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Input use pattern of water users' association in Periayr-Vaigai river basin

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Abstract
Given the existing water supply scenarios, the demand management strategies will be considered more relevant for the efficient management of the available supplies. Therefore, what is needed is the clear understanding of the value of water in alternate uses as well as the incentive to allocate the water among competing crops and uses in different river basins. This will also help to work out the performance of both irrigation and agriculture sectors at basin level. Accordingly, the following objectives are set forth: to discuss the characteristics of WUAs and the impact of such characteristics on the water use efficiency of the selected farms to examine the participation of farmers under WUAs in the selected area The deliverables will be a boost for water user association and find a way possible ways for the water use in a economic prospects.

Keywords: Input Use Pattern, Water Use Efficiency, Periyar-Vaigai River Basin

Introduction
The Thamirabarani river basin has the largest number of Water Users' Association in Tamil Nadu in the ratio of 132:150 villages. Water Users' Association of Thindal Distributory of the Lower Bhavani Project in Tamil Nadu was the first of its kind in the state established during April 1988 and it was the outcome of the pioneering work of the State Agricultural Engineering Department. The main aim is to involve farmers on a sustained basis for taking up the full responsibility of managing the water distribution below the distributory level. It is reported that more than 85 per cent of the 1641 WUAs' with an area of 840.94 thousand hectare established at the sluice level in the river basin continue to function effectively.

Objectives of the Study
In order to test the above hypotheses, the overall objective of the study was fixed as to study the impact of Water Users' Associations on productivity and farm income in the study area with the following specific objectives:

(i) to examine the participation of farmers under Water Users' Associations in Thamirabarani river basins of Tamil Nadu.
(ii) to identify the constraints and suggest policy measures for improving the water use efficiency in the farms covered by the selected Water Users' Associations.

Methodology
The present study was conducted in Periyar-Vaigai river basin which had the largest number of WUAs' (132) in 250 villages. Hence, they were purposively selected to study the impacts and characteristic features of WUAs. Tamil Nadu is pioneer in Water Users' Association especially southern Tamil Nadu. Periyar vaigai river basin have been selected. The study covered 60 farmers under WUAs and 40 farmers under Non-WUAs in each of the selected river basins and thus making the total sample size at 100 farmers.

Review of Literature
Palanisami and Subramanian (1983) [1] observed that the farm water supply in tail portion is affected by size of holding, distance of field location and possession of wells. The social character was found significantly affecting water supply in the head portion only. Canal lining and changes in water allowance along with on-farm development activities and conjunctive use of surface and ground water are suggested to eliminate the difference in water receipt of the farms at different locations.

Sampath (1985) [2] made a comparative analysis of four methods of water distribution with a view to assess the efficiency in terms of output generated and equity implications in terms of relative (i) practice of relating water needs to farm size (ii) volumetric water pricing,

(iii) productivity criteria and (iv) allocation according to demand expressed by farmers. He concluded that the common practice of relating water needs to farm size was less efficient and less equitable of the four methods of water distribution.

The water should be distributed by fixing irrigation timings for individuals in proportion to the area to be irrigated and making allowances for conveyance losses in field channels based on their distance from the outlet.

Sudha (2005) employed Garrett's scoring technique to find the constraints involved in adoption of Integrated Pest Management Technology (IPM). She found that high wage of labour as the major problem with the score of 75.65 followed by non-availability of labour, lack of IPM inputs, lack of extension follow up practices, lack of proper training facilities, lack of confidence, complex practice, fragmented land holdings and lack of assured irrigation.

Gnanaprakasam (2006) using Garrett's ranking technique found that delay in input supply as the major problem faced by coleus contract farmers followed by insufficient input supply, seasonal labour scarcity and high cost of labour, forced insurance, yield loss due to climate and lack of fixed price policy.

Result and Discussion

Table 5.17: Input Use Pattern in Banana Cultivation in Periyar-Vaigai River Basin

Sl. No	Particulars	Members	Non-members
1	Suckers (numbers/ha)	2100	2040
2	Farm Yard Manure (t/ha)	14.10	12.80
3	Fertilizer (kgs/ha)	719	672
4	Plant Protection Chemicals (Rs./ha)	3831.93	3802.55
5	Irrigation (Nos./ha)	32	28
6	Machine power (hp hrs/ha)	25	26
7	Human labour (man days/ha)	278.43	230.63

Source: Primary data collection, 2014-2015.

Suckers

Under banana cultivation for member and nonmembers, average sucker rate per ha used was 2100 numbers/ha and 2040 numbers/ha. This would reveal that in the study area, generally, farmers adopted less seed rate than the recommended sucker rate for banana cultivation. Non-members planted less trees than that of members in the study area.

Farm Yard Manure (FYM)

The application of farm yard manure by members of WUAs in Periyar-Vaigai River Basin for banana cultivation was slightly higher (14 tonnes/ha) than that of the non-member farms (13 tonnes/ha).

Fertilizer

NPK fertilizer usage in banana cultivation of members and non-members under water users' association is presented in Table.5.18.

Table 5.18: Fertilizer Usage in banana Cultivation (Kgs/ha)

Sl. No	Fertilizers	Actual usage		Recommended*
		Members	Non-members	
1	Nitrogen	245	220	210
2	Phosphorus	54	52	50
3	Potash	420	400	390
	Total	719	672	650

*- ADA office, Theni

It can be interpreted from the above table that the nitrogen fertilizer usage for members was 245 kg/ha for banana cultivation, phosphorous usage was found to be 54 kg/ha; and potassium usage was also more 420 kg/ha by the members of WUAs. As indicated in the table, the total fertilizer usage for banana cultivation was 719 kg/ha which was higher than the recommended dosage (650 kg/ha). It can also be interpreted that for banana cultivation by non-members, the nitrogen fertilizer usage was 220 kg/ha; phosphorous usage was found to be 52 kg/ha; and potassium usage was also more which showed 400 kg/ha. On an over view, the total the fertilizer usage for banana cultivation by non-members was 672 kg/ha which was higher than the recommended dosage (650 kg/ha). Fertilizer usage by non-members was more in banana cultivation when compared with that of members of water users' association.

Plant Protection Chemicals (PPC)

Under banana cultivation, the expenditure incurred for plant protection chemicals was found to be Rs. 3831.93/ha and for non-members it was Rs.3802.55/ha which contributed a major share in the total cost of cultivating banana.

Irrigation

On an average, 32 and 28irrigations per ha were given for banana cultivationby member and non-member farmers respectively as water availability under water users' association was enormous to the irrigated farms. The farmers usually followed trenching and bed and channel type of irrigation throughout the crop duration. Hence, the number of irrigations was highest in member farms cultivating banana in Periyar-Vaigai river basin in Theni district. The water users' association is responsible for opening and closing up of the sluice and the entire water distribution operation and hence irrigation of the cultivated area under banana cultivation was carried out by the sample farmers themselves.

Human Labour

For banana cultivation, the labour usage was found to be 278.43-man days/ha for member farmers. Based on the number of irrigations for banana cultivation, the labour charges were higher in case of non-members and found to be 230.63-man days/ha irrigated rice cultivation.

Machine Power

It was found that more machine power was required for the banana cultivation. This was mainly due to inadequate availability of labour for agricultural operations in the selected sample farms during peak season. Machineries like tractor and power sprayers were mostly used by the sample farmers under banana cultivation. As different machineries had different capacities, their usage was measured in terms of horse power hours per hectare. Under banana cultivation, the machine power usage was found to be 25HP hours/ha for members and 26 HP hours/ha for non-members.

It could be concluded from the input use pattern analysis that in the study area, there were wide differences between the quantity of different inputs applied for banana cultivation and the recommended quantity of them.

Varietal differences, availability of inputs like irrigation water, human labour, FYM and so on, and expected yield or expected yield loss due to extreme weather parameters also determined the extent of input usage.

Summary and Conclusion

Input Use Pattern in Banana Cultivation

Under banana cultivation for member and nonmembers, average sucker rate per ha used was 2100 numbers/ha and 2040 numbers/ha, respectively. Non-members planted more trees than that of members in the study area. Among the selected farmers, nitrogen fertilizer usage for members was 245 kg/ha for banana cultivation; phosphorous usage was found to be 54 kg/ha; and potassium usage was also more 420 kg/ha by the members of WUAs. The total fertilizer usage for banana cultivation was 719 kg/ha which was higher than the recommended dosage (650 kg/ha). It can also be interpreted that for banana cultivation by non-members, the nitrogen fertilizer usage was 220 kg/ha; phosphorous usage was found to be 52 kg/ha; and potassium usage was also more which showed 400 kg/ha. On an over view, the total fertilizer usage for banana cultivation by non-members was 672 kg/ha which was higher than the recommended dosage (650 kg/ha). Fertilizer usage by non-members was more in banana cultivation when compared to that of members of water users' association. Expenditure incurred for plant protection chemicals was found to be ₹ 3831.93/ha for members and for non-members it was ₹ 3802.55/ha which contributed a major share in the total cost of cultivating banana. On an average, 32 and 28 irrigations per ha were given for banana cultivation as water availability under water users' association for the member and nonmembers by members and non-members respectively. Labour usage was found to be 278.43man days/ha for member farmers. In case of non-members, it was found to be 230.63-man days/ha. Machine power usage was found to be 25 hp hours/ha for members and in case of non-members it was 26 hp hours/ha.

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