

Agro-Wells: Their Socioeconomic Profile and Potential for Conjunctive Use with Surface Water

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AGRO-WELLS (OPEN dug wells) have been introduced in the dry zone of Sri Lanka primarily to augment the availability, adequacy and equity of irrigation water throughout the year. By 1992 nearly 5,000 agro-wells had been constructed and the program is continuing. For this study, conducted in 1993, a stratified sample of 15 wells was selected from two topographies—in highlands (upstream of storage tanks) and in lowlands (downstream of storage tanks) in Galgamuwa. Agro-wells, unlike ordinary domestic wells, have a much higher capacity by virtue of their larger size. Excluding the family labor used by the farmer families in the construction and preparation of irrigation systems, the cost of construction of a well varied from Rs 15,000 to Rs 75,000.¹⁷ The sample included wells of various types of construction such as unlined, unplastered, and fully plastered wells. The average cost of a pumping set and accessories was Rs 15,000.

The study observed that the majority of the owners were from the poor or lower middle classes of rural society. All the farmers except two in the sample drew their main income from agriculture. The average family size was five. The age of the sample farmers varied from 23 to 66 years, with an average of 42 years. The number of years of schooling by sample farmers varied between 2 to 10, with an average of six. All the owners borrowed money from the bank to purchase the pumping set.

Static water table data indicated that the wells located downstream of the reservoirs are hydraulically connected to the irrigation canals and as such, the water table in the wells responds directly to the changes in the water level of the canals. It was also observed that the water table in the wells downstream of the reservoir showed less fluctuation than those located in the highlands and away from the influence of the tanks. The static water table in the wells located in well-drained rice soils ranged from 3.2 meters (m) from the ground level in early June to 4.65 m by the end of September. In the wells located in poorly drained rice lands, the maximum distance to the static water table from ground level was 3.0 m even in the peak dry period during which there were no water issues from the reservoir. During the same period, the maximum distance to the static water table from ground level in wells located in the highlands varied from 3.3 m to 6.2 m. The maximum amount of water pumped from wells located in the highlands, and in well-drained and poorly drained rice soils were 1,017 cubic meters (m³), 1,089 m³, and 753 m³, respectively, from June to September. These figures imply that water removal from the wells located in poorly drained rice soils is well below their potential. The average recharge rate ranged from 0.05 to 0.10 liters per second (lps). Even in the peak dry period, nearly 70 percent and 60 percent recharge occurred within 24 hours in wells located respectively in poorly drained and well-drained rice soils.

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¹⁷US\$ 1.00 = Sri Lanka Rs 47.75 in 1993.

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The cropping potential of an agro-well located in the highlands is such that it can maintain a long-duration crop with supplementary irrigation during *maha* (wet season) and a short-duration crop during *yala* (dry season). The wells located in the lowlands are capable of providing water for long-duration crops even in the *yala* season. Wells located downstream of the reservoirs were used for supplementing surface water for irrigating rice in the latter part of the 1992/93 *maha* season. Upland wells were used exclusively to grow other field crops, mainly chili, by supplementing rainfall. The average command area of a well was 0.21 hectare. The farmers cultivated small extents and also used low inputs.

Costs and returns from the wells indicated that the average net income was Rs 74,558.00 per hectare per season (from chili). It appears that most of the farmers who own agro-wells are not in a position to use their full potential due to lack of capital and knowledge about economically attractive crops and on-farm water management.

Farmers owning wells downstream of the reservoirs practised limited conjunctive use of well water with surface water for rice during the 1993 *yala* season, but indicated that as rice is a high water consuming crop, pumping a large quantity of water is near cost prohibitive. Pumping tests indicated, however, that potential exists for conjunctively using surface water and groundwater even for rice cultivation.