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Profile characteristics of head reach and tail-end farmers of water users' associations in Tungabhadra command area of Koppal district of Karnataka

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Abstract

In this agrarian landscape, water plays a pivotal role, making the efficient management of water resources a matter of paramount importance where Water Users Associations (WUAs) have emerged as key entities responsible for the equitable distribution of water resources among farmers. The present study conducted during 2020-21 examines the profile characteristics of head reach and tail-end farmers of WUAs in the Tungabhadra Command Area of Koppal district. Ex-post facto research design was employed for the study and data was collected from 120 farmers across twelve WUAs in Gangavathi and Karatagi taluks. The results showed that majority of the head reach farmers had medium level of material possession, extension contact, mass media exposure, cosmopolitanness, social participation, achievement motivation, innovativeness, management orientation and high level of economic motivation, risk orientation, and low level of scientific orientation. Whereas, majority of the tail-end farmers had medium level of material possession, extension contact, mass media exposure, cosmopolitanness, social participation, economic motivation, achievement motivation, innovativeness, risk orientation, decision making ability, management orientation and scientific orientation. Therefore, the head reach farmers have been using more irrigation water at the cost of deprivation to tail-enders and this fact has to be constantly kept in mind while dealing with the problems and hence there is a need to maintain equity and harmony among the farmers.

Keywords: Profile, water users associations, extension contact

Introduction

Agriculture has been the backbone of the Indian economy for centuries, providing sustenance and livelihoods to millions of people across the country. In this agrarian landscape, water plays a pivotal role, making the efficient management of water resources a matter of paramount importance where Water Users Associations (WUAs) have emerged as key entities responsible for the equitable distribution of water resources among farmers. In the Tungabhadra Command Area in Koppal district, Karnataka, these WUAs have been integral in ensuring that water reaches farmers at both the head and tail-end of the irrigation system.

In most of the irrigation projects, water is not used effectively. Substantial quantities of water are lost due to percolation, leakages, seepages etc., in the canals and by field channels. Another persevering problem in irrigation is unequal distribution of water between head reach and tail-end farmers. The head reach farmers, who have the first opportunity to receive water, use water indiscriminately depriving the tail-enders of their legitimate share. They usually deviate from the recommended cropping pattern and grow heavy duty crops like paddy and sugarcane in protective irrigation commands. Use of irrigation by head reach farmers will not only induce soil salinity but also deprive the water to tail-enders. Further, the head reach farmers recourse to lobbying and taking to grab more water for their lands. This points out the need for studying the characteristics of head reach and tail-end farmers participation in water users' associations.

Materials and Methods

Ex-post facto research design was adopted for the study. This was considered as most appropriate because the phenomenon has already occurred. The study was conducted in Gangavathi and Karatagi taluks of Koppal district of Karnataka state. These taluks were purposively selected, since these two taluks have maximum number of water users' associations coming under Tungabhadra Command Area.

The utilization of irrigation water primarily depends upon its availability, which has got direct relevance with the locational factor of the farmers viz., head reach and tail-end farmers. There are 140 water users' associations present in the district and among these 12 waters users' association comprising two taluks were selected for the study. Thus, from Gangavathi taluk, 6 WUAs (Jeeral, Singanal, hanaval, Hoskera, marali and Narasapura) were randomly selected, and from Karatagi taluk, 6 WUAs (Gundur, Siddapur, Yerdona, Kuntoji, Mustur and Baraguru) were selected. From each WUAs, 10 farmers were randomly selected for the study. Thus, from gangavathi taluk, 30 farmers from head reach and another 30 tail-end farmers were selected. Similarly, from Karatagi, 30 head reach and 30 tail-end farmers were selected for the study. Thus, the total sample constitutes 120 farmers (i.e., 60 head reach and 60 tail-end farmers).

Results and Discussion

Assessing profile characteristics of head reach and tail-end farmers is imperative for better understanding of their background and the results are presented in the Table 1 and 2.

Profile characteristics of head reach farmers

Age

The results presented in Table 1 enunciated that about 60.00 percent, 23.33 percent and 16.67 percent of head reach farmers were belonged to middle, old and young age category respectively. Age is an important dimension which revealed higher the maturity of farmers which will help to take proper decisions for achieving their needs. Usually, middle age farmers are having good farming experience, enthusiastic to learn about new farming techniques, more responsible towards family than the younger farmers and more efficient as compared to the old aged farmers. The results are in line with the findings of Mini (2006) [9].

Education

The results related to education level of farmers are presented in Table 1 accordingly it was noticed that about 30.00 percent of farmers had completed primary level education followed by illiterate (23.33%), middle school (21.67%), high school (11.67%), pre-university (8.33%) and 5.00 percent had completed graduation/diploma. The reason for this trend might be the poor facility for higher education in the villages at their learning age. Furthermore, number of primary and even little more illiteracy is due to the fact that farming does not reduce higher education since it was the primary occupation and having higher farming experience. Anyhow little education is required to know about the importance of participation and its use in water users' associations. Therefore, more efforts need to take up for more education in rural areas. Further the presence of good schools and colleges in their vicinity and availability of good transportation facility might have encouraged farmers to pursue higher education. The results are in line with the findings of Malge and Kulkarni (2017) [6] and Mohan and Rameshkumar (2013) [10].

Farming experience

The results pertaining to farming experience of head reach farmers indicated that more than half (70.00%) of the respondents had high farming experience followed by medium (20.00%) and 10.00 percent had less farming experience. This might be the reason that farmers had more

than 20 years of farming experience probably they might have started farming at an early age and also agriculture is the main occupation of their family and they are not even aware about any other occupation. The findings of the present study are in conformity with the findings of George (1993) [22] and Mohan and Rameshkumar (2013) [10].

Family size

It is observed from the Table 1 that 55.00 percent of head reach farmers had to larger family, 28.33 percent had medium family size and 16.67 percent of them had smaller families. The family size may act as a stimulus in decision making on different aspects pertaining to on and off farm activities. As the number of members in family increases, personal involvement/participation of family members in different activities also increases and it might be helpful in saving the labor as well as achieve a good economic stability. The findings of the present study are in contradictory with the findings of Sunitha (2015) [19].

Land holding

It could be seen from Table 1 that majority (55.00%) of head reach farmers had big land holding. At the same time 30.00 percent belonged to small land holders and 15.00 percent were marginal land holders. The possible reason that could be attributed to this might be that agriculture was found to be the main occupation of the family who have inherited it from their ancestors and specially in head reach location farmers had potential agricultural land along with good water source which generated more returns/income to farmers which in turn increased farmers land purchasing power. The findings seek support from the studies of Kalra *et al.* (2014) [3] and Malge and Kulkarni (2017) [6].

Material possession

As it is furnished in the Table 1, majority of the farmers had medium (38.33%) level of material possession followed by 33.34 percent had high level and 28.33 percent had low level of material possession. The reason might be that most of the farmers had higher annual income and current lifestyle demands a greater number of household materials to lead comfortable life. Therefore, head reach farmers have the capability to purchase materials and farming implements which they need for domestic purpose and cultivation of land. The results are in line with the findings of Golyanaik (2008) [1] and Pramod (2013) [14].

Extension contact

It could be seen from the Table 1 that among the sample, 40.00 percent of farmers had medium level of extension contact followed by 36.67 percent had high and low (23.33%) level of extension contact in head reach location. Extension contact results in purposeful action which is largely contingent upon an individual's belief in their ability to perform that action effectively and thus, he / she frequently contact irrigation and agricultural department officials to seek more information. But majority of the farmers seek information regarding irrigation schedule, availability of input and for other purposes rather than the cropping pattern and water management practices. The above findings are in line with the findings of Prasad (1994) [15] and Ningareddy (2005) [12].

Mass media exposure

It could be recognized from the results presented in Table 1 that maximum number of farmers had high (40.00%) level of mass media exposure followed by 33.33 percent had medium and 26.67 percent of the farmers had low level of mass media exposure. Farmers in present days are more accessible to the mass media such as television, mobile, radio, newspapers and farm magazines etc. high level of mass media exposure resulted not only as a source of news and information but also as a source of entertainment. In general mass media increases the awareness level among the farmers and it helps to update the latest developments which is a good sign to improve farming practices. The results are in line with the findings of Sunitha (2015)^[19] and Yashodhara (2015)^[21].

Cosmopolitaness

Based on the results presented in Table 1, in head reach location, highest number of farmers were presented in medium (38.33%) level of cosmopolitaness followed by high (35.00%) and low (26.67%) level of cosmopolitaness. Majority of the head reach farmers had frequent contact with individuals outside their social system. This provides an opportunity for interpersonal communication with people outside their social system. Farmers who are more cosmopolite in nature will be innovative, risk takers, motivated and will try to know more and acquire knowledge about different aspects and another reason might be that villages in study areas had better road connectivity and transport facilities, which enabled farmers to visit city to sell their produce, to purchase the inputs, to meet the irrigation departments to derive benefits as well as for domestic and entertainment purpose. The observation made by Golyanaik (2008)^[1] and Mamathalakshmi (2013)^[7].

Social participation

A bird eye view of Table 1 reveals that 35.00 percent of head reach farmers had medium level of social participation followed by 35.00 percent of them had high level and 30.00 percent had low level of social participation. The medium and high level of social participation might be due to the reasons that basically they are the members of water users' association which is also a social organization where people meet there together. Further they have advantage of becoming member of other social organizations in the rural areas as it will not only helps the farmers to solve the problems related to irrigation water but also benefit them to involve in other activities in the village. The results are in line with the findings of Malge and Kulkarni (2017)^[6] and Neethi and Sailaja (2018)^[11].

Economic motivation

Economic motivation of head reach farmers was studied and the findings presented in the Table 1 reveals that 45.00 percent of head reach farmers had high level of economic motivation followed by medium (33.33%) and low (21.67%) levels of economic motivation. The likely reason might be that the head reach farmers attached greater importance to profit maximization and another possible reason may be that majority of the head reach farmers by virtue manifested higher profit maximization coupled with their amenable high annual incomes. This has also been reflected in their big land holdings and standard of living prompting higher economic motivation. Rather it was observed that these folk with higher

economic motivation, rarely adopted appropriate irrigation management practices *viz.*, to grow less water consuming crops and to follow the recommended cropping pattern and etc. at the cost of ample availability of water resources. The above findings are in line with the findings of Golyanaik (2008)^[1].

Achievement motivation

Table 1 summarizes the achievement motivation of farmers in head reach location, the number of farmers with medium (43.33%) level of achievement motivation was found followed by high (31.67%) and lower (25.00%) level of achievement motivation. Now-a-days, farmers think economically and in a rational way of obtaining more yields as well as more return. On the other hand, they compare with the fellow farmers and try to achieve more to realize higher returns. In this process, farmers recognize the importance of canal water which paves way to the adoption of cash crops/high yielding crops. Therefore, it could be concluded that farmers with medium to high levels of achievement motivation mostly adopt new ideas or skills better than others. Similar findings were reported by Palaniswamy and Sriram (2000)^[13].

Innovativeness

As it is furnished in the Table 1, in head reach location, 36.67 percent of farmers had medium level of innovativeness, 33.33 percent had higher level of innovativeness and lower (30.00%) level of innovativeness. Innovativeness plays a greater role in the individual's personality because the person with higher innovativeness can do things at the earliest and more precisely than others. Further he/she will try to seek more information and try out new ideas and technologies and also farmers having more inclination towards innovations will try to gather information regarding the new technology from various sources, as they wanted to learn new ways of farming, improved cultivation practices and adopt those technologies at a faster rate. Shashidhar (2004)^[17] and Ningareddy (2005)^[12].

Risk orientation

As it is evident from the Table 1, 41.67 percent of farmers had higher level of risk orientation followed by medium (30.00%) and low (28.33%) level of risk orientation in head reach location. The probable reason for this trend might be that head reach farmers receives sufficient irrigation water whenever it is required to irrigate his/her farm. Also, irrigation of paddy cultivation involves risks of pests and diseases, non-availability of labour. Thus, farmers had made up their mind to take high to moderate risk and have put efforts to adopt high cost agricultural technologies and ready to try about new ideas/technologies, Hence, risk taking is a must for farmers to earn money, to lead a better life. The above findings are in line with the findings of Shashidhar (2003)^[18].

Decision making ability

Table 1 reveals that the highest percentage of farmers were belonging to medium (40.00%) level of decision-making ability category followed by high (31.67%) and low (28.33%) level of decision-making ability category in head reach location. Decision making ability is the process of choosing alternatives course of action based on the degree of importance, values, preferences etc. Decision making ability

built on the foresight and confidence of an individual. If farmer possess the skill of decision-making ability, then he/she will be better off in making appropriate decision with respect to what kind of crops to grow, nature of cultivation practices, mode of marketing. In this study also farmers expressed medium to higher decision-making ability since they have to take important decisions specially at critical crop stand with regard to irrigation schedule, nutrient management etc. The study was supported by the findings of Sunitha (2015) [19].

Management orientation

It could be observed from Table 1 that majority of farmers had medium (36.67%) level of management orientation followed by low (33.33%) and 30.00 percent of the farmers had high management orientation. Farmers have to make a plan for every activity or action right from the point of what to produce to the point of where to sell. Farmers are doing so to get maximum profit from the agriculture and other subsidiary activities. Besides this, with the high management orientation, farmers had better level of participation in proper planning, irrigation scheduling and other cultivation practices of the farmers in water users' association. Further they are well aware that resources are almost similar to all only they can produce efficiently through managing them. The present findings are in line with the findings of Ningareddy (2005) [12].

Scientific orientation

Scientific orientation of the farmers was studied and findings are presented in the Table 1 the results indicated that 40.00 percent of head reach farmers had low level of scientific orientation followed by medium (31.67%) and 28.33 percent high level of scientific orientation. The plausible reason for the above type of findings might be due to their education level and also paddy being basic crop does not require too many technological interventions except additional resources that lead to soil salinity issue, thus the farmer with the high scientific orientation will think about the soil fertility and its adverse effect, therefore more educational programmes or training programmes need to be conducted to create awareness among the farmers regarding scientific utilization of irrigation water instead of frequently irrigating the land. The present findings are in line with the findings Mamathalakshmi (2013) [7].

Profile characteristics of tail-end farmers

Age

Highest (58.33%) percentage of tail-end farmers were belonged to middle age category followed by old (21.67%) and young (20.00%) age category. The trend was domineered in the middle-aged category followed by old aged folk since most of them had assured income by virtue of guaranteed irrigation. By nature, they were owners of their land and had more responsibility which lead them to depend highly on farming with limited alternatives and were settled on the same piece of land. This opportunity can be utilized by giving them a better training for imparting participatory management awareness, knowledge and required skills on irrigation management practices. The present findings are in line with the findings of Mini (2006) [9].

Education

With regard to their education level, 26.67 percent of the tail-end farmers were illiterate followed by Primary school (23.33%), High school (21.67%), Middle school (13.33%), and 8.33 percent had completed Pre-University and 6.67 percent had completed Graduation/diploma. This trend might be due to obligatory routine farming operations performed with regard to crop management in such irrigated belt. This reflected for lesser crop diversification and also does not demand higher education. By nature, the demographic profile of this region exhibits lower education levels contributing to lower standard of living which might also be one of the reasons for conduct of this variable. It is also due to the fact that poor education facilities for higher education and agriculture was the main occupation where their parents want their children to involve in the field work. The present findings are in line with the findings of Mohan and Rameshkumar (2013) [10].

Farming experience

The results pertaining to farming experience of tail-end farmers indicated that more than half (65.00%) of the farmers were found to be in high farming experience category whereas, 23.33 percent of the farmers had medium and 11.67 percent of them had low farming experience category. This might be due to the reason that in this study area farmers had more than 20 years of farming experience probably they might have started farming at an early age along with farming was predominantly their prime source of livelihood. On the other hand, farming was also supplemented with their due share of irrigation since the availability of the irrigation source i.e., Tungabhadra reservoir. The present findings are in line with the findings of George (1993) [22].

Family size

From the Table 2 it is observed that 58.33 percent of tail-end farmers had larger family size whereas, 23.33 percent of the farmers had medium family size followed by smaller (18.33%) family size. The probable reasons for manifesting higher number of large families are due to the dominating farming systems practiced involving paddy along with other crops reflecting intercropping to sustain with the due share of irrigation available and also to resolve the issues of lack of labour at critical stages of crop management urges higher participation by the family members. As the number of members in family increases, personal involvement of family members in field activities increases and also it might be helpful to the farmers to maintain subsidiary activities. The finding seeks contradictory from the studies of Umamaheshwara (2009) [20].

Land holding

Majority of the farmers had small (46.67%) land holdings followed by marginal (40.00%) and big (13.33%) land holders. This might be the reason that the fragmentation of ancestral land from generation to generation might have led to smaller size of land. Even then, small holdings are also economical in such irrigation belts which would support to improvise their livelihood. And also irrigated land itself is precious which has psychologically pressurized the farmers to retain it. The present findings are in line with the findings of Kumaran (1994) [4] and Madhava (2001) [5].

Table 1: Profile characteristics of head reach farmers

(n1=60)				
Sl. No.	Characteristics	Category	f	%
1	Age	Young (35 years and below)	10	16.67
		Middle (36-55 years)	36	60.00
		Old (>55 years)	14	23.33
2	Education	Illiterate	14	23.33
		Primary school	18	30.00
		Middle school	13	21.67
		High school	07	11.67
		Pre-University	05	08.33
		Graduation/diploma	03	05.00
3	Farming experience	Low (<10)	06	10.00
		Medium (10-20)	12	20.00
		High (>20)	42	70.00
4	Family size	Small (Up to 5)	10	16.67
		Medium (6-7)	17	28.33
		Large (8 members and above)	33	55.00
5	Land holding (Acres)	Marginal (<2.5)	09	15.00
		Small (2.5-5)	18	30.00
		Big farmers (>5)	33	55.00
6	Material possession Mean= 12.43 SD= 2.84	Low (<11.01)	17	28.33
		Medium (11.01-13.85)	23	38.33
		High (>13.85)	20	33.34
7	Extension contact Mean= 7.71 SD= 2.79	Low (<6.31)	14	23.33
		Medium (6.31-9.10)	24	40.00
		High (>9.10)	22	36.67
8	Mass media exposure Mean= 8.56 SD= 3.65	Low (<6.73)	16	26.67
		Medium (6.73-10.38)	20	33.33
		High (>10.38)	24	40.00
9	Cosmopolitaness Mean= 14.78 SD= 2.34	Low (<13.61)	16	26.67
		Medium (13.61-15.95)	23	38.33
		High (>15.95)	21	35.00
10	Social participation Mean=4.23 SD= 1.76	Low (<3.35)	18	30.00
		Medium (3.35-5.11)	21	35.00
		High (>5.11)	21	35.00
11	Economic Motivation Mean= 23.31 SD= 2.96	Low (<21.83)	13	21.67
		Medium (21.83-24.79)	20	33.33
		High (>24.79)	27	45.00
12	Achievement Motivation Mean= 20.39 SD= 2.16	Low (<19.31)	15	25.00
		Medium (19.31-21.47)	26	43.33
		High (>21.47)	19	31.67
13	Innovativeness Mean= 9.56 SD= 2.43	Low (<8.34)	18	30.00
		Medium (8.34-10.77)	22	36.67
		High (>10.77)	20	33.33
14	Risk orientation Mean= 9.12 SD= 2.54	Low (<7.85)	17	28.33
		Medium (7.85-10.39)	18	30.00
		High (>10.39)	25	41.67
15	Decision making ability Mean= 19.45 SD= 3.12	Low (<17.89)	17	28.33
		Medium (17.89-21.01)	24	40.00
		High (>22.32)	19	31.67
16	Management orientation Mean= 42.48 SD= 4.16	Low (<40.41)	20	33.33
		Medium (40.41-44.56)	22	36.67
		High (>44.56)	18	30.00
17	Scientific orientation Mean= 9.34 SD= 1.23	Low (<8.72)	24	40.00
		Medium (8.72-9.95)	19	31.67
		High (>9.95)	17	28.33

Material possession

As it is furnished in the Table 2, in tail-end farmers, 36.67 percent of farmers had medium level of material possession followed by low (35.00%) and 28.33 percent had high level of material possession. The reason for exhibiting medium extent of material possession because most of the materials are invariably essential to lead basic life amidst the modernization. Also, the trend has highlighted the lower

material possession due to the farmers had lower annual income, low purchasing power on farm implements compared to head reach farmers but they were hiring the farm implements for operation and maintenance of field. The finding of the study is supported by Hasmukh and Lokesh (2016) [2].

Extension contact

It could be seen from the Table 2 that among the total sample, 36.67 percent had medium level of extension contact followed by low (35.00%) and 28.33 percent had high extension contact in tail-end location. The results clearly indicated that majority of the tail-end farmers had medium level of extension contact since these farmers had regular interaction with the extension agencies to obtain benefits of new schemes and to procure inputs. They also sought the information regarding irrigation schedule, cropping pattern and input availability. The trend was trailed by the lower category of extension contact as these folks were recipients of information from their fellow farmers and peer group and also the technologies they practiced were standardized and operations followed exposed no much scope for extension role. The results are in line with Prasad (1994) [15].

Mass media exposure

It could be recognized from the results presented in Table 2 that majority of the farmers had medium (38.33%) level of mass media exposure followed by 33.33 percent were belonged to low and high (28.33%) level of mass media exposure in tail-end location. The reason might be that medium level of mass media exposure by virtue of their medium levels of material possession including communication gadgets like mobile, TV, radio which were obviously used for education and entertainment. Further the vogue also highlighted low level of mass media exposure since most of them had low level of literacy which reflected them to low or no usage of print media especially the newspapers, publications, magazines, leaflets etc. The above findings are in line with the findings of Shashidhar (2003) [18] and Mohan and Rameshkumar (2013) [10].

Cosmopolitaness

Based on the results presented in Table 2, majority of the tail-end farmers had medium (38.33%) level of cosmopolitaness followed by low (35.00%) and higher (26.67%) level of cosmopolitaness. The reasons for eminent majority of medium and low category of cosmopolite farmers might be due to the predominant farming system practices which evoke less frequent visits to the nearby towns and cities for multiple purposes like information seeking, input procurement. Also, the paddy-based cropping system which is long duration system does not necessitate frequent interactions with the concerned and majority of the farmers seek information from their fellow farmers. The results are in line with Golyanaik (2008) [1] and Mamathalakshmi (2013) [7].

Social participation

A bird eye view of Table 2 reveals that 46.67 percent of the tail-end farmers had medium level of social participation followed by 31.33 percent of them had low and high (21.00%) level of social participation. This trend appealing medium and low level of social participation since by default these farmers are members of water users' associations which contemplates their participation. And also, the required indispensable inputs including information are fulfilled by the membership of their existing association. Also, might be due to the reasons that limited social organizations in the rural areas, lack of awareness of the advantages of becoming member and its elite dominance. The findings seek support from the studies of Malge and Kulkarni (2017) [6].

Economic motivation

A close observation of Table 2 reveals that majority of farmers had medium (40.00%) level of economic motivation followed by high (33.33%) and low (26.67%) levels of economic motivation. The probable reason for this trend might be that majority of the farmers under tail- end location were small and marginal land holders with medium income level which attributed more attention towards profit maximization and have an urge to get more profit with effective utilization of available resources. Also, by dint of assured irrigation they tend to maximize the yield with the introduction of new technologies and interventions to improvise their standard of living. The present findings are in line with the findings of Mohan and Rameshkumar (2013) [10].

Achievement motivation

Table 2 summarizes the achievement motivation of farmers in tail-end location, majority of the farmers had medium (45.00%) level of achievement motivation followed by high (31.67%) and low (21.33%) level of achievement motivation. Motivating the inner drive of farmers would be helpful in reaching the goals set by the group. In this study, majority farmers come under the medium level of achievement motivation due to the reason of attaining higher yields the farmers had an urge to excel and reach his/her goal by adopting the suitable water management practices. The present findings are in line with the findings of Palaniswamy and Sriram (2000) [13].

Innovativeness

As it is furnished in the Table 2, majority of the tail-end farmers had medium (38.33%) level of innovativeness followed by high (36.67%) level of innovativeness and 25.00 percent had low level of innovativeness. Results revealed that majority of the farmers were of medium category with respect to innovativeness since they were moderately receptive to new ideas and interested to learn new ways of management techniques. Majority of the cropping pattern followed by these farmers do not owe advanced technologies and has limited scope for innovations along with new ways of doing things. And also, most of them had small land holdings aversion of experimentation with innovations. The present findings are in line with the findings of Manjunath (2007) [8].

Risk orientation

As it is evident from the Table 2, majority of the farmers had medium (46.00%) risk orientation followed by low (31.67%) and high (21.33%) level of risk orientation. The trend exhibited medium level of risk orientation followed by lower risk inclination amidst the farmers. Dryland farming is risk averse due to uncertainty of rainfall and gambling monsoon which might lead to the crop loss. On the other hand, in this study area there is due assured irrigation reflecting nominal crop yield. And also, the farmers had made up their mind to take low risk and scared to put efforts to adopt high-cost agricultural technologies but the farmers were ready to adopt low-cost technologies which help them to effectively manage irrigation water. The present findings are in line with the findings of Manjunath (2007) [8].

Decision making ability

Table 2 reveals that 41.67 percent of farmers belonged to medium level of decision-making ability category followed

by low (38.33%) and high (20.00%) decision making ability in tail-end location. Majority of the farmers had exhibited medium extent of decision-making ability since the cropping system practiced by most of the farmers does not call for critical decisions to be taken except in the realms of selection of crop varieties, pest and disease management, nutrient management etc. and the crucial decisions regarding irrigation schedule are not under the complete control of farmers. The findings seek support from the studies of Mohan and Rameshkumar (2013) [10].

Management orientation

It could be observed from the Table 2 that 40.00 percent of the tail-end farmers had medium level of management orientation followed by high (33.33%) and low (26.67%) level of management orientation. Most of the farmers revealed to possess medium level of management orientation since they follow similar cropping pattern and also, midst the fellow farmers have a competitive attitude to grow more and

reap benefits within the available resources. Hence, they try to manage both the resources and activities for instance plant protection, harvesting, marketing etc. The present findings are in line with the findings of Sakharakar (1995) [16].

Scientific orientation

Scientific orientation of the farmers was studied and findings are presented in the Table 2, the results indicated that majority of the farmers had medium (43.33%) level of scientific orientation followed by low (31.67%) and 25.00 percent had high level of scientific orientation. The probable reason for this trend was lack of higher education and moreover, irrigation was traditionally designed and farmers did not have much scope to follow scientific management practices including systematic spacing, seed treatment, balanced fertilizer application, plant protection, harvesting etc. and modern technologies. The findings seek support from the studies of Mamathalakshmi (2013) [7].

Table 2: Profile characteristics of tail-end farmers

				(n2=60)	
Sl. No.	Characteristics	Category	f	%	
1	Age	Young (35 years and below)	12	20.00	
		Middle (36-55 years)	35	58.33	
		Old (>55 years)	13	21.67	
2	Education	Illiterate	16	26.67	
		Primary school	14	23.33	
		Middle school	08	13.33	
		High school	13	21.67	
		Pre-University	05	8.33	
		Graduation/diploma	04	6.67	
		Low (<10)	07	11.67	
3	Farming experience	Medium (10-20)	14	23.33	
		High (>20)	39	65.00	
		Small (Up to 5)	11	18.33	
4	Family size	Medium (6-7)	14	23.33	
		Large (8 members and above)	35	58.33	
		Marginal (<2.5)	24	40.00	
5	Land holding (Acres)	Small (2.5-5)	28	46.67	
		Big farmers (>5)	08	13.33	
		Low (<6.22)	21	35.00	
6	Material possession Mean = 7.21 SD = 1.98	Medium (6.22-8.20)	22	36.67	
		High (>8.20)	17	28.33	
		Low (<5.51)	21	35.00	
7	Extension contact Mean = 6.57 SD = 2.14	Medium (5.51-7.64)	22	36.67	
		High (>7.64)	17	28.33	
		Low (<4.25)	20	33.33	
8	Mass media exposure Mean = 4.87 SD = 1.24	Medium (4.25-5.89)	23	38.33	
		High (>5.89)	17	28.33	
		Low (<8.84)	21	35.00	
9	Cosmopolitaness Mean = 9.96 SD = 2.24	Medium (8.84-11.08)	23	38.33	
		High (>11.08)	16	26.67	
		Low (<5.40)	19	31.33	
10	Social participation Mean = 6.35 SD = 1.89	Medium (5.40-7.29)	28	46.67	
		High (>7.29)	13	21.00	
		Low (<21.15)	14	23.33	
11	Achievement Motivation Mean = 22.31 SD = 2.32	Medium (21.15-23.47)	27	45.00	
		High (>23.47)	19	31.67	
		Low (<6.44)	15	25.00	
12	Innovativeness Mean = 7.56 SD = 2.23	Medium (6.44-8.67)	23	38.33	
		High (>8.67)	22	36.67	
		Low (<6.52)	19	31.67	
13	Risk orientation Mean = 7.24 SD = 1.43	Medium (6.52-7.95)	28	46.00	
		High (>7.95)	13	21.33	

14	Decision making ability Mean = 13.16 SD = 1.78	Low (<12.27)	23	38.33
		Medium (12.27-14.05)	25	41.67
		High (>14.05)	12	20.00
15	Management orientation Mean = 55.78 SD = 4.53	Low (<57.18)	16	26.67
		Medium (57.18-58.04)	24	40.00
		High (>58.04)	20	33.33
16	Economic Motivation Mean = 16.82 SD = 2.12	Low (<15.76)	16	26.67
		Medium (15.76-17.88)	24	40.00
		High (>17.88)	20	33.33
17	Scientific orientation Mean = 12.35 SD = 1.37	Low (<11.66)	19	31.67
		Medium (11.66-13.03)	26	43.33
		High (>13.03)	15	25.00

*f = frequency, % = percentage

Conclusion

Looking at the profile characteristics of head reach farmers, it is evident that, the majority of the farmers had medium level of material possession, extension contact, mass media exposure, cosmopolitaness, social participation, achievement motivation, innovativeness, management orientation and high level of economic motivation, risk orientation, and low level of scientific orientation. With respect to profile characteristics of tail end farmers, majority of the farmers had medium level of material possession, extension contact, mass media exposure, cosmopolitaness, social participation, economic motivation, achievement motivation, innovativeness, risk orientation, decision making ability, management orientation and scientific orientation. Therefore, the head reach farmers have been using more irrigation water at the cost of deprivation to tail-enders. This fact has to be constantly kept in mind while dealing with the problems and need to maintain equity and harmony among the farmers.

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