



17th WEDC Conference
 Infrastructure, environment,
 water and people
 Nairobi, Kenya 1991

Water resources in semi-arid Kenya

Dr Samuel K Mutiso

INTRODUCTION

Water is a vital substance for human existence and that it is also a major factor in determining the progress of civilization. The importance of water to man is not limited to individual persons, individual communities, of individual countries, but it is often carried beyond the national boundaries, thereby resulting in international water problems whose solution require international understanding and co-operation. This is equally true in the Kenyan context where the water resources are shared between urban and rural communities; between highland and lowland people; industrialists versus the agriculturalists, including pastoralists.

As the population continues to increase and the high potential areas become less available, the country's medium potential (often called marginal and semi-arid lands) are increasingly being used for both crop and livestock production. According to Kenya's Fifth Development Plan, 1989-1993, "the Governments Agricultural Policy will focus on the development of technologies appropriate to the arid and semi-arid lands through work on the introduction of new crop varieties". These lands constitute 88 per cent of the total area and hold 35 per cent of the population. For agricultural purposes, the semi-arid areas which constitute 80 per cent and which hold 20 per cent of the population is the most immediate target for agricultural development. The semi-arid areas can support more people given improved water supply, technological and financial back-up.

Another important component in the development of water resources is the human resources. Included in this are manpower resources, information and cultural resources. The manpower resource must consider its quantity and quality. While the information resource is the body of knowledge available to all mankind. Finally, the cultural resources include overall cultural background as well as institutional structure which is necessary for human resources to be effective (Chow, 1975).

Despite the need to develop the water resources in the semi-arid areas, our scientific knowledge of these areas is very scanty. Research on the current and future

potential of water resources in these areas is imperative. Similarly, the place of public education in water resource development and its relationship with environmental problems is important. Public education creates awareness about the significance of conserving the existing water resources.

WATER AVAILABILITY SOURCES

The availability and hence supply of water resources for domestic, and agricultural purposes in the semi-arid lands is influenced by many and varied factors such as climate, geology, hydrology, capital and distance from the homestead to the water source. Because of the complexity of these factors, it is not possible to discuss their individual contribution to the overall availability of water as a resource for development in the semi-arid lands. A few examples are drawn from the Machakos District of Eastern Kenya which is largely semi-arid.

In order to acquire a better idea about water availability and supply, water balance in the entire area is necessary (Table 1). Water balance is determined by measuring the continuity of water flow in order to establish the balance between total input, total output and change in storage over a given period of time, year, month on a number of days for a specific basin or area.

An attempt to work out detailed and reliable water balance for Machakos District and most of the semi-arid areas of Kenya is made difficult by lack of an even distribution of rainfall stations. Most of them are located in the high potential areas. At some stations there is lack of care and continuity in collecting rainfall data as well as lack of reliable data from which evapotranspiration, soil water deficit and hence the available water capacity for plant requirement can be computed.

Woodhead (1968) is right to point out that "such data are basis to catchment research and they have considerable bearing upon the feasibility of irrigation project" particularly in the semi-arid