



## Research Article

# ASSESSMENT OF TRANSACTION COST IN FUNCTIONING OF WATER USER COOPERATIVE SOCIETIES IN TUNGABHADRA COMMAND AREA OF KARNATAKA

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**Abstract:** In India irrigated area particularly from canal command area has been considered as development of rural economy, poverty reduction. However, due to intensive cultivation of rice and poor maintenance of canal irrigation system which led to deprivation in the flow of canal water irrigation in the tail end reach farmers and also poor recovery of water cess. The Gol, formed Participatory Irrigation Management (PIM) involves farmers in planning, operation and maintenance of the canal irrigation system and it collects water cess and ensures equity in distribution of water among head and tail reach farmers. The PIM were brought under the ambit of Cooperative Act, which are called as Water User Cooperative Societies (WUCS). The present study undertaken in the Tungabhadra command area of Karnataka with main objective of assessing the transaction cost incurred in functioning of WUCS. The findings indicated that information cost is least proportional of transaction cost in the better performing (BP) WUCS as compared to moderately performing (MP) WUCS. While enforcement cost with regard to supervision and maintenance of field channels (24.64 %) forms major proportion of transaction cost in the BP as compared to MP region (14 %) of WUCS. The transaction cost per member and per acre of paddy lower in BP as compared to MP. The farmer in the moderately performing WUCS may be educated and motivated them to enrol as members and encourage them to participate in general body meeting which helps them to reduce the transaction cost and funds raised from membership fee could be used in operation and maintaining the canal irrigation system thereby helps to reduce seepage and deprivation in flow of canal water to tail end farmers in the command area.

**Keywords:** command area, WUCS, tail-end, transaction cost, enforcement cost

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## Introduction

Irrigated agriculture particularly command area has played a major role in the development of rural economy, poverty reduction and maintaining economic growth. Recognizing this, Government of India has made large-scale investment in canal irrigation. In spite of large investment in canal irrigation system and phenomenal growth of irrigation potential since 1950s. There is a widening gap between irrigation potential created and irrigation potential utilised is due to the inefficient operation and maintenance of canal irrigation system and poor collection of water cess (constitute only 0.2 to 1.2 % when compared with crop value). The intensive cultivation of rice in head reach of canal command area particularly in Tungabhadra command area has led to persistence deprivation in flow of canal water to tail end farmers, which is estimated about 40-91 percent in Karnataka [1]. The Government of India initiated Participatory Irrigation Management (PIM) through the Command Area Development (CAD) program. PIM primarily involves farmers in planning, operation and maintenance of the canal irrigation system and it collects water cess and ensures equity in distribution of water among head and tail reach farmers [2]. Accordingly, Karnataka state amended its Irrigation Act of 1965 [3] and PIM was brought under the ambit of Cooperative Act, which are called as Water User Cooperative Societies (WUCS). These policy reforms emphasize "Irrigation management transfer" from the state department to water user cooperative Society, which a paradigm shifts from state management to user institutions.

## The Institutional and Transaction cost

The Institutional approach much focused on hierarchy approach reduces the transaction cost. The North revealed that institutions as the "rules of the game" in society and indicated that how institutions hierarchy had influence on the

transaction cost. Importantly, transaction cost is incurred in formation or functioning of the society or an organisation which is expense associated to mobilize the participators and institutional framework and transferring of property rights. The high transaction cost occurred mainly because of asymmetric information exists among the peoples and lack of proper institutional arrangements and free riding problem and bounded rationality, asset specificity and opportunistic behaviour [4]. Thus, high transaction cost will affect the functioning of the society. With this background, the present paper emphasised mainly on to assess the transaction cost is incurred in functioning and formation of water user cooperative societies. The transaction cost has classified into three types namely: Information cost, contractual cost and enforcement cost.

## Methodology

The present study undertaken in the Tungabhadra command area of Bellary district of Karnataka. Purposive multistage sampling technique was employed to select the WUCS. Out of 151 WUCS, 30 WUCS were selected randomly (20% of 151). The transaction cost was calculated by considering the opportunity cost of the labor of time spent for different activities of the WUCS. The prevailing wage rate of the study area was taken as the opportunity cost of labor. For instance if secretary involved in recovery of water cess how much time spent in recovery of water cess to total cultivated land converted into man-days and then multiplied by the prevailing wage thus TC incurred in recovery of water cess. (Ex: 4 hours per day divided by 8 and then multiplied by prevailing wage rate i.e.,  $(4/8) \times 250 = \text{Rs.}125$  incurred in collection of water cess per day) accordingly calculated for all the activities of the WUCS. The WUCS are classified in to better performing (BP) and moderately performing (MP) WUCS.

Table-1 Different phases of Transaction cost involved in functioning of WUCS

SN	Transaction cost	Where they occur
1	Information cost	OTC Participation in planning, Visit to other WUCS, number days spent for training tour.
		AC Access to information of technologies, Training programme to directors of WUCS.
2	Contractual cost	OTC Cost of establishing society (Registration of society, Opening of account).
		AC General body meeting, Annual body meeting and cost incurred in collecting water cess and room rent
3	Enforcement cost	OTC CADA officials to promote the WUCS formation
		Collecting the records of farmer members of the society
		AC Salary of the secretary, Supervision and Maintenance of field channels

Note: OTC = One time cost, AC = Annual cost, Source: Own compilation after Lyons B.R, 1994.

Table-2 Transaction cost incurred in functioning of WUCS in TBP command area

	Information cost	Moderately performing WUCS (18)			Well performing WUCS (12)		
		No of days	Total cost	% of TC	No of days	Total cost	% of TC
OTC *	Participation in planning	5	1125	1.10	8	1600	1.64
*	Visit to other WUCS	3	675	0.66	3	600	0.62
*	Days spent for Training tours	6	1350	1.32	3	600	0.62
AC	Access to information to technologies	12	2700	2.65	15	3000	3.08
#	Taking the CADA officials to visit farmers field	15	3375	3.31	6	1200	1.23
*	Training program to directors regarding the functioning of WUCS	9	2025	1.99	1	200	0.21
	Subtotal		11250	11.04		7200	7.39
	Contractual cost						
OTC*	Cost of establishing society (Registration of society, Opening of account)	2	450	0.44	2	400	0.41
	Cost of establishing office (Furniture, Miscellaneous)		3750	5.00		2800	2.87
AC*	General body meeting	33	7425	7.00	26	5200	5.34
*	Monthly meeting	47	10575	11.00	37	7400	7.60
*	Building rent**	10200	10200	10.00	9000	9000	9.24
*	Cost incurred to collect water fee	23	5175	5.00	11	2200	2.26
*	Arranging meeting	4	900	1.00	4	800	0.82
	Subtotal		38475	39.44		27800	28.54
	Enforcement cost						
OTC#	CADA officials to promote the WUCS formation	6	1350	2.00	6	1200	1.23
*	Collecting the records of members to register the society	6	1350	1.00	6	1200	1.23
AC*	Salary of the secretary (Rs.3000 per month)	36000	36000	31.00	36000	36000	36.96
*	Supervision and Maintenance of Field channels	60	13500	14.00	120	24000	24.64
	Sub total		52200	48.00		62400	64.07
	Total Transaction cost		101925	100.00		97400	100.00

Note: OTC = One time cost, AC= Annual cost, \*(No of hours spent/day, no of days/year, imputing labour cost @ Rs.225 and Rs. 200 for MP WUCS and WP WUCS respectively). # ( No of visits to WUCS by CADA officials per year, imputing transportation cost @ Rs. 550/- for MP and WP reach per visit). \*\* (Building rent @ Rs. 850 per month and Rs. 750 per month in both WUCS of MP and WP reach region).

Table-3 Transaction cost per acre of paddy and per member of WUCS in TBP command area, 2016 (Rs.)

SN	Particulars	Information cost		Contractual Cost		Enforcement cost		TC/ Acre	Transaction cost per acre of paddy	Transaction cost per member
		Total cost	Cost /acre	Total cost	Cost /acre	Total cost	Cost /acre			
1	MP WUCS									
	OTC	3150	10	4200	13	2700	8	10050	50	84
	AC	8100	25	34275	106	49500	153	91875	455	765
	Total	11250	35	38475	119	52200	161	101925	504	849
2	BP WUCS									
	OTC	2800	7	3200	8	2400	7	8400	27	58
	AC	4400	11	24600	63	60000	154	89000	283	614
	Total	7200	18	27800	71	62400	160	97400	310	672

Note: OTC=One time cost, AC= Annual cost, Total paddy area under MP WUCS = 202, Total paddy area under BP WUCS = 314, Total number of members for the WUCS =120 (MP), 145 (BP).

Table-4 Transaction cost of raising total funds and water cess collected to total cultivated land of WUCS TBP command area, 2016 (Rs.)

SN	Particulars	TF*	TC	Water cess collected	% TC to TF	% water cess to TC	% of water cess collected to TF
1	MP WUCS	221884	101925	27133	45	27	12
2	BP WUCS	250018	97400	39485	39	40	16

Note: TC: Transaction cost, TF: Total fund. Water charge per acre =150 (Paddy), 50 (Cotton and chilli) in both MP and BP WUCS. \*Total funds consist of grants from CADA, water cess collected to total cultivated land and membership fee of the farmer to register in the WUCS.

The WUCS is categorized as BP and MP based on following criteria i) Water cess collected should be more than 50 percent to total cultivated land, ii) More than 50 percent of farmer members attending the general body meeting iii) More than 50 percent of farmers registered as members. Whereas, MP WUCS having following criteria i) Water cess collected should be less than 50 percent to total cultivated land, ii) Less than 50 percent of farmer members attending the general body meeting iii) Less than 50 percent of farmers registered as members.

## Results and Discussion

Transaction cost is defined as the cost of making and enforcing decision. It includes the cost of obtaining information, establishing one's bargaining power, arriving at group decision, and enforcing the decision made. The Transaction cost incurred by BP and MP in functioning of WUCS is comprised of information cost, contractual cost and enforcement cost which consists of one time and round the year cost.

With regard to information costs, one-time cost included participation in planning, visit to other WUCS and number of days spent in training programmes. These one-time costs accounted for 3.08 percent of the total transaction cost (Rs. 3,150) in the MP they accounted for 2.88 percent of the total transaction cost (Rs. 2,800) in BP reach of WUCS. The annual information cost includes access to information of technologies, taking the CADA officials to visit farmers field and training program to director on functioning of WUCS. These cost accounts 8 percent of the total transaction cost (Rs. 8,100) in the MP region, while these cost 4.5 percent (Rs. 4,400) in the BP reach region [Table-3]. The contractual cost consists of both one-time cost and annual cost components. One time cost includes cost of establishing society and office, which accounts for 5.44 percent of the total transaction cost incurred by the farmers (Rs. 4,200) in the MP, while in BP WUCS forms 3.29 percent of the total transaction cost (Rs. 3,200). The cost incurred annually included general body meeting, monthly meeting, building rent and cost incurred to recover water cess and arranging meetings. These costs formed 34 percent of total (Rs. 34,275) in the MP region of WUCS while it was 25.26 percent of total transaction cost (Rs. 24,600) in the BP reach of WUCS. Enforcement cost consists of one time cost and annually cost. One time cost includes CADA officials to promote the WUCS formation and collecting the records of members to register the society which accounts for 3 percent of total transaction cost (Rs. 2,700) in MP region of WUCS, while 2.46 percent of total transaction cost (Rs. 2,400) in BP reach region of WUCS. Further, cost incurred annually includes salary of secretary and supervision and maintenance of field channels which forms 45 percent of the total transaction cost (Rs. 49,500) in MP region of WUCS while it formed 61.60 percent of the total transaction cost (Rs. 60,000) in WP reach region of WUCS [Table-4]. Furthermore, among annually enforcement cost supervision and maintenance of field channels (24.64 %) forms major proportion of transaction cost in the BP as compared to MP region (14 %) of WUCS. It indicates that BP WUCS are actively involved in supervision of canal water to stop the illegal withdrawal of water from canal and maintenance of field channels through cleaning and lining of field channels to overcome loss of water through seepage that's why enforcement cost is higher in BP WUCS as compared to MP WUCS. A comparison of the different items of transaction cost in the WUCS that in the MP, the information cost formed 11.04 percent, contractual cost formed 39.44 percent and enforcement cost formed 48 percent of the total transaction cost. While in BP WUCS information cost (7.39), contractual cost (28.54) and enforcement cost (64.07) of the total transaction cost. Thus, information cost is least proportional of transaction cost in the BP WUCS, which indicates that the farmers were actively participated in functioning of WUCS compared to MP WUCS. The results were in consonance with study conducted by Sripadmini (2001) reported that the enforcement cost (71 %) which was higher than information cost and contractual cost in Government watershed.

#### Transaction cost per acre of paddy and per member of WUCS

Transaction cost per acre of paddy and member of WUCS is presented in the [Table-4]. The Transaction cost per member and per acre of paddy was found to be low (Rs. 672) and (Rs.310) in the BP as compared to MP (Rs.849) in WUCS. The transaction cost per member was lower in BP as compared to MP because of large number of farmers registered as members and percentage of attending general body meeting also highest. The transaction cost per of paddy found to be lower in BP mainly due to highest area under paddy cultivation as compared to MP. The results are similar to Sripadmini (2001) reveals that the transaction cost per beneficiary as well as per acreage lower in Government watershed compared to NGO watershed because of large number of beneficiaries and larger area under arable land.

#### Transaction cost incurring in raising total funds and collection of water cess of WUCS

Total funds of WUCS consists of grants form CADA, canal maintenance charge (Rs.100 per acre) and collection of water cess to total cultivated land and farmers shares to enrol as a member (Rs.115). The percentage of transaction cost to total funds was highest (Rs. 45) for MP as compared to BP (Rs. 39) this indicated that the farmers members in BP WUCS are actively involved in various activities of

WUCS and also the percent of farmer member attending general body meeting is highest. The percentage of water cess collected to the transaction cost was highest (40 %) in BP as compared to (27 %) MP WUCS, which indicated that collection of water cess to cultivated land higher in BP as compared to MP WUCS. The percentage of water cess to total funds was highest (16 %) in BP WUCS as compared to MP WUCS (12) because of larger farmers registered as member in BP as compared to MP WUCS.

#### Conclusion:

The present study has been undertaken in TBP command area of Karnataka in order to assess the transaction cost incurred in formation and functioning of WUCS. The well performing WUCS incurred less transaction cost as compared to moderately performing WUCS. This indicates that institutional arrangements with respect to disseminating the information and percentage of farmers enrolled as members were high in well performing WUCS as compared to moderately performing WUCS. In moderately performing WUCS farmers should be educate and motivate to enrol as members and encourage them to participate in the general body meeting which helps to reduce the transaction cost and funds raised from the membership fee and collection of water cess could be utilised in better manner for other activities WUCS like supervision and monitoring the canals to check the illegal withdrawal of water and cleaning the field channels and helps to reduce the inequitable distribution of water among the tail and head reach farmers.

**Application of research:** The finding of the study helps to take appropriate policies measures to reduce the transaction cost involved in water user cooperative societies.

**Research Category:** Institutional economics

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#### References

- [1] Anonymous (2000) *The Karnataka irrigation and certain other laws (Amendment) act, Karnataka Act No.24, Government of Karnataka, Bangalore.*
- [2] Anonymous (2002) *National water policy, Ministry of water resources, Government of India, New Delhi.*
- [3] Shah A. (2003) *Tail-enders and other deprived in canal irrigation systems: Paper presented at national workshop on Tail enders and other deprived in canal Irrigation systems, Ahmedabad, India.*
- [4] Hobbs J.E. (1997) *A. J. of Agricultural Economics*, 79 (4), 1083-1095.
- [5] Lyons B.R. (1994) *J. of Economics & Management Strategy*, 3(2), 257-278.
- [6] Sripadmini R. (2001) *Relative economic performance of watershed development projects under different management protocols in Karnataka, M.Sc (Agri) Thesis, (Unpub.), Uni. of Agri. Sci., Bangalore.*