

## Conservation of Water in Dry Eastern Africa: Some Lessons from Handicapped Development

Ralph Tanner

*Institute of Missiology, Radboud University, Nijmegen, The Netherlands*

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**ABSTRACT** The use of water is not based on what can be expected to become available because of the economic cost and the lowering of the water table. There is a need to lower the use of water for personal hygiene and to develop dry systems of hygiene.

### INTRODUCTION

Since the availability of water is a basic biological rather more than a behavioural necessity, it is not surprising that societies in their traditional as much as their modern forms have developed distinctive styles for the development of whatever water resources they have, and for their conservation and equitable distribution. There is an ongoing contemporary clash between rational possibilities and the ideology of hope for a better material life.

There are highly developed irrigation-based societies in the Euphrates, Nile and Ganges valleys which rely on the annual flooding of riverine plains as well as on monsoon rains deluging whole areas. We are concerned here with East African societies which have lived for many millennia in environments with irregular seasonal rainfall which have apparently not found it a rational option to base themselves on the Athi, Rovuma and Rufiji permanent rivers. In this, there are cross-cultural lessons to be learnt since beyond basic needs there are cultural and ecological alternatives to the use of water sources.

We can presume in the absence of any contrary evidence that their pattern of living without villages except in the coastal fringe developed under Arab influence at Kilwa, Mombasa and Bagamoyo, was an adaptation imposed by an uncertain environment of which the principal characteristic was a shortage of water and the avoidance of riverine disease.

Outside the coastal fringe drawing water from saline wells, we have an historically and contemporary population with little evidence of any permanency in any one location. A social system based on dispersal and an agricultural regime

midway between a shifting system and one of some permanency within an area. The reason for this pattern of living will have been a combination of factors: defence, ecological uncertainty, disease both human and animal such as the Rinderpest epidemic of the late 19<sup>th</sup> century described as an ecological catastrophe (Iliffe 1979: 163-167) preventing the development of wheeled transport and manured fields except where firewood cutting and cattle grazing had reduced the underbrush maintaining the disease carrying tsetse fly populations.

In contemporary conditions, this time-tested pattern of survival has been severely modified by the control of some mass diseases, the growth of demographically unbalanced migratory populations and an increased use of water related to a mass media generated demand for a higher standard of living and the teaching of water-borne rather than dry hygiene.

### THE USES OF WATER

The uses of water are not uniform and it is useful to examine these as a hierarchy of needs (Maslow 1987), in which the lower needs have to be satisfied before the next stage up is used. Firstly, there is water as a survival necessity. Since social behaviour involves movement minimal intakes are rare. The El-Molo, a small tribal group living on Lake Rudolf, northern Kenya where the only water is heavily saline and urination so limited that an adult found it difficult to fill a test tube in a day. Their intake of fluids was small despite leading active lives by fishing. It is likely that the Kung Bushmen hunters in the Kalahari semi-desert of Botswana may have developed a similar behavioural balance based on very low fluid intakes.

Certainly it would seem that water use can be minimized under conditions of ecological and social necessity although it is certainly more important than food. The British and German armies in the Libyan Desert in World War II, severely rationed water without damage to health or physical functioning. The common Western practice of drinking bottled water throughout the day is a modern practice for which the need is social.

Then there is water use in relation to food. Most eating does not require cooking with much water either in preparation or cleaning up which can be done without water. It is probably not essential ethologically for survival since much food can be eaten raw as meat, forest products, fruit and honey.

Thirdly, in relation to housing. Brick making and mud and wattle construction are usually done when rain water is available, often from flooded small pits near to housing in which bananas are also grown.

Fourthly, the idea of personal cleanliness and the washing of clothes and such luxuries as water-borne sanitation which is a double waste of both water and excreta which could be used as fertiliser (Tanner 2001). The idea of cleanliness is socially initiated and not related closely to hygiene, coming as the result of comparisons with images in advertising and the mass media generally and the presence of tourist strangers with high water demands and many changes of clothes.

Lastly, there is water as a source of enjoyment usually in rivers and specially constructed pools as an adjunct to washing. There is sea and pool bathing as an activity limited to higher status people in towns. The East African coastal people do not use the sea for pleasure.

The conclusion from this tentative hierarchy of needs must be that much domestic use is the consequence of social and economic change and is not related to basic needs. The use of water domestically has increased markedly in the last few decades in some sections of society. Essential quantities are much less than current domestic uses.

### **Contemporary Water Use and Control- The Dry Season**

In the large north-western treeless or savanna forest area of Tanzania, bordered by Lake Victoria occupied by the five million Sukuma, there is just one perennial spring. All the rivers are seasonal turning into mud flats with some drying out ponds.

This is a vast area of mildly undulating land of average fertility which dries out progressively from top to valley bottoms. To the south, the Gogo expect crop failure from drought in one year in every five (Mnyampala 1995; Rigby 1969).

This is a mixed animal and subsistence agriculture with cotton as a cash crop in which the people live spread out in order to take advantage of their environment, and to reduce the wasting of time in walking from homes to farms. In this dry environment, the tribal culture is based on anticipated dryness rather than on the possibility of adequate regular seasonal rains. For most of the year, there is minimal water available and women have progressively further to walk to fetch limited water (Drangert 1993).

Since they base much of their social and religious understandings on the accumulation of livestock among which certain animals are dedicated to family ancestors, their preservation of water and grazing is a major concern. Owners keep only a few cows at home and lend out the remainder creating networks of reciprocity, enabling better maintenance and disease protection. Communities do not allow grazing in valley bottoms until late in the dry season; a downhill movement as the environment dries out.

Any source of water is publically owned even if the individual has dug his own well (Cory 1953: 131-133). The only way to retain a personal right over water would be to build one's house over such a privately dug well but he would be unlikely to do so for fear of being ostracised. This dispersed pattern of living, water control and restrictions on grazing are part of their sensible adaptation to poor water availability. Large numbers of neighbourhood earth dams have been constructed by communal labour under minimal supervision which has contributed to the increase in cattle holdings in some localities (Malcolm 1953). Once more dependable water supplies are provided, human use will increase as will the number of livestock.

In a similar way, the five thousand Ssonjo, the only irrigation based society in eastern Africa, living at the base of the Rift Valley wall in Tanzania, have adapted their culture to limited water resources (Gray 1963). In the dry season, they build an earth aqueduct over dry stream beds from their major spring to their small square plots cultivated with digging sticks which prevents the water from soaking away too rapidly and they found the use of iron hoes broke up the soil too

deeply and wasted water. The movement of water between plots is communally controlled by star watching.

Both these communities have created, not adapted their own ways of coping with limited water in predominantly dry environments thus conserving water for communal rather than individual needs.

### **Contemporary Water Use and Control- The Wet Season**

The area experiences a wet season rather than a monsoon in which there is localised and irregular rainfall. This patchy wetness which falls here rather than there bringing unequal social as much as economic benefits between people who are virtually neighbours in an egalitarian society. This demands explanations so effort is put into rain attracting rather than rain making over the growing of cash crops and rice patches for social advantages and the connected escalating violence against witches of whom 3693 largely women were killed between 1970-1984 (Mesaki 1992: 281-287).

The Sukuma have adapted to this irregularity by planting crops at intervals and in strips down hill to cover different ecological settings as well as rain providing for the increased but temporary social uses of water. The Sonjo have seen rain as a bonus in providing for the opportunity of planting seasonal crops away from their irrigated plots. Around Lake Victoria, there has been some planting of sweet potatoes in raised beds between irrigated ditches. The lake fringe has been assessed as having more health disadvantages than advantages which might come from water manually scooped on to specially created fields.

### **Government Provided Water for Existing Rural Communities**

There are departments of water development and political promises made but once its remit goes beyond surface water catchments and the presence of indicator plants, governments plan to put in large numbers of bore holes. This is an expensive undertaking in which these dispersed communities are not involved in either the preparation of sites or their installation. In some places such as Ruanda, the planting of white ant resistant Eucalyptus trees and enlarged human and animal populations has already lowered the water table and this is likely to happen elsewhere.

So, the decisions to put in boreholes are made by technicians and according to local power pressures rather than on being equidistant from specific populations so that few people are satisfied (Mujawahuzi 1991). A study of funded water supplies in developing countries found that after 7 to 10 years between 70 and 85% were out of order (World Bank 1986). In Ikoma, Musoma region a borehole was sunk on a hill from which witches had in the past been thrown to their deaths, an unpopular and bare place were no one lived. Any wholesale provision requires enormous expense dispersed over impermanent populations, well-paid professional experts and an adequate number of maintenance staff.

### **Government Provided Water for Urban Communities**

A state has a civil obligation to provide basic facilities for its major centres of population but its failure to do so is almost a global problem when mass immigration from rural areas into or around cities has overwhelmed its ability to provide water from centralised sources. Most governments do not have the resources to augment water supplies from distant sources and to provide water for slums which they want to actively discourage which is as much a problem in Mumbai as Mombasa so it is left to private initiatives to provide water for purchase.

Most governments in developing states have found themselves overwhelmed by urban expansion and have little interest in assisting slum growth to become permanent. They may have tacitly decided to risk riots rather than give expensive water supplies any priority.

### **The Hinge of Provision**

Once a state comes into existence with a voting electorate, it takes on obligations to provide for the needs of their citizens which are derived from the mythology of development and the politics of comparative envy based on mass media advertising, obviously wealthy tourists, imported television serials and the life styles of their own national elites. Planning is not based on national incomes but on the regularity of grants. These needs supported by competitive political programmes are not based on what is geographically, economically and socially feasible in local and national circumstances and the plain

fact of expanding populations preferring poverty in towns to poverty in rural areas.

Except when there are unexpected or annual floods, water has always been assessed in terms of shortage and behaviour has related to this with some ingenuity. If water is a scarce commodity in proportionate terms to national population size, then to provide additional supplies by mechanical means may be an error in long-term planning.

If water is unavailable, then most societies make their own provisions for its minimal supply and use; this ability is illustrated by virtually every subsistence community whether urban or rural. When water is provided from some centralised source at a subsidised price then the use of water will increase enormously in accordance with social rather than subsistence needs (Obrist 2004). The provision of water by institutions not related to the social and economic capacities of the provided for communities is surely a form of political irresponsibility.

Little attention has been paid to the social consequences of extra water provision which will disrupt existing patterns of water related behaviour. People and cattle will move to where water is assured and this can lead to serious erosion and the disruption of previous patterns of social association connected with water fetching and use. In some cases, it will stabilize populations which have had previously shifting patterns of agriculture and grazing.

The cost of providing bore-hole water for dispersed rural populations is a strain on limited budgets particularly as the tax basis from these populations to cover costs is negligible. The inability to maintain existing pumps and their installation has led to considerable corruption and theft of materials. There is no doubt that the bureaucratic scaffoldings rather than structure is in place for the provision of water but the inability of states to pay salaries equal to their required responsibilities leads at best to moon-lighting of both professionals and mechanics.

### **The Consequences of Failure to Provide Adequate Water Resources**

There is perhaps a cyclical aspect to this failure to provide new sources of water to new or dispersed populations in developing states which have low tax bases, high loan dependency or ineffective and often corrupt bureaucracies.

The need to develop systems of acceptable

domestic and personal hygiene using less water. There is also the need to rethink the nature of communities being required to practise self-help which often involves collecting money rather than devising schemes which involve collective manual effort.

First, there is the community being responsible traditionally for the development and maintenance of its own water resources which they seem to have been done very efficiently. Then, there is the period after the euphoria of self-determination in which it was generally assumed that there would be an immediate improvement in their general standard of living. While many communities and individuals may now accept that development on the anticipated scale is not going to happen, no government except possibly Zambia has started to plan on what is possible rather than ideological and marginally probable. Finally, the return to their own resourceful ways of producing water and private enterprise providing tankers of water as it is generally recognised that the state faced with the expenses of independence and development will be unlikely to fulfil its economic promises over water provision. This has been handicapped by rapid population growth, the absence of an efficiently run and adequately paid state and local government bureaucracies and the visible corruption of the political elite is never going to fulfil its optimistic politically motivated policies.

### **CONCLUSIONS**

The provision of water in Eastern Africa faces conflicting possibilities which lead to social and political dissatisfactions over the failures to provide improved standards of living for both urban and rural voting populations.

Surface water depends on irregular rainfall and indeed regular droughts which suggests that the water table may well be a similarly limited resource. This ecological environment would suggest that it would be politically sensible to discourage the use of water beyond existing existential needs.

Boreholes would tend to stabilize populations geographically when historical data shows that few people have occupied the same localities for more than a few generations for good ecological reasons. Providing stable water supplies may be against the long-term interests of people unless it is part of an overall plan to refertilize overworked soil.

If existing boreholes were properly maintained, the over use of water would probably lower the existing water table which does not hold large reserves as a result of millennia of low rain fall.

The hygiene taught in schools is founded on the pattern of living developed with Western mechanically-aided water supply systems and the virtual abolition of domestic water sources. There is thus an erosive clash between what is taught as a basic health need and what is physically possible. The water supply in the national capital is inadequate for mothers to carry out for their children what they have been taught in School.

Regular personal washing and the use of water for personal hygiene as well as the washing of clothes comes from a modern European pattern. This may not have been part of any tradition way of life. It is popularized by the advertising in the mass media, the living standards of the intellectual and political elite and in particular the tourist industry which shows to all involved standards of hygiene which they are rarely able to attain or even expect for themselves.

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