture when a man marries a woman the man is traditionally older than the woman, but after a few years it is the woman that looks older than the man". Discussion followed about how this was, and eventually the men had to concede that it was because the women had the hardest lives and did most of the work. This sort of discussion is important not only because it may help to motivate women to become involved in a water project but for another critical reason, it gives women the chance possibly for the first time to discuss issues which really do affect their lives on an

Women involved in the "Why Mother Gets Tired" exercise at a water committee workshop. Senanga West, Zambia. (Photo Brian Mathew)

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equal par with the men. In doing so it can promotetheir visibility and empowerment, since men have the issue of the unequal work burden placed before them in reasoned arguement, and by the raising of the issue, women may realise some degree of collective solidarity. This workshop technique I found to be very successful, however it must be stressed that such an approach needs to be tactful, diplomatic and well prepared. The exercise is not intended to promote discord or confrontation between men and women, it is intended to create a situation conducive to adult debate about important issues to both sexes.

For the planner manager, the problem of promoting the visibility of women at meetings, by possibly insisting on single meetings for each sex will have to be worked out carefully. Two problems can arise from combining men and women at meetings: firstly in most cultures it is common for men to be the traditional decision makers and the holders of councils and meetings. At a meeting to discuss water affairs the men will arrange themselves at the front and do all the talking while the women who are the main water users sit in respectful silence in the background, unable to hear properly what is being discussed and unable to take part in the discussion (Jackson & Palmer, 1983). Secondly, women, as we have seen in chapter two, have very busy days and may simply have no time to attend meetings. There are also many other reasons why women may not attend meetings, the women may not speak the main language of the country, and thus may be excluded through incomprehension (4) (van Wijk-Sijbesma, 1985). Women may also have less access to information; they may

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4 - On this point Christine van Wijk-Sijbesma (1985, pp.56) cites four examples from the Andes, to Fiji and India; from work I did in Zambia with Angolan Refugees I found the same problem.

not be informed by their husbands that a meeting is going to take place. In these circumstances it is essential to have separate meetings for the women, and where possible these should be arranged when convenient for the women to turn up. Women staff are often more useful in conducting such meetings since, as I discovered, village women are often more at ease speaking to another woman, than a strange man. This is also important to the village men who may not like some flash young male field worker chatting up their wives or daughters, who can blame them?

Meetings do not however have to be totally separate, and problems can result here if they are. Men if excluded from what they see as their role, may become obstructive and either forbid their wives to conduct meetings, or simply withdraw their labour from the scheme. This is obviously counter productive for all concerned. The solution, I adopted from the OXFAM water scheme at Sichilli (also in Western Province, Zambia) was, during the planning stage, to have a first village meeting with the headmen and some of the women; at this meeting the time, place and format of the second meeting would be discussed along with the general topic of water supply project. This first meeting would thus set the scene for the second meeting, which would be held in tandem, with the women meeting in one part of the village and the men in another. When the single sex discussion was over a meeting of the whole village would take place where the issues would be raised again. Often we found that it was the women who became the real motor force behind the project from then onwards. As Christine van Wijk-Sijbesma states : "Experience has shown that women can be the driving force behind successful self-help construction"(1985, pp.64). The reasons for this are not really hard to

find, if a water project is to work well it is to benefit the women and once they understand the project and agree to take it on, it is a strong man that can stand in their way. Men also generally have less appreciation of what a project may mean in terms of benefits (Wijk-Sijbesma, 1985).

The following four suggestions on the promotion of women's attendance are worth listing:

1) - Hold meetings at suitable places and times for women.

2) - Women should be informed and encouraged to attend.

3) - Special efforts made to encourage poor women who are not often represented in women's organisations.

4) - Keep it small, small neighborhood meetings where all can contribute are better than large meetings where only the confident make themselves heard. (Wijk-Sijbesma, 1985 pp.59)

Other similar techniques of involving people in various project activities, from appraisal and evaluation to health education methods, can be found in two excellent books:

a) - "Partners in Evaluation". by Marie-Therese Feuerstein, published by Macmillan 1986. This book describes methods for promoting the participation of people at community level in various parts of the evaluation process. It is, "geared towards technologies which are centered on people working as a team, in partnership with project teachers and managers"(back cover). See chapter four "Collecting more information". Surveys pp.64-68, sampling pp.69-76, questionnaires and interviews "the art of asking questions", pp.77-89, there is also a good section on selecting and training interviewers pp.90-95.

b) - "Health Care Together; Training Exercises for Health Workers in Community Based Programmes". Edited by Mary P.Johnston and Susan B.Rifkin, also published by Macmillan 1987. This book is more central to health education methods, and the community workshop exercises are worth trying.

FEMALE LABOUR - WOMEN AND CONSTRUCTION

The use of female labour on construction sites is becoming common in a growing number of "self help" water projects. It is thus an issue which the planner manager will need to face. In Malawi for instance women provide up to 70% of the labour in most of the piped water schemes implemented (WASH-MALAWI, 1983).

This paper supports involving women on water projects, The issue over whether they should be the ones to do all the hard work is however another matter. In purely cost benefit terms, women in the Third World have a much higher labour opportunity cost than men (Munro, 1982), or In laymen's terms women have much more to do than men. Male labour in the third world is often in surplus, as any one who spends a bit of time in African Villages will notice. "Female labour on the other hand tends to be fully occupied within the full range of subsistence agricultural and informal sector tasks, as well as those of reproduction in the house hold"(Munro, 1982 pp.83). Thus to burden women with heavy construction work, when there are unemployed and underemployed men around, does seem to be a bit more than plain unfair. There are several points which justify the involvement of women however; there may be a high level of male migration (Wijk-Sijbesma, 1985), and men may not be around to help in the work. The involvement of women in construction work does also help them to understand the workings of the new technology. This

Women working to construct a Self-Help concrete ring well.

Senanga West, Zambia. (Illustration by Carey Mathew)

is especially so of an open well, where during maintenance people may need to enter the well to retrieve fallen buckets or other objects. The enthusiasm that women can bring to a water project is also important and has to be seen to be believed. I remember the sound of women singing as they worked at the bottom of a well, it was a truly wonderful thing to behold. Men can also be encouraged to put a major effort into the work if women are working there, if for no other reason than they are ashamed not to, "after all a man can dig faster than a woman, can't he?" This does of course depend on the numbers of men that are available. It was not uncommon in Senanga West, Zambia, to find that most of the men were away working on the sugar estates, and those that remained were the old, infirm and/or too young to work. At these times the majority of households were effectively headed by women and thus the work did to a large extent fall on them. Work was organised on a rota system by the water committees, and this usually meant that each woman would be required to work for two half days per week for the construction period, which would last about a month; the men that were available would work every day.

Involving women in voluntary work on water schemes however, "does not by itself lead to a sense of ownership and responsibility and capacity for maintenance"(Wijk-Sijbesma, 1985 pp.65). The dialogue process of continued meetings, discussions and workshops (as mentioned above), are vital to instill a sense of purpose, maintain morale and make sure that the water committees do not simply fade away after the project is finished.

VILLAGE WATER COMMITTEES

The Village Water Committee (VWC) is an institution which has been a feature of many self help water projects. VWCs are important since they can be involved in community/organisation liaison: prior to the start of construction, during it and after work has finished, when they may be able to take over responsibility for the management and maintenance of a new installation. VWCs should be formed early on before construction starts, and they should be made up of respected individuals in the village. Many water projects now encourage the formation of village water committees. Where villages have existing functioning organisations, the responsibility for the up keep of a well or other installation could be taken on by these associations, however it is important that the organisation is adequately representative. Women, and especially poor women, should be properly represented and able to make themselves heard. In the project I was involved with in Zambia, Water committees were made up of three people, two women and one man, they would then meet with the head man of the village to make decisions about the village water supply. In Zimbabwe the Lutheran World Federation also had female dominated water committees, here one female member of the committee also had the additional responsibility of being the well caretaker, and undertaking maintenance and small repairs. Putting too much work on to the committee is however not a good idea. Repetitive jobs such as sweeping and cleaning around a well should be shared by the whole community, or if not then the individual appointed to this duty should be paid for doing the job; resentment can easily build up if one person thinks they are been taken advantage of.

WOMEN STAFF

The issue of using women as staff on water projects is important, because as mentioned, women often react better to women field workers than they do to male field workers (Wijk-Sijbesma, 1985). For the project manager, hiring women does present difficulties, women of the right education level may be difficult to find because they are less likely to have received as much of an education than men. Women often will have children and work at home and thus not be able to take on a job with a project. Young women, who do not have family commitments, may not be mature or suitable enough. Young women also often get pregnant, this may mean that the project manager is reluctant to post them to remote areas where no medical facilities are available. Pregnancy leave will mean that other staff have to be hired and trained. Training takes time as does gaining experience and if female staff quit to start a family this is wasted. The answer is to persuade women to stay with the project even if they have children. Indeed in Guinea Bissau women field workers who carried their children with them found that this facilitated communications with other women(Ploeg, Douwe, Wijk-Sijbesma, 1980). Women were found however to need special training when communicating with men on Village authorities (Wijk-Sijbesma, 1985). Indeed when the question was asked in Sumi Krishna Chauhan's book "Who puts the water in the taps", "Do men or women make the most effective motivators"(Chauhan, 1983 pp.82), the answer came back, "Their effectiveness in each project had less to do with being a man or a woman than with their other qualities of character and training"(Chauhan, 1983 pp.82).

What will probably happen in the project situation is that both men and women will be used as field workers. Christine van Wijk-Sijbesma suggests that

Three women community organisors of the LWF/ZCRS field staff team. Senanga West, Zambia. (Photo Brian Mathew)

"Men field workers have been able to involve women, provided they have a favorable attitude, were aware of the roles and position of women, had been trained for this task, and were skilled communicators"(Wijk-Sijbesma, 1985 pp.76).

The employment of women on a water project as field workers is important to the success of the project, and despite some of the short term problems this can mean to the management, it is worthwhile doing.

CONCLUSION ON WOMEN AND WATER

This chapter has looked at some of the solutions which can be used to make water projects more responsive and aware of women. Water projects can and do have a dramatic impact on the communities which experience them; for this impact to be sustained and beneficial, the planner manager must be aware of the effects that the intervention can have on women, and how best to involve women so that they do actually benefit.

Where in the past water was drawn from an unprotected hole in the ground it had a low status as did the women who collected it. A water project is more than an operation of installing new facilities; it is or should be, a consciousness raising process. If it is not then it will fail. Installations will become dirty, buckets or other parts will be stolen, broken parts will not be repaired, no one will feel responsibility and the village women will return to their traditional sources for water. This sorry situation has been repeated too many times, purely because communities in general and women in particular have not been involved in the planning, implementation, management and maintenance of water facilities intended for their use.

CHAPTER FOUR

TECHNOLOGY SELECTION, COST-BENEFIT ANALYSIS & MANAGERIAL RESPONSIBILITY

Chapter four will now look at three issues of water development which are, for the planner manager, important individual decision areas. This will be done in the light of what has already been covered. The issues are: the choice of technology; the use of Cost-Benefit Analysis (CBA), and other economic analysis methods; managerial responsibility, followed finally by the conclusion.

SOCIAL & ECONOMIC CRITERIA FOR THE CHOICE OF TECHNOLOGY

The choice of technology for rural water projects, has usually been made on technical grounds; the water table can be found at such and such a depth, the water requirement is for so much water per head, the project requires clean water, therefore the project will purchase X number of such and such hand pumps. Other criteria that might creep in to the choice of technology could be the familiarity the engineer had with it(Henry, 1978), or even that the equipment comes from the donor country that is putting up the money(Wood, 1988). The Association for Consumer Research's, laboratory testing programme for Village Level Operation and Maintenance hand pumps, has added further technical criteria which can be used by the planner manager when selecting a water lifting technology(Reynolds, 1987).

The selection of a technology for a water scheme is vital for that schemes success. If the technology cannot physically do the job then the scheme will as a result be a failure. There are however, as much of this paper has tried to point out, other criteria as to what is appropriate and what is not. The technology has to be socially and economically compatible

what is not. The technology has to be socially and economically compatible with the people who are going to use it. Questions have to be asked, by the planner manager, about a range of socio-economic factors, a negative answer to any one of these questions must put question marks over the appropriateness of the technology, and may invalidate it as a method. The following checklist is included as a suggested guide to the planner manager of what questions he or she should be considering when selecting a technology.

CHECK LIST OF SOCIO-ECONOMIC QUESTIONS TO ASK WHEN ESTABLISHING THE VALIDITY OF A RURAL WATER SUPPLY TECHNOLOGY FOR THE THIRD WORLD:

1) Will the new technology benefit the people:

* Will the technology make more water available at: a) the water point? b) the home?
* Will the water be of acceptable quality in the peoples eye's? ie will it taste OK to the people? and will it be the right colour for the people?
* Will the water be of fair quality? ie a) - Does the water contain heavy metals, chemicals or other mineral pollutants which might make the water harmful to health? b) - Does the water contain biological pollutants; i) at source? ii) when the water reaches home?
* Will the new supply reduce the amount of time spent fetching the water?
* How near will the new supply be to the users homes?

2) Women and ownership of the new supply.

* Will the community and the women in particular be involved in:
* Selecting the new technology?
* Siteing the new technology?

* Will the people own the new technology? If they do, will they use it? Will they accept responsibility for it ? Will they be able to do this?
* If extra facilities are included with the technology; ie laundry blocks, washing houses etc., will the women be properly consulted and involved in the design, location and maintenance of these?

3) Who will work to install the new supply?
* What level of community involvement will there be in doing this work?
* How long will the work take?
* Will the work be done safely?

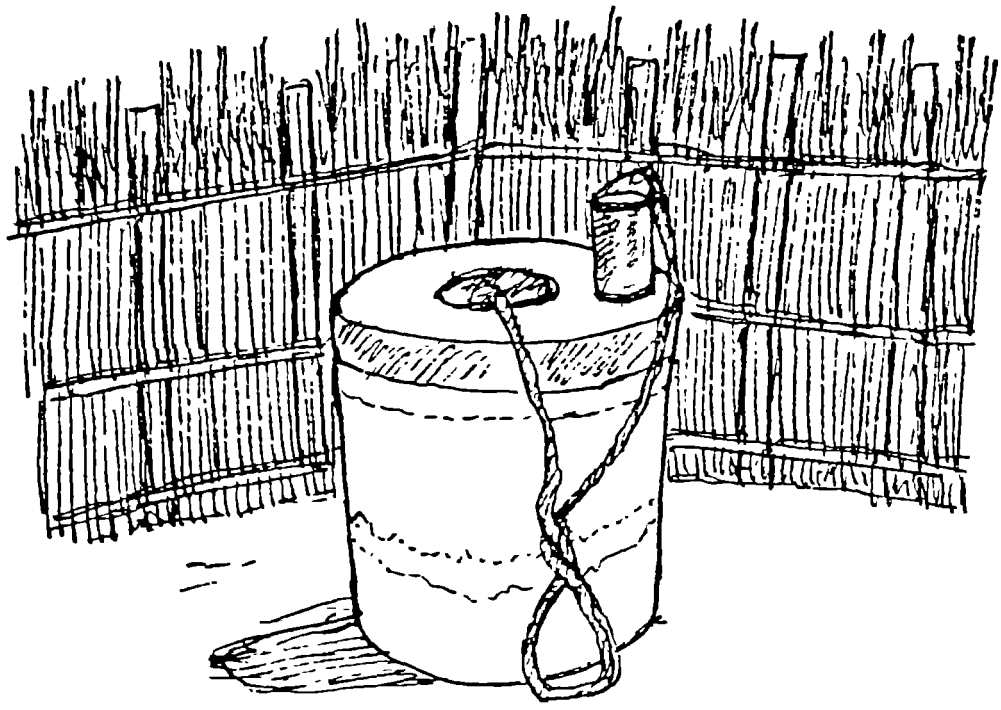
4) Maintenance
* Whose responsibility will this be?
* If the government: is it likely that maintenance will or can be done up to fifteen years after project completion? Does the relevant department have: a) the vehicles or the equipment? b) the capability to keep these running fifteen years hence? Will the department be able to purchase spare parts and new vehicles, as and when they need them over the fifteen year period after project completion?
* If the village is to be responsible for maintenance, who will be responsible for this in the village? Will there be a water committee? Will women be fully represented on this? Will the committee be respected? Will they be prepared and able to handle maintenance and repairs? Will they have the training? Will they have access to spare parts fifteen years after project completion? Will they have to pay for these parts? Will they be able to afford them, is there agreement on collecting funds to do this? Where will they have to go to purchase/collect these spare parts? How far will they need to go to do

this? Can parts be made in the village? Have people been trained to do this?

5) Economic considerations: Is the technology imported? How much does it cost? Are all the spare parts imported ? How much do they cost? Who is paying for this: a) now? b) up to fifteen years hence? If parts are imported, is access to foreign exchange likely to be a problem now, or over the next fifteen year period? If the technology is made in the country, is the company which makes them likely to be able to produce the required spare parts, to specification, fifteen years from now?

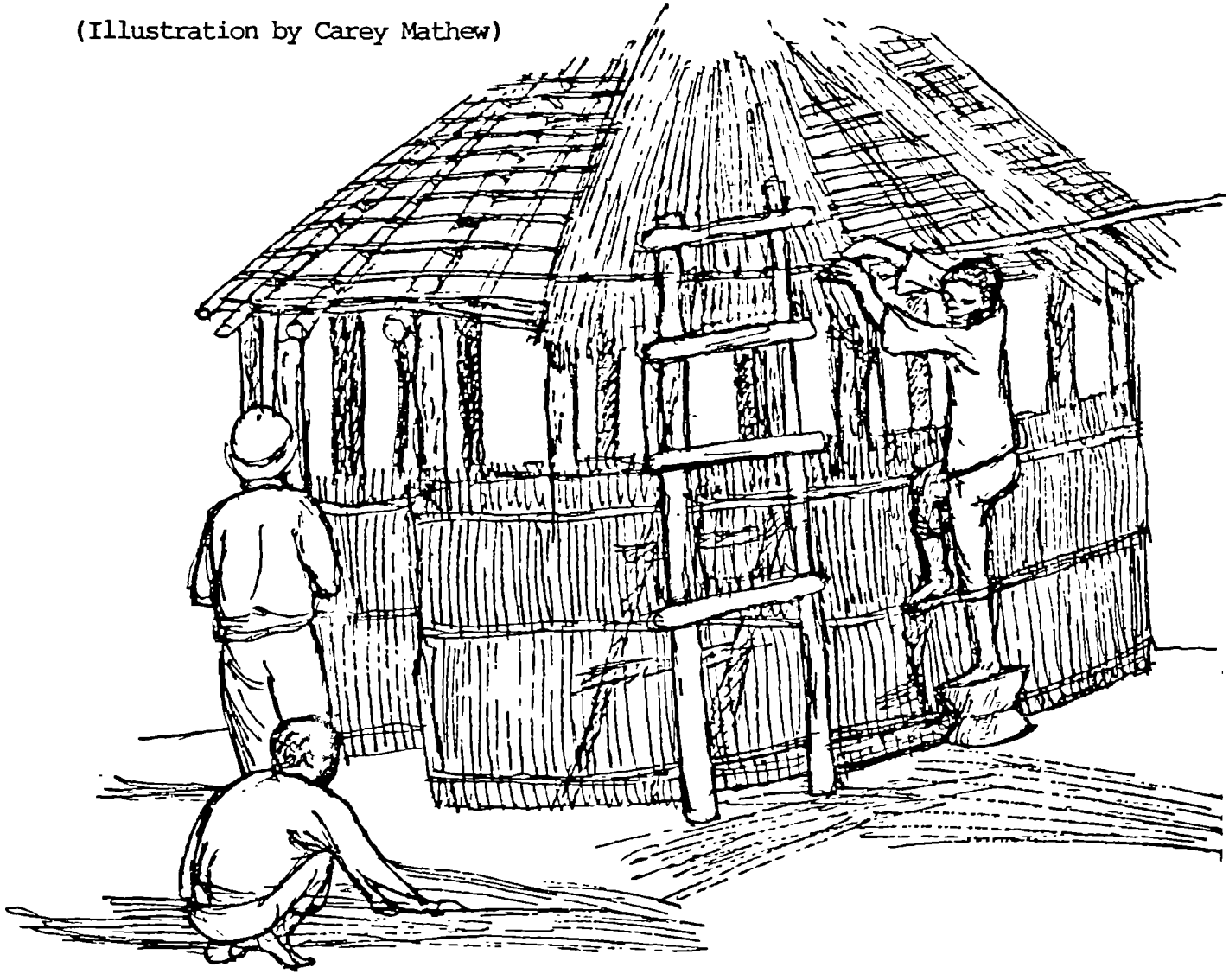
This check list out lines some of the key socio-economic issues which will need to be considered by the planner manager in technology selection. Discovering the answer to these questions will require consultation with the people. This will help to sensitize the planner manager to the social issues which as an engineer he /she might overlook. At the same time by providing answers to a specific set of questions the planner manager is able to present a cohesive case to the donor, of the socio-economic factors as well as the physical factors, thus avoiding what has been a major problem in the past.

It is very important that the planner manager resists the temptation to go for a high tech solution, which ignores these social and economic factors. Even though, in the short term, such solutions may appear to have a more rapid impact, and to be easier to implement, than all the hassle which goes with involving communities in the design and implementation of such projects. As David Henry said back in 1978, "It is far easier, for instance, to deal with a programme requiring $3.0 million worth of drilling equipment than it is to assist a country to plan and design a water project based on local labour and



(above) A completed Self-Help concrete ring well. (below) Men work on the well house of a newly completed well. Senanga West, Zambia.

(Illustration by Carey Mathew)



resources"(Henry, David 1978 pp.367). Indeed the work of OXFAM reflects the shift away from high technology. "Today we are sinking more and more open wells"(Howard, 1984 pp.2). The provision of open wells with buckets and ropes, and some method for climbing in and out (ie cast iron rungs in the well wall), are often the most appropriate technology, more appropriate than even the best designed hand pumps. The planner manager should not be afraid of going for such low-tech solutions. If the criteria mentioned in the check list point towards open hand dug wells then this is the selection that should be made. To go for other methods is to install a technology which will at best, last for a fraction of its design life, and then may become, as so many hand pumps have, a rusting steel scratching post for cattle, the relic of a mis-placed technology.

COST BENEFIT ANALYSIS AND WATER DEVELOPMENT: BEING CAUGHT BETWEEN THE DEVIL AND THE DEEP BLUE SEA.

"In assessing the desirability of a proposed project a number of related features of the project will be examined, e.g. the technical, managerial and organisational characteristics of the project. However, although a project may be judged desirable from these points of view the planners frequently require some indication of what the economic returns will be before they can finally approve the project for implementation. Cost-Benefit Analysis (CBA) is the principle economic appraisal method in use and through CBA the economic costs of carrying out a project can be compared with the expected economic returns to that investment"(Jones, J.H.M. 1982 pp.3).

The above description depicts fairly closely the need for project

planners, to do some economic analysis of rural water projects. Recently water projects have been required to justify themselves economically as well as in the existing areas of health and social benefits, mentioned in chapter one. The World Bank has been one of the chief forces behind this new trend. In a recent paper by the Bank, Anthony Churchill postulates on how Social Cost-Benefit Analysis(where a money value is assumed for social costs and benefits) should be used to justify water projects, by putting a monetary value on the time saved by women, when new facilities are brought in. "Regardless of what the members (of a household) actually would do with the time, a valid measure of its value to them can be inferred from how much they could earn if they used it in income-producing work"(Churchill, 1987 pp.xi).

There is nothing intrinsically wrong in putting such a value to women's time, the problem comes when this value is then equated with other economic factors. The question arises of what figure to use; is it fair to use the male wage rate per hour for example? Work mentioned previously in chapter three, by Munro, would suggest that this was not so since women have a much higher opportunity cost for their labour than do men(Munro, 1982 pp.83).

There is a danger in putting too much importance on monetary values. The idea that, "The ideal planning approach would be to explore all water-related problems and select those projects (whatever their purpose or combination of purposes) that produce the greatest net benefit"; is it self dangerous because it assumes that a true value can ever be put on human life. For example, an irrigation scheme for a sugar cane project will probably have far more to recommend it in cost benefit terms than a community water supply could ever have; does this make the irrigation intrinsically more valuable than the community water supply? Even with improved methods of social cost

benefit analysis the true value, of such things as women's time, is likely to remain hidden. This is because of the difficulty of assigning the opportunity cost to any one complex situation, and having done so the figures would only be relevant to that one situation(Curtis, 1986). Cost benefit analysis, as the sole method of justifying a water project, is not a good policy because its method is basically competitive, projects are set against each other, and because this is done in economic terms there is a danger that the real underlying social benefits of a project will not come out; social cost benefit analysis methods are just not sensitive enough to reveal the full value of these factors. Thus analysis based solely on CBA may come to the wrong conclusions. Broad economic justification for water development in rural areas is however valid. "The developing countries are based predominantly on agricultural economies and the economy stands or falls on the production of surplus agricultural products for export. Not only that, but it is the rural areas which feed the cities" (Henry, 1978 pp.367-8).

Cost-Effectiveness Analysis (CEA) is mentioned by Jones as being one of the most important alternatives to CBA(Jones, 1982). In this method, the desired objective is not given a money value, and although this avoids justifying the benefits of a water programme in purely economic terms, problems can arise because the emphasis is still on competition between one project and another in terms of project costs. The quality of the project is not taken into account, since the solution which may appear most cost effective, or the cheapest, may be missing out on vital socio-economic factors which could make or break the project.

The planner manager needs to be aware of the advantages and the shortfalls of the methods at his/her disposal. The economic analysis

techniques of CBA and CEA are both valid methods for water supply, but they need to be presented by the planner manager as part of a "portfolio of analysis" on a specific project; which could also include results from a checklist oriented survey, a field workshop and possibly a modified sondeo style rapid rural appraisal. By providing this sort of range of evidence, the planner manager can be more sure that he/she has properly covered the underlying issues, and at the same time this sort of highly professional approach cannot be faulted by the donor or government department.

MANAGERIAL RESPONSIBILITY

The managerial responsibility of the planner and manager of a rural water project is really important to bare in mind. The altering of peoples lives is not something to be approached lightly. A water project can, if planned and managed appropriately, produce profound and beneficial changes to the lives of the people who are influenced by it. It can also if badly planned and managed, waste peoples valuable time, raise hopes only to leave them unfulfilled, and increase the division between rich and poor. The latter can occur when the rich and powerful exert control over the project. Political pressures may be brought to bear to influence the siteing of new wells, and when this happens it will be up to the planner manager to decide what to do. One way of preventing this problem from arising is to decide on a strategy of siteing the most remote and poorest villages first, this way the project reaches the poorest people first. By using the project vehicles to travel to the remotest areas while they are still new, these places can be covered; if they are left till last it is possible that the project vehicles may not be in a fit state to reach them. The areas close to the main towns, because they

often have better access to resources and influence will have the political clout to ensure that they are covered, while those in outlying areas are less likely to. By having a firm policy from the beginning, it is often easier to avoid the danger of falling into the situation where the most needy are at first by-passed and later forgotten.

Badly managed projects can also provide dangers to people while working on water schemes, and afterwards to playing children if wells are left unprotected. It is really vital that the issue of safety is at the back of the planner managers mind.

The project is there to help real people, help themselves to a better life. For appropriate planning and management the planner manager will need to take into account technical and socio-economic considerations, however a degree of association, identification, and solidarity, with the people is also required. The knowledge that real men and women, real boys and girls, are potentially going to benefit from the work of the planner manager should never be forgotten.

CONCLUSION

This paper has attempted to draw together and present, to planners and managers, a range of socio-economic issues which they both need to take into account when they work with rural water projects in the Third World. It has also presented some methods by which the planner manager can isolate and identify these issues and incorporate them as indicators in the appraisal, implementation and evaluation of such schemes.

Chapter One looked at the issue of identifying the benefits which are likely to occur as the result of a water project, and how knowledge of this

could be used in shaping project policy. It also looked at how hard it is for water schemes to be justified in purely health terms, and how other methods such as analysing the time saved may produce more useful results.

Chapter Two and Three approached the issue of women and water development. The former looking at how women have been ignored in water projects, effectively "invisible" to the eyes of planners and managers alike. The results of this "invisibility" in terms of project failures are listed, and the nature of the position of women, in terms of their productive role as principle family supporters is discussed. Chapter Three extended the investigation of this area into methods for the recognition and involvement of women, via qualitative research methods and a non formal approach to health education. It tackled the issue of female labour on water projects, village water committees and the hiring of women as staff members on water projects.

Chapter four, looked at the area of technology selection, and presented a checklist of questions which both planners and managers need to consider before opting for a technology. The use of Cost-Benefit Analysis was considered along with other economic and social procedures, in the reporting, appraisal and evaluation of water projects. Finally a small section was given to the important issue of managerial responsibility, and the need of the planner manager to give proper consideration to the people on whom the project is going to have an impact, and without whom the project has no meaning.
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APPENDIX ONE

This appendix contains the "Why Mother Gets Tired" exercise mentioned in Chapter Three (pp.39-40). To do this exercise detach or copy the pictures in appendix, and place them in any order in the discussion group. The task is arrange them in the order of a typical woman's day and to discuss "why mother gets tired?" The pages in this appendix have not been numbered because this might make the participants feel as if they had to follow a specific sequence rather than develop their own order, which is part of the purpose of the design. The illustration of the exercise was done by Lou, an artist working for the Department of Water Affairs, Health Education Section, Mongu, Western Province, Zambia.