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HYDROLOGICAL CHARACTERISTICS OF AND WATER UTILIZATION IN DRY ZONE VILLAGE ENVIRONMENTS OF NORTHWEST SRI LANKA.

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ABSTRACT

Social and institutional aspects of water utilization in Dry Zone tank villages with regard to irrigation and water management have been studied by many researchers. But the physical aspects and domestic water utilization have not received adequate attention. Tank villages which are located in river valleys relate to the Dry Zone hydrology. Thus, water utilization problems are a result of the interplay of hydrological and social factors. Hence, it is appropriate to utilize an integrated approach concerning both hydrological and social aspects to view the real dimension of problems of water utilization. The main objective of this study is to identify hydrological characteristics of the utilization of water in Dry Zone village environments. The first chapter outlines, the above mentioned objective dealing with the theoretical basis of the relationship between water and the human environment.

The second chapter presents the research methodology utilized in achieving the research objective. A catchment approach is utilized concerning both physical and social factors to view the problems in a broad perspective. A sample comprising 11 tank villages from two cascades in the Mi Oya catchment was selected for field research. Hydrological data such as tank water, ground water, soil moisture and surface water movements were collected through field surveys, observation, and sample analysis. Social data pertaining to water utilization were collected with the help of questionnaires and discussions and interviews held with the villagers included in the sample. Both types of data are analysed utilizing statistical methods.

The third chapter outlines the physical background of the study area and deals with geology, soil, climate, hydrology and vegetation which relate to water availability in the area.

Based on the analysis of physical and social data, the fourth chapter discusses the particular hydrological conditions pertaining to paddy fields which is determined by soil and topographical factors. Paddy yield variations are used to view the spatial variation of the effect of hydrological characteristics on water utilization.

The fifth chapter deals with the distribution of soil moisture and ground water conditions in the highland areas of tank villages. The distribution and yield of coconut cultivation are used as indicators of soil moisture and ground water conditions.

The sixth chapter illustrates the effect of tank and ground water on domestic water utilization with reference to bathing, drinking cooking and washing. The effect of the fluctuations of tank water levels on the above mentioned activities are examined. Impact of tank water on ground water levels and quality is also considered. Water utilization implications of economic activities such as brick production and cadjan weaving are discussed.

Chapter seven views the effect of social factors on the resolution of conflicts arising from water utilization. In this context, habits and practices pertaining to water utilization, relationship between family and land ownership, and particular adaptations to water scarcity are considered.

Based on the findings of the study, chapter eight presents the following conclusions:

Paddy field-hydrology more than water management affect the problems of water utilization in paddy tracts. Problems of water scarcity are most evident in lower parts of the yaya. Such problems also vary according to location of the paddy tract in the upper or the lower part of the cascade.

Distribution of high soil moisture and ground water levels in the highland areas of villages which is indicated by coconut cultivation helps to identify areas with a potential for highland cultivation.

The rapid decline of tank and ground water levels determines the pattern and practices of water utilization in tank villages in the dry season.

In areas which are free from salinity such as areas below the tank bund there is a greater possibility to extract good quality water for drinking purpose.

As water availability in tanks is determined according to different utilizations, the peoples' perception to water scarcity differs from village to village even within the same cascade.

Water related economic activities such as brick production and cadjan weaving have become additional income sources but such enterprises are affected by seasonal fluctuations of tank water levels.

Many problems relating to water utilization are either neutralized or minimized by social factors, but there are also water related conflicts which cannot be so resolved.

The concluding chapter finally provides guidelines for policy with regard to the development of water resource utilization in tank villages and other irrigation settlements of Dry Zone Sri Lanka.

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