

A STUDY ON WATER RESOURCES AVAILABILITY OF NUWARAWEWA CATCHMENT AREA IN THE NORTH CENTRAL PROVINCE

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Introduction

Nuwarawewa tank system of Anuradhapura dates back to the early period of the hydraulic civilization in the Dry Zone of Sri Lanka that began to flourish from 5th Century BC (Brohier, 1934). There are four village tank cascades in this system connected to the Malwathu Oya River Basin. Paddy cultivation, Chena and other rain-fed cultivations are the main types of land use in the area. Water resources availability determines all these agricultural practices from ancient times. At present, it does not seem that the irrigation and water management activities take place in an optimum manner due to several issues in water availability that manifests in various form in the system. This study focuses on an examination of cascade water resources availability in terms of a few parameters such as drainage density, tank density, ground water use and rainfall that determine the water availability in the area. In conclusion an attempt is made to indicate some possible solutions for the improvement of water resources management.

Materials and Methods

In order to understand the social dimensions of the problem, a questionnaire survey and key informant interviews were used to collect the primary data. Field observations were undertaken to examine the ground water behavior with the aid of GPS and Remote Sensing. Secondary data were collected from several sources such as Grama Niladhari Reports, and information available at local government offices such as Divisional Secretariat, and the Departments of Agriculture and Agrarian Development.

Results

Three water sources can be identified in the area namely, agro-wells, surface reservoirs and rainfall. An amount of 12.6 million cubic meters of rainfall is captured by the study area in the *Maha* season annually. For *Yala* season, the figure is 8.1 million cubic meters. As a percentage of surface storage in the tanks is 21% for the *Maha* season. The water availability for one acre of paddy is estimated at 1.45 of water acres feet (0.18HM). Additional water requirement is fulfilled for paddy cultivation from rainwater. Therefore,

most of the paddy cultivation in the area is dependent on the reliability of the rainfall. It is revealing that 43% is rain fed, and 57% is depending on irrigation, for cultivation.

As anticipated the rainfall pattern is directly affecting for the water resources availability in the study area. Lowering of rainfall in the *Yala* as well as the *Maha* season is observed during the period of 1940-1994 as reflected in the data from three local meteorological stations of Mihintale, Nachchaduwa and Anuradhapura. As a long term trend, the average annual rainfall has been decreasing in the Nuwarawewa catchment area. The percentage of decline in *Maha* rainfall is 64% and it is 24% in *Yala*. The rainfall outside these two main seasons is 12% during the period of 1940-1994. The percentage decline in surface water storage is 21% in relation to the rainfall captured by the tanks. Current water availability for one acre of paddy land is 1.45 acres feet (0.18HM). The highest water availability is recorded from Nuwarawewa reservoir and the lowest is recorded from the Kurundankulama Cascade. On the other hand, the highest tank density is recorded from Kurundankulama Cascade and the lowest is from Atthikulama Micro Catchment. The largest amount of ground water is used by the people in the Kurundankulama Cascade and the lowest is reported from the Atthikulama Micro-Catchment. This reflects that, when agro wells are situated near by the tanks, a shallow ground water table can be seen. When the agro wells are situated at a distance from the tanks, the ground water table is deeper.

Conclusions

Although water availability is high in some areas, agricultural water management activities are less developed. However, the successes and failures are depending on the methods through which water management is practiced (Chambers, 1974).

Ground water availability in the upper part of the area is higher than the lower part of the area. It would also be observed that in the vicinity of village tanks, ground water table is shallow. Ground water table in the far area from the village tanks is deep. Therefore, it is concluded that most of the agricultural practices in the dry zone are determined by the reliability of the rainfall (Farmer, 1956).

References

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