Impact of National Water Resource Policy on Irrigated Paddy Farmers' Livelihood in Sri Lanka: Case Study in Lunuwewa under Mahaweli System H

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ABSTRACT

Rice is the staple food of 20 million Sri Lankans, as well as the livelihood of more than 1.8 million farmers. Yields higher than the national average were recorded in major irrigation systems where water supply is assured. This study briefly reviewed the current issues on National Water Resource Policy. The contingent valuation method was used to measure farmers' willingness to pay for existing irrigation system for the recovery of management cost. The management cost recovery is essential for the sustainability of existing irrigation system and for the future improvements. Awareness of the National Water Policy was 62 percent among the respondents. This study revealed that the maximum willingness to pay was Sri Lankan Rupees 500 per annum and it was a 100 percent increment compare to the present payment, with no considerable increase of the average amount. This study implied that sustainability of water use systems require a more comprehensive approach to determine the management recovery fees.

KEYWORDS: Irrigated Paddy, Management Cost Recovery, Willingness-to-Pay (WTP).

INTRODUCTION

Rice is the single most important crop occupying 34 percent (0.77 /million ha) of total cultivated area in Sri Lanka. An average of 560,000 ha is cultivated during Maha * and 310,000 ha during Yala** making an average annual extent sown with rice to about 870,000 ha. About 1.8 million farm families are engaged in paddy cultivation islandwide. Sri Lanka currently produces 2.7 million tons of paddy annually and satisfies around 95 percent of the domestic requirement. Rice is the staple food of 20 million Sri Lankans and it is the livelihood of more than 1.8 million farmers (Anon, 2005).

The yields higher than the national average were recorded in major irrigation systems where water supply is assured. In minor irrigation and rainfed systems, a lower grain yield was recorded due to various stresses and risk factors involved in crop management. Sri Lanka has now become almost self-sufficient in rice production due to innovative measures adopted by the central government.

Rice production has increased considerably over the past fifteen years. Sustainability problems have surfaced in recent years, mainly in the high productive areas in the dry zone in the North Central Province of the country. Most farmers apply high doses of fertilizer as well as neglect recommended agronomic and pest management practices which leads to poor yield. The production cost of a kilogram of paddy is approximately 9 Sri Lankan Rupees (LKR) for the last few years.

The growing demand for water in household, commercial and industrial sectors as a result of population and industrial growth combined with frequent occurrence of droughts have raised increasing concerns about the conventional wisdom of perceiving irrigation water as a free gift of nature. In many part of the world both the free distribution and under pricing of water have caused serious misuse of the resource (Petit, 1994). Both under pricing of water and lack of cost recovery mechanisms in many governments managed irrigation systems have resulted a poor operation and maintenance (Sampath, 1992).

In terms of aggregate statistics, Sri Lanka is relatively well endowed with water resources. Annual freshwater withdrawal is only about 15 percent of the total resources, which is far below the 40 percent level adopted by the United Nation (UN) to mark water scarcity. Sri Lanka faces little or no scarcity, either physical or economic, even by 2025. Aggregate statistics mask the very pronounced temporal and spatial aspects of water scarcity in the country, largely owing to the bi-modal pattern of rainfall. It is estimated that by 2025, most of the districts in the dry zone will face severe seasonal or year-round absolute water scarcity at the current level of irrigation efficiency.

The central challenge facing irrigated agriculture today and in the foreseeable future is how to produce more food with less water. Increasing population rate at 1.2, industrialization, and urbanization will no doubt cause a reduction in the share of available fresh water allocated to agriculture. The inevitable result of this convergence of factors is increasing competition for water and increasing pressure to use water much more productively.

The current Water Resource Policy and the draft Water Resources Act attempt to introduce the following basic principles for water resources management in Sri Lanka: Integrated Water Resources Management (IWRM) allocation on an equitable and efficient basis; decentralized decision-making; and a new holistic institutional structure. A key feature of

* Paddy cultivation season under North-east monsoon
**Paddy cultivation season under South-west monsoon

the policy is its emphasis on the sensitive issue of water entitlements and their transfers as an institutional mechanism for water allocation. The domestic users are the least concentrated group on the policy while irrigated farmers are highly concentrated (Ariyabandu, 2002). There will be a water permit system for bulk water users to ensure protection against the overuse of water and to allow all stakeholders in a river basin to have access to adequate water for their legitimate use. Traditional and customary water rights will be protected.

The main objective of this study is to analyze the possible impact of implementing the National Water Resource Policy within irrigated paddy farmers' community. Measures the Willingness to pay for recovery of management cost and identify the responses of farmers' towards the new management concept are the specific objectives of conducting this case study.

METHODOLOGY

The estimation of farmers' willingness to pay (WTP) for irrigation water required information on their household characteristics. For the purpose of household survey, the selected area was divided into three zones head, middle and tail. Among the 54 households interviewed, 20 households (37%) were from the head portion, 20 households (37%) from the middle and the rest 14 households (26%) from the tail portion. Farmers who take water from Distribution Cannel -5 (DC-5) and DC-6 were selected for the survey.

The basic purpose of a WTP survey is to elicit farmers' WTP for recovery of management cost incurred in existing irrigation system. The WTP questionnaire designed for the survey was consisted with both close-ended questions and open-ended question. In the case of close-ended questions, farmers were asked to give their choice on fixed amounts. In the case of open-ended question, farmers were asked how much they are willing to pay for management cost recovery.

In functional form the relation can be expressed as:

WTP = f (EDCN, FSIZE, AGE, FLABOR, AREA, WSUFF, AGIN) (1)

Where,

WTP = respondents' willingness to pay for irrigation water (Rs/ha/yr),

EDCN = respondents' education level (D1, D2),

FSIZE = respondents' family size (number),

AGE = respondents' age (years),

FLABOR = family labour force (number),

AREA = area of paddy cultivated (ha),

WSUF = respondents' perception on water sufficiency (yes/no),

AGIN = total agricultural income from both seasons (Rs),

$$WTP=\beta_0+\beta_1EDCN_1+\beta_2EDCN_2+\beta_3FSIZE+\beta_4AGE+\beta_5FLABOR+\beta_6AREA+\beta_7WSUF+\beta_8AGIN$$

Error! Switch argument not specified (1)

Where,

β_0, β_1.....β_8 were regression coefficients corresponding to the independent variables, and WSUFF was dummy variable. D1, D2 were dummy variables,

Where,

D1=D2=0 no education,

D1= 1 below ordinary level,

D2= above ordinary level.

RESULTS AND DISCUSSION

Sample farmers were asked their willingness to pay for following fixed amounts.

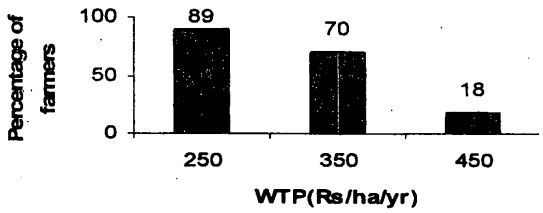

Figure 01. WTP of Percentage of Farmers.

Among the total sample size of 54, 'yes' answer was received from 70 percent of the respondents at 350 Rs/ha/yr, and 18 percent at 450 Rs/ha/yr. Farmers who owned lands in tail-ends willing to pay highest values for recovery of management cost. The rest replied 'no'. In the case of open-ended questions, the bid amount varied from as low as zero to as high as 500 Rs/ha/yr for paddy cultivation. The average WTP value for the existing water supply conditions was estimated to 300 Rs/ha/yr.

Table01. Parameter estimates of variables.

Variables	DF	Parameter Estimate	Standard Error	t value	Pr > t
Intercept	1	586.19044	107.40608	5.46	<0.0001
EDCN1	1	-73.37907	36.72489	-2.00	0.0620
EDCN2	1	-49.91485	25.26948	-1.98	0.0647
Family size	1	-1.43823	1.73971	-0.83	0.4199
Age	1	80.59441	31.81938	2.53	0.0215*
Family labour	1	72.63622	51.04908	1.42	0.1729
Water sufficiency	1	-0.89823	0.21561	-4.17	0.0006*
Income	1	42.70562	44.71725	0.96	0.3530

R^2 = 0.7058 **significant at 5%*

The result of regression analysis showed that 70.5 percent of variation in WTP can be explained by these sets of variables (table 1). Further it revealed that the age of the respondent and water sufficiency were significantly affected the WTP. The educational level, family size and water sufficiency showed negative relationships with WTP for management cost recovery. With the increase of family size the amount of WTP had decreased. The disposable income is getting lower when farmer's family size is high. When farmers were satisfied with existing irrigation system, they were reluctant to pay for irrigation water. The Level of education negatively affected to the WTP for management cost recovery. It was observed that the reason behind the fear is "Privatization of natural resources". Eventhough educated farmers required an improved irrigation system; they are not motivated to pay for irrigated water. This study showed that the WTP of the farmers with higher income level was also high. Age of the respondent showed positive relationship with WTP.

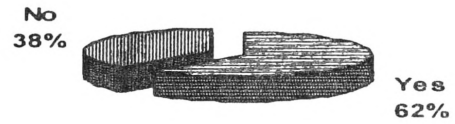

Figure 02. Awareness of National Resource Water Policy among Farmers.

Awareness of the paddy farmers on the National Water Resource Policy was 62 percent among the total respondents. 58 percent of farmers who knew about the policy were having at least secondary education. Therefore average awareness about the National Water Resource Policy was not in a satisfactory level. Most of them were not aware of recommendations which are going to be practiced within the existing irrigation system. Therefore the awareness improvement programs have to be conducted among the farmer community.

Table 02. Farmer Satisfaction to Irrigation Water Problems.

Irrigation water problems	No. of farmers (%)	
	Satisfied	Unsatisfied
Water sufficient in Maha	74	26
Water sufficient in Yala	53	47
Timely water supply	90	10

Among the total respondents 74 percent of farmers were satisfied with the current irrigation system in Maha season. In Yala the scenario was recorded with low amount of satisfactory farmers. The management of available water was in a satisfactory level. With the increase of non-water input prices farmers were unable to pay more money to recover the management cost of existing irrigation system. The paddy market prices and the infrastructure facilities related to paddy production and distribution have not shown positive improvement within last decade. So farmers hesitate to pay more even they feel current payment is not sufficient for further improvements.

Farmers were able to get higher productivity level by using improved rice varieties. Currently nobody practiced cultivation systems which make higher yield from a drop of water. 'System of Rice Intensification' (SRI) was not popular among the farmer community. There is a current requirement to improve the awareness of farmers on new water saving cultivation practices.

Table 03. Farmers' Response to Available Alternatives

Available alternatives	No. of farmers (%)
Remain in paddy cultivation in both seasons	67
Remain in paddy cultivation only in Maha season	28
Escape from paddy cultivation.	5

The survey showed that 67 percent of farmers were not willing to quite from paddy farming in both seasons even the government mandates management cost recovery system within the existing irrigation system. Because they have been engaging in paddy cultivation for a long time and it has become a part of their livelihood. However the farmers were significantly depend on the other field crops rather than the paddy cultivation. The 5 percent of farmers those expect to quit paddy farming belonged to the second generation of the settlers. The trend of the new generation could badly affects to the paddy production in Sri Lanka.

CONCLUSIONS

The regression analysis showed that there is a relationship of income and water sufficiency with WTP. In addition, factors which affect to income have to be considered before giving a recommendation. The management cost recovery mechanism should be developed in specific geographical area. It should be fitted to the socio-economic factors of a particular area. The recommendation should be communicated with the farmer organizations of the area with the aim of encouraging them and changing the perception of management cost recovery mechanism.

The measurements of the economic sustainability of water use systems required a more comprehensive approach than simply comparing the value of water obtained from different methods. This can be further demonstrated using existing conditions, future requirements and potential changes of the area.

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