

# Attitude and Participation of Farmers under Water Users' Associations in Kerala

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A study was conducted to quantify the relationship between attitude of farmers and their participation in the activities of Water Users' Associations under the Command Area Development Authority (CADA) in Kerala. There is a significant relationship between the two. The participatory activities have been explained through relevant social theories applicable to irrigation management. Lack of activities like provision of farm channels, rotational water supply, consolidation of landholdings and group farming, were found to be the reasons for low farmer participation. Based on the study, factors relevant for Participatory Irrigation Management (PIM) for decentralised irrigation have been identified.

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## INTRODUCTION

Command Area Development Authorities (CADA) have been established in different states in the country with the main objective of improving on-farm water management in terms of adequacy, equitability and timeliness for the farming community under irrigation projects. In Kerala, the CADA programme is being implemented under 14 irrigation projects. The activities of CADA have been planned to be carried out by the farmers' participation through Water Users' Associations (WUAs), registered under different outlets in the irrigation canals.

The activities envisaged for WUAs include:

- improvements in on farm water management;
- adoption of improved agricultural practices;
- arranging transportation and marketing facilities;
- distribution of subsidies; and
- organising training for farmers.

Therefore, farmers' participation through the WUAs was conceived as the backbone of the CAD A programmes (CAD A, 1997). However, several studies have shown that many of these associations are non-functional or inactive after their initial formation. The requirement of a favourable attitude on the part of farmers towards effective participation was reported by Sherif and Centril (1945). The role and tasks of WUAs should refer to the degrees of cooperative attitudes among water users themselves (Kalshoven, 1989). Many studies have also reported farmers' favourable attitude and their participation for success in various activities related to agricultural development (Dasgupta, 1966; Dasgupta, 1968; Kaufman, Singh and Dasgupta, 1975; Singh, 1973).

Singh (1992) was of the opinion that attitudes and values of people are some of the factors that affect people's participation. People's participation, in a broader sense, means their total involvement with development agencies, in deciding programmes and activities, fixing up of priorities, taking initiative and carrying out the projects as partners by the contribution of ideas, interest, material, money, labour and time (Setty, 1985).

The present study was taken up to assess the attitude of farmers towards participation and also their level of participation through WUAs established under CADA and to quantify the relationship, if any, between them.

## **METHODOLOGY**

### **Location**

The location of study was the command (irrigated) area of Malampuzha Irrigation Project (MIP) in Palakkad District of the state of Kerala. The total command area under this project is 20,500 hectares and irrigation water is supplied to farmers for the second crop (*mundakan* season) of paddy during the dry period (October-December). This project is covered under the CADA programme. The number of WUAs reported to be registered under CADA in this project is 444 (CADA, 1997). The 43 WUAs, which had renewed their registration during the period of study, were taken as samples for the present work. The physical location and the number of WUAs on the canal network taken up for the study were 13, 13 and 17 at head, middle and tail reaches, respectively.

## **Sampling**

Within the 43 WUAs taken up, 400 farmers were selected through stratified random sampling based on the official definition of Landholding size of farmers as reported by Jayaraman (1982). The strata defined were as follows:

- marginal farmers: less than one hectare,
- small farmers: 1-2 hectares, and
- big farmers: more than two hectares

The sample was distributed among the above three categories of landholding size through proportional allocation (35 per cent of the total) as follows: marginal farmers — 160; small farmers — 140; and big farmers— 100. The distribution of the sample of farmers based on physical location and reach of WUAs on the canal were as follows: head reach WUAs— 130; middle reach WUAs — 120; and tail reach WUAs—150.

The study was carried out among the individual farmers of the sample through questionnaire survey, incorporating the two variables of the study, namely attitude towards participation through WUAs and farmer participation index. -

## **ATTITUDE TOWARDS PARTICIPATION THROUGH WUAs**

For studying the attitude, a scale was developed based on the methodology (Anantharaman, 1991) as detailed below.

### **Collection of Items (Statements)**

Seventy items, expressing *some* opinion related to WUAs under CAD A, were collected from review of literature and discussion with officials and experts working in this field. These items were then classified under the following heads as adopted by Jayaraman (1982), in his study of attitude of farmers towards irrigators' organisations in Gujarat.

1. Necessary and favourable conditions for functioning of WUA.
2. Type of WUA.
3. Selection of office bearers of WUA
4. Functions of WUA.
5. Advantages of WUA.

### **Relevancy Rating of Items**

The 70 items arranged under the above five heads along with **their** responses under a five-point continuum — 'most **relevant**', '**more**

relevant', 'relevant', 'less relevant', 'least relevant' —were prepared and given to 30 judges (experts in the fields of Sociology, Irrigation Engineering and Agronomy). These experts were asked to do the rating of relevance of each item in measuring the attitude of farmers on the five point continuum mentioned above. It was also ensured that these judges were not the same persons, who had been contacted earlier for the collection of statements to be included for development of the scale. Out of the 25 responses received, 23 had rated all the items and these were considered in the selection.

### **Selection of Items**

Weightages were given for the relevancy rating of the responses, namely, most relevant, more relevant, relevant, less relevant and least relevant as five, four, three, two and one respectively. For inclusion of items in the scale, the following criteria were considered.

#### *Mean Relevancy Score (MRS)*

The MRS of each item was found out by summing up the weightages obtained for the item (based on judges' response) and then dividing by the number of judges.

#### *Coefficient of Variation (cv)*

The coefficient of variation of each item was worked out using the following standard formula.

$$cv = \frac{\text{Standard deviation of an item score}}{\text{Mean score of the item}} \times 100$$

The average MRS and cv were found out by dividing the calculated MRS and cv with the number of items included in the judges' rating. Those items having more than average MRS, and less than the average cv, were selected for inclusion in the attitude scale. The former criterion showed higher level of relevancy for an item, while the latter indicated a higher degree of agreement among the judges on the relevancy of an item. Accordingly, 41 items (statements) were selected under the five heads mentioned earlier for inclusion in the attitude scale.

### **Reliability of the Scale**

Reliability of the scale was determined by the test-retest method as shown below. A sample of 50 farmer members of WUAs under CADA in Malampuzha irrigation project were randomly selected.

The attitude scale was administered to this sample twice, at 15 days interval. The two sets of attitude scores, thus obtained from the same respondents, were correlated. The correlation coefficient ( $r$ ) was 0.82, indicating the reliability of the scale for measuring the attitude of farmers.

### **Content Validity of the Scale**

Content validity relates to how well the contents of the scale represent the subject matter under study. Since all possible items covering the universe of contents regarding WUAs were selected from review of relevant literature, as well as from experts and officials working in this field, the scale can be considered as satisfying content validity.

The attitude scale consisted of 41 items arranged under the five heads mentioned earlier. The scoring for the responses, to each item (statement) namely, 'Agree', 'Neutral', 'Disagree' were three, two, and one respectively. The range of total score in the scale was 41-123. This scale was administered through the questionnaire among the sample of 400 farmers and their total attitude score was quantified, based on their responses to each statement.

### **Farmers' Participation**

Singh (1992), had suggested that people's participation could be measured using a ratio scale having zero at its minimum, to indicate 'no participation' and an arbitrary maximum of 100, indicating 'maximum possible participation'. Such a scale could be constructed by asking a sample of target beneficiaries of the concerned programme a set of questions related to participation and then assigning a score ranging from zero (no participation) to one (full participation).

For the above measurement, Singh (1992) had suggested a list of questions that could be included in the scale, to elicit information necessary for working out the People's Participation Index (PPI). For the present study, a set of 16 relevant questions were framed for inclusion in the scale to measure farmers' participation, taking into consideration the objectives and functions of WUA under CADA (Kerala, 1991). The scoring for all responses to these questions were one and zero, for 'Yes' and 'No' respectively, and one, zero point five (0.5) and zero respectively for the responses 'Always', 'Sometimes' and 'Never'. Details of the questions in the participation scale adopted are given in Table 1.

**TABLE 1: Participatory Activities Undertaken by Farmers under WUAs**

<i>Sl. No.</i>	<i>Activity</i>	<i>Percentage of Participating Farmers *</i>
1.	Planning on-farm development works undertaken through WUAs	Nil
2.	Attending meetings of	83.00
3.	Discussing problems on irrigated rice farming with CADA officials	35.00
4.	Discussing the above with fellow farmers	97.00
5.	Discussing one's knowledge and experience on irrigation water management with fellow farmers	98.00
6.	Discussing the above with officials	33.00
7.	Attending training organised by	17.00
8.	Contributing money for constructions such as field, farm drainage channels and farm road	15.00
9.	Contributing labour for the above	1.00
10.	Contributing money for maintenance of the above structures	63.00
11.	Contributing labour for maintenance of the above, structures	56.50
12.	Consolidation of fragmented	Nil
13.	Adopting suitable cropping pattern under the	Nil
14.	Implementing group farming approach through the	Nil
15.	Conflict resolution between members through	53.00
16.	Adopted rotational water supply	5.00

*Note* : \* rounded off to nearest decimal or 0.5.

The total score from all the statements, gives the participation score of the individual. From the information gathered by administering the participation scale to the sample of 400 farmers, the Farmers' Participation Index (FPI) was worked out for WUAs using the following formula recommended by Singh (1992).

$$FPI = \frac{\sum_{i=1}^n P_i}{n}$$

Where FPI = Farmers' Participation Index of WUAs

n = number of farmers

P<sub>i</sub> = participation score of ith farmer defined as,

$$P_i = \sum_{j=1}^k W_{ij} x_j$$

where <sup>W<sub>ij</sub></sup> is the weight assigned to the jth question (asked to the ith farmer) showing it's relative importance as a measure of participation, with the condition that the sum of weights from all questions is equal to 100. X<sub>j</sub> is the score obtained for the response to the jth question.

The range of FPI was from zero to 100. The classification of peoples' participation by Singh (1992), as shown below, was adopted in this study.

Very low participation	0 - 25
Low participation	26 - 50
Moderate participation	51 - 75
High participation	More than 75

The participation scale was also administered, through the questionnaire, to the sample of 400 farmers and data on farmers' participation collected for working out the FPI of WUAs.

Statistical analysis of data was carried out through chi-square tests to find out the influence of the physical location of WUAs on the canal network and landholding size of farmers on their participation. Similarly, correlation was worked out between the attitude score of farmers and their participation score. In addition to this, interpretation of data based on frequencies (percentages) has also been carried out.

## FINDINGS AND DISCUSSION

The number of farmers (expressed as percentage of total) undertaking different participatory activities through WUAs of CAD A is given in Table 1. Based on field level observations, it has been understood that the major activity undertaken by the CADA for the WUAs was construction of concrete field channels upto 20 per cent of the length of the command area, below the outlets located on the branch canals and distributaries of the irrigation project.

Table 1 also indicates that none of the farmers or WUAs were involved by CADA in planning this on-farm development work, which is necessary for achieving the main objective behind the formation of WUAs, namely improvement in efficiency of water use and on-farm water management by farmers. A top-down administrative approach, which is termed as 'external actors' (Ambler, 1994), had been adopted by CADA in the activities of WUAs. This approach of CADA in not involving local WUAs can be explained by the rational choice approach (Ostrom, 1974), which describes, among other things, the tendency of large public bureaucracy (in this study, CADA) towards aggregate uni-dimensional decision-making rather than multiple, diverse, local decision-making. The interests of the few are sacrificed to the state definition of the collective good. The large bureaucracy is neither cost, nor decision accountable to its clients. This approach can be considered as a serious drawback for the participatory programme envisaged under CADA.

Only in six out of the 16 participatory activities envisaged under CADA, more than 50 per cent of farmers are involved. Out of this, more than 80 per cent farmers undertake activities such as attending WUA meetings and discussing their knowledge, experiences and problems related to irrigation management with their fellow farmers.

Fifty-seven to sixty-three per cent farmers are found to contribute money and labour for maintenance of concrete field channels, constructed by CADA. This indicates the importance assigned by farmers in ensuring availability of water for irrigation. According to CADA norms, management subsidy at the rate of Rs. 4,000/-, Rs. 3,000/- and Rs. 3,000/- respectively is provided to the WUAs for the initial three years, after their formation. Farmers are intended to make use of this money, along with their contributions, for yearly maintenance work of the field channels. In the present study, the average membership of each WUA was found to be in the range of 50-75 farmers only. This may be considered as a small group. The interest shown by the small group of farmers of WUAs for involving themselves in the maintenance of field channels can be attributed to the rational, self-interested individual's actions, which are noticeable to the other individuals in the small group (Olson, 1971). Under the above circumstances, the concept of 'free riding' by individuals, which is normally seen in the case of a large group, may not be applicable.

Activities such as resolution of conflicts between farmers, discussions related to irrigation, water management among farmers, as well as attending meetings undertaken by a good majority of farmers may be considered as a sign of the level of cooperation and trust existing among the farmers of WUAs.

Lusk and Parlin (1990), were of the opinion that individual choice is the basis of collective action and social organisation. Individual decisions are the expression of different preferences and incentives. Therefore, conflict is inherent in social life and the organisation is the means of managing that conflict. This explains the participatory activity of conflict resolution undertaken by farmers through the WUAs.

The cooperative attitude of the WUA members can be explained by the theory of collective action propounded by Buchanan and Tullock (1965). According to them, individuals perceive collective action to be profitable, when the costs are less than the perceived

benefits. The perceived costs include decision-making costs, which is an increasing function of the number of individuals required to reach an agreement. In the present study, the smaller size of the group of farmers under WUAs would mean that the decision-making costs will not be very high. This may be the reason that can be attributed to farmers attending meetings, as well as discussing with fellow farmers, which, as already mentioned earlier, can be considered as processes related to decision-making by farmers.

With regard to other participatory activities namely,

1. Discussing one's knowledge, experience and problems related to irrigation management with CADA officials, it is seen that only about 33 per cent farmers are involved (Table 1). The table also shows that only 17 per cent of farmers have attended training programmes of CADA. It has been understood from discussions carried out with both farmers, as well as officials of CADA, that the latter has not been able to maintain sufficient contact with the WUAs, nor conduct enough training programmes. The CADA officials attribute this to the lack of sufficient humanpower.
2. None of the WUAs have undertaken activities, such as, consolidation of fragmented landholdings, adopting a suitable cropping pattern and group farming, which are all essential for scientific use of water and higher crop yield.
3. Rotational Water Supply (RWS) at the farm level is necessary for maintaining the required depth of irrigation water and also for ensuring equity of water distribution among farmers. This is seen only in the case of 5 per cent of farmers who are members of two WUAs. They have constructed farm channels in continuation of CADA field channels. These WUAs have reported that they appoint a 'common irrigator' paid by the WUA, who distributes a pre-determined depth of irrigation water to different fields on a 'turn' basis. They were also of the opinion that, this has actually helped in better use of water, avoiding unwanted losses and also helps in achieving a reasonable level of crop yield.

From the above discussions, it is evident that majority of the farmers or WUAs have not come forward to implement improved methods of cultivation, including proper water management. Lupanga (1988) derived a hypothesis to explain lack of people's participation in development activities. According to the hypothesis, majority of rural people

have heavy load (defined as the self and social demands by a person to maintain a minimum level of autonomy) and little power (described as resources such as abilities, possessions and position, which a person can command in coping with the load), to cope therewith and, hence, they are too preoccupied with mere survival than to participate in the development activities. The above hypothesis holds good in the case of paddy farmers in Kerala, where the productivity of the crop is low, such that paddy cultivation is not profitable, particularly with the high labour cost prevalent in the state. Most of the farmers cultivate paddy mainly for household consumption. Hence, as mentioned in the hypothesis, their resource base is poor and they are more interested in survival than to participate actively. This may be the reason for their non-entrepreneurship regarding adoption of improved methods of cultivation under the CADA programme.

Further, social scientists have noted that the apparently conservative and risk averse behaviour of farmers is actually a rational response to the fragile economics of peasant society (Lusk and Parlin, 1990). Another reason which can be attributed to the non-implementation of collective group level activities, such as land consolidation, adoption of a commonly suitable cropping pattern, group farming and even RWS among farmers in the study area, is that collective actions (like the ones stated above) tend to limit individual liberty and, hence, people choose to avoid them where possible (Lusk and Riley, 1986).

### **Farmer Participation Index (FPI) of WUAs**

The mean FPI of WUAs under head, middle and tail reaches of the canal network in the present study worked out to be 30.9, 31.5 and 31.9 respectively. This shows that farmer participation is low (Singh, 1992) and does not vary between the different reaches of canals.

To determine the statistical significance of empirical relationship between physical location (reach) of WUAs on canal and Farmer Participation (FP) score, chi-square test was carried out. The results are presented in Table 2.

Usually, under irrigation projects, water will be scarce at the tail reaches of canals, as compared to middle and head reaches. However, in the study area, WUAs at all the reaches reported that they were getting enough water. This can't be the reason attributed to the non-significance of chi-square test based on the physical location of WUAs (Table 2). Similarly, the low level of participation observed

under all the reaches can be again attributed to the sufficiency of irrigation water, which confirms the theoretical proposition of Uphoff, Wickramasinghe and Wijayaratna (1990). Their theory states that farmers' net benefits from participation in water management are likely to be the greatest over a 'middle range' of water availability. Accordingly, participation is expected to be low, both under absolute water scarcity, as well as under sufficient water supply. In the present study, the latter holds good as explained earlier.

**TABLE 2: Impact of Differences in Physical Location of WUAs on Farmer Participation Score**

<i>Canal Reach</i>	<i>Farmers with*</i>		
	<i>High Score</i>	<i>Medium Score</i>	<i>Low Score</i>
Head	12.7	72.0	15.3
Middle	15.8	69.7	14.5
Tail	13.6	72.8	13.6
Total sample (n=400 farmers)	13.8	71.8	14.4

Note: Head/Middle/Tail : df:4  
 Chi-square value : 0.509 (non-significant)  
 \* in percentages rounded off to first decimal.

The analysis of participation versus landholdings size of farmers, show that the chi-square value is significant (Table 3). It can be seen from Table 3, that there is considerable variation in the percentage of farmers falling within each range of FP scores in the case of marginal farmers, as compared to small and big farmers. This may be the reason for the significance of chi-square test. Therefore, it may be inferred that the landholding size of farmers influences their participation. It was also observed from the study, that mean participation score of big farmers was comparatively higher than the other two classes. Also, under many of the WUAs, office bearers were mostly big farmers, who can naturally be expected to be more involved in the activities of the WUA.

### **Attitude of Farmers towards Participation through WUAs**

Table 4 shows the distribution of farmers in different range of attitude scores. It may be inferred that, practically, all the farmers have score above 100, indicating a high level of attitude on the part of farmers towards participation.

**TABLE 3: Impact of Differences in Landholding Size on Farmer Participation Score**

<i>Landholding Category</i>	<i>Farmers with*</i>		
	<i>High Score</i>	<i>Medium Score</i>	<i>Low Score</i>
Marginal	3.7	94.0	2.3
Small	14.5	73.3	12.2
Big	15.6	72.7	11.7
Total sample (n=400 farmers)	11.2	80.2	8.6

*Note :* Marginal/Small/Big : df:4  
 Chi-square value : 24.763 (Significant at 0.01 level)  
 \* in percentages rounded off to first decimal.

**TABLE 4: Distribution of Farmers in Different Ranges of Attitude Score.**

<i>Score Range</i>	<i>Farmers *</i>
91-100	0.5
101-110	28.5
111-120	67.2
121-123	3.8

*Note :* \* in percentages rounded off to the first decimal.

Since the final outcome or result of farmers' participation can be analysed based on the advantages realised by them through WUAs, an analysis of attitude responses regarding the advantages of WUAs was undertaken. The details are presented in Table 5. The advantages on which a higher proportion of farmers have agreed relates to conflict resolution, development of a sense of 'we' feeling through the WUAs and minimising unwanted water loss. As already reported earlier, majority of farmers have reported participatory activities such as conflict resolution, attending meetings and discussing their knowledge, experiences and problems related to irrigation management with their fellow farmers, which has been interpreted as a sign of their cooperation. Water loss has been minimised only in those areas adjoining concrete field channels constructed by CADA.

It is interesting to note that a higher proportion of farmers disagree with the following statements related to advantages of WUAs.

TABLE 5: Attitude of Farmers towards Advantages of WUAs

Sl. No.	Statements of Advantages of WUAs	Farmers' Expressions		
		Agree	Neutral	Disagree
1	Seeds and fertilisers can be made available to farmers at a lower cost	41.0	0.5	58.5
2.	Tail end farmers of WUAs assured of irrigation water	41.0	9.0	50.0
3.	Unwanted loss of water is minimised	64.5	5.5	30.0
4.	Problems and conflict among farmers are solved	51.5	13.0	35.5
5.	Profitability from cultivation is enhanced	25.0	20.5	54.5
6.	Able to develop a sense of 'We feeling' among farmers	52.5	8.5	39.0

Note : \*Percentages rounded off to 0.5 or nearest decimal.

#### *Availability of Seeds and Fertilisers at a Lower Cost*

Adoption of group farming practices would have enabled the WUAs to avail agricultural inputs at a lower cost when compared to individual-oriented cultivation, since a provision for this exists under group farming. Further, during discussions, it was understood that farmers are individually able to receive subsidies on agricultural inputs through the farmers' associations established by the Agriculture Department, while the same farmer who is member of CADA/WUA can avail this only through the WUA.

#### *Ensuring Water for Tail end Farmers*

As already reported earlier, on-farm development works, undertaken by CADA, is restricted to concrete field channels upto a maximum length of 20 per cent in the command area. Since most of the farmers have not come forward to construct either earthen or concrete farm channels, after these field channels, the water distribution among farmers is mainly through the field to field method, which results in excess water usage by farmers in the upper reaches. This can be the reason attributed for non-availability of water to the tail enders. Also, the high level of water depth maintained by farmers under field to field irrigation will contribute to water losses through deep percolation and seepage.

### ***Increase in Profit from Rice Cultivation***

Activities such as adoption of group farming, suitable cropping pattern and RWS by the WUAs, would have been helpful in improving crop productivity as well as reducing cost of cultivation, thereby improving the level of profitability. However, these activities have not been taken up by most of the WUAs. It was also understood from discussions with farmers that the average yield of rice in their areas works out to be about 3000 kg/ha only, when compared to a possible yield potential of 5000 kg/ha for high yielding varieties of rice (Centre for Water Resources Development and Management [CWRDM], 1994).

Thus, group farming activity to reduce the cost of cultivation and better water management practices to improve yield have not been accepted as measures for increasing profitability of irrigated rice in the study area, though there is scope to do so.

### **Attitude—Participation Relationship**

Simple correlation was worked out between attitude scores and participation scores of farmers. The correlation coefficient ( $r$ ) was found to be 0.31 and it is statistically significant. This establishes the influence of attitude of farmers towards WUAs and their participation. However, the low 'r' value may be attributed to the low participation scores of farmers when compared to their high attitude scores. From this, it may be inferred that even though farmers possess a high level of attitude, due to the lack of suitable programmes such as land consolidation and group farming, as well as the required infrastructure, such as farm channels for carrying out improved water management such as RWS among farmers, the WUAs have not been able to implement many of the activities envisaged under CADA programme. It may also be noted that most of the farmers expressed the opinion that they were not aware of their rights and responsibilities, as well as about the schemes of CADA meant for WUAs. In short, a condition exists wherein farmers are unable to translate their attitude into action through relevant participation under the WUAs.

The present study clearly indicates the extent of participatory activities of farmers in WUAs and the influence of their attitude towards certain areas of activity such as group farming, better water management practices and higher level of productivity. Unless suitable schemes such as provision of proper infrastructure (farm channels), RWS, land consolidation and group farming which will all

help to improve productivity of irrigated rice are taken up, the formation and purpose of WUA may not lead to the desired goals. These factors need to be considered in any future Participatory Irrigation Management (PIM) programmes being envisaged in order to help restore higher responsibility of farmers and productivity of irrigated rice in Kerala. The PIM is a programme being envisaged under irrigation projects in Kerala, involving decentralisation through transfer of operation and maintenance (O&M) responsibilities of minors and distributories to a group of WUAs, with the Irrigation Department maintaining the O&M of main canals and reservoirs. Under this approach, the government and farmers are expected to work as partners with decision-making and investment shared between them.

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