

A Comparative Analysis of Farmers' Well-being under Irrigated and Rainfed Farming Conditions in Central Dry Zone of Karnataka

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ABSTRACT

The present study was conducted during 2017-18 in central dry-zone of Karnataka state in order to assess the well-being of farmers under irrigated and rainfed farming conditions. The data was collected from randomly selected 180 farmers through personal interview method using structured pre-tested interview schedule. Results revealed that most of the irrigated condition farmers had high level (42.22%) of well-being, while most (44.44%) of the rainfed condition farmers were found to have low level of well-being. The t-value obtained was 4.14, indicating significant (at 1%) difference in well-being of the farmers in irrigated and rainfed farming condition.

Keywords: Well-being, irrigated farmers, rainfed farmers, central dry zone

WELL-BEING is a positive outcome that is meaningful for people and for many sectors of society, because it tells us that people perceive their lives are going well. Good living conditions (*e.g.*, housing, employment, health, education) are fundamental to well-being. Tracking these conditions is important for public policy. However, many indicators that measure living conditions fail to measure what people think and feel about their lives, such as the quality of their relationships, their positive emotions and resilience, the realization of their potential, or their overall satisfaction with life *i.e.*, their "well-being." Well-being generally includes global judgments of life satisfaction and feelings ranging from depression to joy (Anon., 2013).

Human well-being is often associated with quality of life, welfare, well-living, living standards, utility, life satisfaction, prosperity, needs fulfillment, development, empowerment, capability expansion, human development and happiness (McGillivray and Clarke, 2006). At present context economic growth or income does not lead necessarily to improved living conditions or high living standards of the human beings. Improving overall well-being implies balance in improving different components of a person's life. Moreover, a complex web of factors determines a person's well-being such as, work, family life, health, housing, etc.

The farmers' well-being is a dynamic process that gives people a sense of how their lives are evolving. More precisely, it refers to the welfare of the farmers which is influenced by both qualitative and quantitative parameters. Well-being may differ from individual to individual due to differences in their socio-economic characteristics and their cognitive styles (Alice beban, 2009). Further, wealth, quality of life and happiness are the most important factors for farmers to keep agriculture in good condition. In this backdrop, the present study was under taken with the following specific objectives:

- 1) To analyse the well-being of farmers
- 2) To document the constraints inhibiting the farmer well-being and suggestions for enhancing well-being

METHODOLOGY

The study was conducted during 2017-2018 in central dry zone of Karnataka, Davanagere, Harihara and Channagiri taluks from Davanagere district for irrigated condition were chosen for the study since these three taluks are the major canal irrigated taluks of the district. For rainfed condition Challakere, Molakalmuru and Hiriyur taluks from Chitradurga district were selected since these three taluks fall under less rainfall receiving taluks in the district and also rainfed agriculture is predominant in these taluks.

Further, from the each selected taluks, 30 farmers were selected by using random sampling method. Thus, making the sample size of 180 respondents from both the districts. Ex-post facto research design was adopted for the study and collected data was scored and analyzed using mean, standard deviation, frequency, percentage, correlation and t-test.

In the present study, farmers' well-being is operationally defined as the level of overall happiness on quality of life influenced by the factors like income, work, family life, health, housing, personal freedom, social participation and financial security. For measuring the well-being of farmers, eight major components were identified based on review of literature and discussion with experts in the field of extension education. A scale to measure the well-being of farmers was developed for the study. It had components such as, income, work, family life, health, housing, personal freedom, social participation and financial security, comprising of 51 statements. Responses of farmers were collected on a five point continuum *viz.*, strongly agree, agree, undecided, disagree and strongly disagree with assigned score of 5, 4, 3, 2, and 1, respectively. For each of the 51 statements minimum and maximum score a respondent could get is 51 and 255 respectively. Based on the cumulated score, the respondents were categorized as low, medium and high levels of well-being considering mean and half standard deviation. To check the statistical difference between the constraints faced and suggestions given by farmers in irrigated and rainfed conditions, the spearman rank correlation co-efficient was used.

RESULTS AND DISCUSSION

The results of the components-wise distribution of farmers in irrigated and rainfed farming condition are depicted in Table I. The table indicates that a majority of farmers belonged to high income category (41.11%) in irrigated condition as opposed to low income category (38.89%) in rainfed condition. Further, the proportion of farmers belonged to medium income category was about 40.00 and 34.44 per cent in irrigated and rainfed condition respectively. The above results are true for the reason that, the irrigation increases the land productivity (annual) by means of

TABLE I
Component-wise distribution of farmers well-being under irrigated and rainfed farming conditions

Components	Category	Irrigated farming condition (n ₁ =90)		Rainfed farming condition (n ₂ =90)	
		No.	%	No.	%
Income	Low	17	18.89	35	38.89
	Medium	36	40.00	24	34.44
	High	37	41.11	31	26.67
Work	Less work	17	18.89	33	36.67
	Sufficient work	45	50.00	35	38.89
	More work	28	31.11	22	24.44
Family life	Not good	21	23.33	31	34.44
	Good	43	47.78	23	25.56
	Very good	26	28.89	36	40.00
Health	Poor	27	30.00	25	27.77
	Average	33	36.67	32	35.56
	Good	30	33.33	33	36.67
Housing	Poorly built	26	28.89	27	30.00
	Moderately built	27	30.00	42	46.67
	Well built	37	41.11	21	23.33
Personal freedom	Low	31	34.45	29	32.22
	Medium	29	32.22	31	34.45
	High	30	33.33	30	33.33
Social participation	Low	27	30.00	42	46.67
	Medium	39	43.33	34	37.78
	High	24	26.67	14	15.55
Financial security	Low	19	21.11	41	45.56
	Medium	25	27.78	26	28.89
	High	46	51.11	23	25.55
Overall well-being	Low	20	22.22	40	44.44
	Medium	32	35.56	31	34.44
	High	38	42.22	19	21.12

higher degree of land and input use intensity. As expected, irrigation also has a positive and significant impact on land prices. Thus, having irrigation has significantly larger level of positive impact on annual gross and net revenues per acre of land. The findings of the present study are in conformity with the findings of Vinay Kumar (2008).

Irrespective of the farming condition, maximum proportion of farmers belonged to sufficient working category in irrigated (50.00%) and rainfed condition (38.89%). Further, percentage of farmers belong to less working category was significantly higher in rainfed condition (36.67%) than the irrigated condition (18.89%). Work is an important aspect for agriculture in many ways. It is the main source of income for most of the farmers and their families, enabling them to satisfy basic needs and peruse other interest. Hence, majority of the irrigated and rainfed farmers belonging to sufficient working category.

As per as the family life component was concerned, good family life (47.78%) were found to be maximum in irrigated condition as against to very good family life (40.00%) in rainfed condition. Furthermore, not good category of family life had the share of 23.33 and 34.44 per cent of total farmers in irrigated and rainfed farming conditions, respectively. Family life component relates to families earned income, care for physical, emotional needs and role of family caring. The education level of people was more in irrigated condition than the rainfed condition. Higher education level urges people to move to cities in search of job, which intern develop the selfcentric behaviour among people and dividing of the families at later stage. Hence, very good family life was found meagre in number in irrigated condition than in the rainfed condition.

In case of the health status of farmers, 30.00 per cent farmers had poor, 36.67 per cent average and 33.33 per cent had good condition of health status in irrigated condition. Similarly, in rainfed condition, about 27.77 per cent farmers had poor, 35.56 per cent had average and 36.67 per cent had good condition of health status. Health has an impact on so many aspects of an individual's life that it is hard to discuss well-being without taking it into consideration. The above

results show that farmers were more or less uniformly distributed across different level of health status irrespective of the farming conditions.

It is observed from Table I that 41.11 per cent of farmers had well built house, 30.00 per cent of farmers had moderately built house and 28.89 per cent of farmers had poorly built house in irrigated condition. On the contrary, 46.67 per cent of farmers had moderately built house, 30.00 per cent of farmers had poorly built house and 23.33 per cent of farmers had well-built house in rainfed condition. As compared to rainfed condition, in irrigated condition the cropping intensity will be higher. The higher cropping intensity is accompanied with higher gross/net revenue or income realized annually from an acre of land. As the cropping intensity increases, the gross/net revenue or income realized annually from an acre of land will also tends to increase. Hence, the number of farmers had well-built house was more in irrigated condition as against rainfed condition.

In the context of personal freedom status, 34.45 per cent, 33.33 per cent and 32.22 per cent of irrigated farmers had low, high and medium degree of personal freedom respectively. With respect to rainfed condition 34.45 per cent were under medium personal freedom followed by high (33.33%) and lower (32.22%) personal freedom. In both the conditions personal freedom was found more or less same.

With respect to social participation of farmers, in irrigated condition, the highest percentage (43.33 %) of farmers had medium level of social participation followed by lower (30.00%) and higher (26.67%) level of social participation. Similarly, in rainfed condition, maximum percentage (46.67%) of farmers had lower level of social participation followed by medium (37.78%) and higher (15.55%) level of social participation. These findings depict the existence of difference in the farmers' social participation level between irrigated and rainfed conditions. Since irrigated areas are having abundant (are equipped with good amount of) infrastructure facilities, social institutions prefer to open their branch in irrigated area, which shows more penetration of social institutions in irrigated area than in rainfed area. Hence, farmers in irrigated area have better access to

institution thereby they show higher degree of active participation in different social institutions. The present findings are in line with the findings of Yashodhara (2015).

The results presented on the financial security of the farmers indicated that in irrigated condition, maximum proportion (51.11%) of farmers belonged to higher level of financial security followed by medium (27.78%) and lower (21.11%) level of financial security status category. Similarly, in rainfed condition nearly half (45.56%) of the farmers fall under lower level of financial security status followed by medium (28.89%) and higher (25.55%) level of financial security status category. As there is an assured irrigation facility in the irrigated condition, farmers grow the crops depending upon the market demand and price which resulted in the higher income generated per unit area. Besides, in irrigated area, there is a higher requirement of the capital as the farmers apply more inputs for the agricultural production which in turn calls for the higher level of credit access / facility availed by farmers in irrigated condition than the rainfed condition. All these facts / reasons accounted for higher degree of financial security in irrigated condition than in the rainfed condition.

An examination of overall well-being status of farmers under irrigated and rainfed farming condition was carried out and results are presented in Table I. In irrigated condition, 42.22 per cent of farmers had high level of well-being, followed by medium (35.56 %) and low level of well-being (22.22%). Whereas, in rainfed condition, 44.44 per cent of farmers had low level of well-being followed by 34.44 per cent had medium and 21.12 per cent had high level of well-being. The findings of the study is supported by Yashodhara (2015).

The results showed that there is a large difference in well-being among irrigated and rainfed farmers. This might be due to the difference in income level, source of income and accessibility of basic agricultural inputs. In irrigated condition, farmers receives extensive assured irrigation facilities due to this two to three crops can be harvested per year which resulted in increased income of the family as compared to rainfed condition.

The mean score of well-being of farmers under irrigated and rainfed farming conditions for individual component was worked out and the results are presented in Table II. It could be seen from the table that, the mean well-being of the farmers in irrigated condition was high in almost all the components. The t-test was applied to compare the mean values of well-

TABLE II
Test of significance of different components of farmer's well-being (n=180)

Well-being	Irrigated farming condition		Rainfed farming condition		t-value
	Mean	SD	Mean	SD	
Income	20.25	2.00	19.04	2.51	3.57 **
Work	25.81	2.89	24.67	2.46	2.80 **
Family life	26.16	2.42	22.12	2.30	11.46 **
Health	23.77	2.84	23.44	2.36	0.86 ^{NS}
Housing	23.24	3.66	21.45	2.81	3.66 **
Personal freedom	22.46	2.50	20.73	2.32	4.80 **
Social participation	22.70	3.89	21.90	3.33	1.47 ^{NS}
Financial security	28.71	3.97	27.61	3.10	2.06 *
Overall well-being	190.93	18.8	180.98	12.82	4.14 **

Note: $t(0.05, 178df) = 1.96$; $t(0.01, 178df) = 2.58$

** Significant at 1 per cent level, * Significant at 5 per cent level, NS: Non-Significant

being of farmers under irrigated and rainfed farming conditions and the values obtained under different components are 3.57, 2.80, 11.46, 3.66, 4.80 and 2.06 for income, work, family life, housing, personal freedom, and financial security respectively. This indicates that the farmers in irrigated and rainfed area are significantly different with respect to their well-being across selected different components. This may be due to availability of water, farmers taking more than one crop and two harvests per year under irrigated condition. In case of rainfed condition, the farmers are practicing mono cropping and only one harvest per year. The other reason might be that participation

in different social institutions, access and using of services and information, size and fertility of land, availability of skilled labours, education level of family members, possession of farm equipment and vehicles, employment of family members, ability to adopt new technologies, extension contact, credit facilities and risk bearing ability and different plans strategies to overcome crisis among irrigated and rainfed farmers.

Health status of individuals is so important that one needs to maintain it in good condition, since the performance of individuals in achieving the different objectives is influenced by health directly and indirectly. Therefore, every individual irrespective of situations always tries to keep their health in good condition. Hence, in the present study, influence of health on the well-being was found non-significant between irrigated and rainfed conditions. Similar kinds of results were found in case of social participation variable that the influence of social participation on the well-being of farmers was found non-significant between rainfed and irrigated conditions.

The data on overall well-being mean score of farmers under irrigated and rainfed conditions are presented in Table II. The results revealed that mean well-being score of farmers in irrigated condition was 190.93 while it was 180.98 in rainfed condition. The t-value obtained was 4.14, indicating significant (at 1%) difference in well-being of the farmers in irrigated and rainfed condition. The results showed that there is a huge difference in well-being among irrigated and rainfed farmers. This might be due to the difference in their income level, sources of income, assets, extension contact, education level, different activities, and managing strategies among irrigated and rainfed farmers.

The results depicted in Table III revealed the major constraints faced by the farmers in irrigated and rainfed farming conditions. High cost of inputs was the major constraint faced by irrigated farmers which ranked first with greater percentage (97.78%). Farmers expressed over exploitation of money lenders by charging higher rates of interest (Rank 2), uncertainty of rainfall and non-availability of institutional credit

and procedural delays in obtaining loans (Rank 3), lack of credit to invest on other income generating activities (Rank 4), prevalence of pest and disease and lack of training on improved agricultural technologies (Rank 5), lack of market intelligence and improper control over traders in the regulated market (Rank 6), lack of remunerative prices for farm produce and high price fluctuation (Rank 7), poor accessibility of extension agencies for technical guidance (Rank 8), lack of veterinary facilities in the village (Rank 9), lack of basic facilities at work place (Rank 10), inadequate irrigation facilities for farming as well as to maintain livestock (Rank 11), non-cooperation among different groups (Rank 12) and lack of awareness and government encouragement about the subsidiary assistance for agriculture (Rank 13) were the major constraints faced by irrigated farmers in attaining the higher level of well-being under irrigated farming condition.

The spearman's rank correlation value of 0.69 indicates the existence of significant difference in constraints faced by farmers between rainfed and irrigated conditions.

The above mentioned results may be due the fact that, farmers' well-being depends on the cost of inputs. If the cost of inputs is very high the farmers may fail to purchase which leads to lower productivity and farmers may end up with lesser well-being. Agriculture is a gambling with rainfall and uncertainty of rainfall leads to lower productivity and inturn leads to lower well-being of farmers. Institutional credit system and procedures failed to provide credit to farmers when needed and due to this farmers fail to gain the higher level of well-being. Further, the constraints like non-cooperation among different groups of farmers, lack of awareness and government encouragement about the subsidiary assistance did not majorly affect the farmers to reach the higher well-being.

Table III also revealed the constraints inhibiting the farmers from attaining the better well-being under rainfed condition. All the farmers opined that they suffered due to uncertainty of rainfall and inadequate irrigation facilities for farming as well as to maintain livestock (Rank 1), followed by lack of remunerative

TABLE III
Constraints inhibiting the farmers' well-being under irrigated and rainfed farming conditions

Constraints [#]	Farmers					
	Irrigated farmers (n ₁ =90)			Rainfed farmers (n ₁ =90)		
	No.	%	Rank	No.	%	Rank
Lack of basic facilities at work place	78	86.67	X	82	91.11	VIII
Uncertainty of rainfall	86	95.56	III	90	100.00	I
Inadequate irrigation facilities for farming as well as to maintain livestock	77	85.56	XI	90	100.00	I
High cost of inputs	88	97.78	I	85	94.44	V
Prevalence of pest and disease	84	93.33	V	77	85.56	XII
Lack of credit to invest on other income generating activities	85	94.44	IV	84	93.33	VI
Lack of veterinary facilities in the village	80	88.89	IX	77	85.56	XII
Non co-operation among different groups	75	83.33	XII	80	88.89	IX
Lack of awareness and government encouragement about the subsidiary assistance for agriculture	73	81.11	XIII	79	87.78	X
Lack of remunerative prices for farm produce and high price fluctuation	82	91.11	VII	89	98.89	II
Lack of training on improved agricultural technologies	84	93.33	V	78	86.67	XI
Over exploitation of money lenders by charging higher rates of interest	87	96.67	II	83	92.22	VII
Non availability of institutional credit and procedural delays in obtaining loans	86	95.56	III	87	96.67	III
Poor accessibility of extension agencies for technical guidance	81	90.00	VIII	86	95.56	IV
Lack of market intelligence and improper control over traders in the regulated markets.	83	92.22	VI	84	93.33	VI

Note: $r_s = 0.691^{**}$, significant at one per cent level, (#: Multiple Responses)

prices for farm produce and high price fluctuation (Rank 2), non availability of institutional credit and procedural delays in obtaining loans (Rank 3), poor accessibility of extension agencies for technical guidance (Rank 4), high cost of inputs (Rank 5), lack of credit to invest on other income generating activities and lack of market intelligence and improper control over traders in the regulated markets (Rank 6), over exploitation of money lenders by charging higher rates of interest (Rank 7), lack of basic facilities at work

place (Rank 8), non co-operation among different groups (Rank 9), lack of awareness and government encouragement about the subsidy assistance for agriculture (Rank 10), lack of training on improved agricultural technologies (Rank 11), prevalence of pest and disease and lack of veterinary facilities in the village (Rank 12) were the major constraints faced by farmers under rainfed condition. This pattern of results obtained under rainfed condition may be due to the reason that farmers are completely dependent

on the rainfall as the source of irrigation for maintaining soil moisture. If they fail to get sufficient rainfall then they may end up with lesser production leading to lower level of well-being. The uncertainty and unequal distribution of rainfall affects agricultural operations which in turn affects higher level of well-being. The gross income realized by farmers can help them to reach greater well-being in their life, but lack of remunerative price for their produce made them to fail to attain higher income and wealthy well-being status. In rainfed condition, the extension agencies were poorly accessible and not providing required technical guidance. Due to the limited support from the agencies and high cost of inputs made the farmers to reach the recognizable or better level of well-being.

The suggestions expressed by farmers in irrigated and rainfed farming conditions to overcome the problems in securing higher level of well-being are presented in Table IV. Under irrigated condition, about 98 per cent of the farmers expressed assured and timely supply of quality inputs for agriculture as the major suggestion followed by increased subsidies for agricultural inputs (94.44%), establishment of hiring farm machinery centers in rural areas (93.33 %), providing nutritive foods through PDS (92.22%) and coverage of health insurance programmes for farmers (92.22%) procedure for loan should be simplified and also insurance has to be extended to all crops (91.11%). The timely supply of quality inputs helps farmer to carry out agricultural operations in

TABLE IV
Suggestions for enhancing the farmers' well-being under irrigated and rainfed farming conditions

Constraints [#]	Farmers					
	Irrigated farmers (n ₁ =90)			Rainfed farmers (n ₁ =90)		
	No.	%	Rank	No.	%	Rank
Assured and timely supply of quality inputs for agriculture	88	97.78	I	88	97.78	I
Creations of social structures like school, hospitals, transportation etc.	80	88.89	VII	80	88.89	VI
Government's assistance in creation of assets like land, house etc.	81	90.00	VI	83	92.22	III
Providing nutritive foods through PDS	83	92.22	IV	81	90.00	V
More encouragement from the government to undertake agricultural development projects in rural areas	79	87.78	VIII	76	84.44	IX
Establishment of hiring farm machinery centers in rural areas	84	93.33	III	79	87.78	VII
Insurance has to be extended to all crops	82	91.11	V	77	85.56	VIII
Encouragement for better social relationship between farmers and other community members	78	86.67	IX	75	83.33	X
Opportunities for entertainment with the family / friends / relatives / neighbours in the village / outside the village	81	90.00	VI	72	80.00	XIII
Coverage of health insurance programmes for farmers	83	92.22	IV	74	82.22	XI
Veterinary facilities should be provided in the village	80	88.89	VII	73	81.11	XII
Procedure for loan should be simplified	82	91.11	V	82	91.11	IV
Subsidies for agricultural inputs should be increased	85	94.44	II	87	96.67	II

Note: $r_s = 0.2554^*$, significant at five per cent level (# Multiple Response).

time which intern helps farmers to get higher yields. Further, the government has to provide higher rate of subsidies for agriculture inputs, because the farmers felt that the cost of inputs were very high. Majority of the farmers were not having all types of agricultural implements, hence the government and all other stakeholders have to plan and establish the farm machinery hiring centers to help them to carry their farming operations on time and bring greater well-being. Nutritional status of farming community also measures the well-being of farmers, so providing nutritive food through PDS may help them to attain the good well-being condition. Some farmers also expressed that insurance has to be extended to all crops to avoid the economic losses due to the crop failure.

Similarly, farmers in rainfed area (Table IV) suggested that, assured and timely supply of quality inputs for agriculture (97.78%), subsidies for agricultural inputs should be increased (96.67%). Government's assistance in creation of assets like land, house etc. (92.22%), procedure for loan should be simplified (91.11%) and providing nutritive foods through PDS were the major suggestions to enhance the farmers' well-being under rainfed farming condition.

The pattern of results obtained might be due to the timely and assured supply of quality inputs for agriculture, which may enhance quality and quantity of output that leads to higher income level. Farmers are finding it hard to get loan timely due to cumbersome process in disbursing loan, so it has to be made simplified to help farmers. In rainfed condition, it was difficult for farmers to purchase the nutritive food. Hence, the government has to provide the nutritive food through PDS to enhance the farmer's well-being were the major suggestions given by the farmers under rainfed farming condition.

The spearman's rank correlation value of 0.2554 indicated the significance of similar sugges-

tions reported by farmers in irrigated and rainfed conditions.

The study revealed that a majority of irrigated farmers had high level of well-being status, whereas a majority of rainfed farmers had low level of well-being status. A statistically significant difference was found between irrigated and rainfed farming condition in respect of well-being. The results implied that the need of necessary steps and programmes to be initiated by government authorities in rainfed areas in effective use of water such as in-situ water conservation, harvesting of rain water, micro-irrigation, inter-linking of water bodies etc. The Well-being of farmers in rainfed area is not as good as that of farmers in irrigated area. Hence, there is a need to improve the well-being of farmers in rainfed condition by providing required and adequate facilities viz., irrigation, agricultural inputs, technical guidance and market facilities at village level.

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