

Conjunctive use of surface and ground water for irrigation with special reference to PAP Basin, Tamil Nadu

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■ **ABSTRACT** : The concept of conjunctive use of water resources requires judicious planning and policy implementation to utilize the surface and groundwater resources. The concept of integrated hydro-systems management was recognized by the practioners' since early 1970's. Earlier, studies on conjunctive use mostly focused when situations such as water logging and salinization problems were caused by intensive irrigation in many canal commands. But shortages of surface water supplies also necessitated the development of groundwater in many canal commands. In such situation, groundwater can be used along with surface water supplies in a profitable way. The present study was carried out in Parambikulam- Aliyar - Palar basin, Coimbatore, Tamil Nadu, where the command area is divided into two zones which receive the canal supply once in alternate years. The water demand and available water resources in the study area were evaluated considering surface water and groundwater and rainfall. The aquifer response and recharge due to rainfall in the PAP basin were studied. The efficiency of canal water delivery system in 4(L) distributory and evaluation of the conjunctive use of available water resources and its optimal allocation with the objective of obtaining maximum net benefits in 4(L) distributory of the Pollachi canal were studied. This paper presents a simple economic- engineering optimization model to explore the possibilities of conjunctive use of surface and groundwater using linear programming, and to arrive at an optimal cropping pattern for optimal utilization of water for maximizing net benefits.

■ **KEY WORDS** : Linear programming, Conjunctive use, Surface and groundwater resources, Water allocation, Cropping pattern

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Increase in water demand poses new challenges for water resource planners to keep pace with the increase in population. Agricultural production has to be increased which is possible through development of new water resources projects or efficient water management within the existing projects. The concept of integrated hydro-systems management was recognized by the practioners' since early 1970's. Earlier, studies on conjunctive use mostly focused when situations such as water logging and salinization problems were caused by intensive irrigation in many canal commands. But shortages of surface water supplies also necessitated the development of groundwater in many canal commands. In such situation, groundwater can be used along with surface water supplies in a profitable way.

Considering these aspects an attempt has been made to study the conjunctive use planning of water resources in Pollachi canal command of PAP basin (Parambikulam-Aliyar-

Palar basin), Coimbatore district in Tamil Nadu, India (Fig. A).

■ METHODOLOGY

Study area :

The study was carried out in the canal command area of Parambikulam-Aliyar-Palar (PAP) Irrigation project which spreads in Coimbatore, Tiruppur and Erode districts of Tamil Nadu. The PAP basin spreads in 2388.72 sq.kms spread over in Coimbatore District of which, one third of the area 822.73 sq.kms is covered with hills and dense forest cover. The basin is surrounded by Cauvery basin on the North and East, Kerala State on the south and West. The water is diverted from west flowing rivers to east by constructing weirs, reservoirs, tunnels, open channels and contour canal etc. to irrigate the drought prone areas of Coimbatore, Erode and Tiruppur districts. The basin is having eight west flowing rivers, six in Anamalai Hills and two in plains. There are 7 canal systems and 3 tanks with