Scale to measure the agriculture sustainability achieved through *Krishi Bhagya* scheme

ABSTSRACT

In the present study an attempt is made to construct the scale that measures the agricultural sustainability of two districts in North Eastern Karnataka achieved through *Krishi Bhagya* scheme. … The major findings of the study indicated that, over one third (38.89 %) of the beneficiaries had achieved medium level of agriculture sustainability, whereas, 30.00 per cent of the beneficiaries achieved low level of agriculture sustainability and 31.11 per cent achieved high level agriculture sustainability in the study area. While in measurement of agriculture sustainability achieved through *Krishi Bhagya* scheme under different dimensions, among the nine statements studied under technological dimension, the beneficiary farmers assigned highest score of 720 and 626 by ranking as first and second to the statement "Farm pond facilitated to increase the water availability for protective irrigation" and "Farm pond enables recharge of ground water table", respectively. Whereas, among the five statements studied under economic dimension that the beneficiary farmers was assigned highest score of 585 to the statement "Farm pond minimize the dependence on bore well or other source of water for obtaining better crop yield" and ranked first. "*Krishi Bhagya* scheme improve overall income of the beneficiaries" was scored 539 with a second rank. Similarly among the four statements studied under social dimension, the beneficiary farmers were assigned highest score of 575 and 569 to the statement "*Krishi Bhagya* scheme beneficiaries gain opportunities for social empowerment" and "It has enabled for mobilization and facilitation of the farming community" with a rank of first and second. Among the six statements studied under ecological dimension, the beneficiary farmers assigned highest score of 645 to the statement "Farm pond increases crop productivity" and was ranked first. "This scheme provided increased fodder production and its availability to the beneficiaries" was scored 601 and ranked second. …

Comment [A1]: Mistaken >> ABSTRACT

An abstract summarizes, usually in one paragraph of 300 words or less, the major aspects of the entire paper in a prescribed sequence that includes: 1) the overall purpose of the study and the research problem(s) you investigated; 2) the basic design of the study; 3) major findings or trends found as a result of your analysis; and, 4) a brief summary of your interpretations and conclusions.

Comment [A2]: The research objectives can be stated here.

Comment [A3]: The description of the results and discussion is too long. please summarize and streamline the sentence.

Comment [A4]: Write your conclusions and recommendations here.

Introduction

The agricultural sustainability at individual farm level is crucial in the countries where large proportion of the population depends on agriculture and operates smaller holdings for their livelihood. The average size of operational land holding in India has declined to 1.08 hectares as compared to 1.15 hectares in 2010-11 according to Agricultural Census, 2015-16

and it is well known fact that, in India more than 80.00 per cent of farmers are small and marginal, who owns less than five acres of land and play a key role in ensuring food security. Hence, it is vital to see that, this section of farming community needs to be sustainable and feasible economically, environmentally and socially. Hence, agricultural sustainability at farm level entails continuous farm income in long run without harming the environment and enhancing the productive capacity of the soil by following economically viable and environmentally sustainable farming practices. At the farm level, an agriculture system is sustainable when it is possible to produce crop and livestock products based on scientific innovations that encompass land, water, farmer health and rights without compromising the yield levels.

Adoption of sustainable farming practices not meant going back to farming practices that forced farmers to practice subsistence farming systems. However, sustainable agricultural practices have to guide the farmers towards the right ways of practicing farming and adopting new agricultural innovations for maximum benefits while protecting the environment for the future generations (Terano *et al.*, 2014) as sustainable agriculture is a set of agronomic practices that are economically viable, environmentally safe and socially acceptable. of late, the indiscriminate use of fertilizers and pesticides, deforestation and urbanization led to increased awareness of sustainable farming practices in place of input intensive agriculture system. Hence, recycling of nutrients, improving efficiencies of fertilizer application, usage of organic nutrient sources (animal and green manures) are important elements that ensure the sustainability at farm level (Brodt *et al.*, 2011) because unscientific agricultural practices are the part of the problem and scientific agricultural practices are the solutions to the problem of unsustainability.

The agriculture sustainability achieved through the *Krishi Bhagya* scheme in North Eastern Karnataka region is a subject of great importance, as 30.00 per cent of the state agriculture crop area is contributed by the North Eastern Karnataka region. This region contribute substantial share for primary sector in the basket of Gross District Domestic Product (GDDP) which is highest when compared to other districts of Karnataka. The six districts of North Eastern Karnataka region are Bidar, Kalaburgi, Yadgiri, Raichur, Koppal and Ballari. These districts are among the most backward regions of the state with low Human Development Indices (HDI) …. Conversely, the agricultural productivity is low when compared to other districts. Hence, many developmental programmes of the State and Central

Comment [A5]: Write the source of the data or information here (author, 20xx)

Government are directed towards the reduction of poverty in this region with a strong commitment to achieve agricultural sustainability and overall development in North Eastern Karnataka region .….

Comment [A6]: The research objectives should be written at the end of the background section.

Materials and Method

The study was purposively conducted in Kalaburagi and Ballari districts of North-Eastern Karnataka region during the year 2019-20 as these districts had highest number of beneficiaries in the *Krishi Bhagya* scheme of Government of Karnataka. From each selected district, two taluks were selected based on highest number of beneficiaries. From each taluk 45 beneficiaries of *Krishi Bhagya* scheme were selected by following simple random sampling procedure. Thus study comprises of 180 respondents. …

Results and Discussion

1 Overall agriculture sustainability achieved through *Krishi Bhagya* scheme by the beneficiaries

The overall agriculture sustainability of the beneficiaries achieved through the *Krishi Bhagya* scheme is presented in Table 1. It was found that over one third (38.89 %) of the beneficiaries had achieved medium level of agriculture sustainability, whereas, 30.00 per cent of the beneficiaries achieved low level of agriculture sustainability and 31.11 per cent achieved high level agriculture sustainability in the study area.

It is concluded that, 70.00 per cent of the beneficiaries found in medium to high level of agriculture sustainability. This may be due to the fact that the project officials made a comprehensive efforts in creating awareness about *Krishi Bhagya* scheme and its objectives to the beneficiaries in order the achieve the agricultural sustainability. The socio – psychological traits of the respondents *viz.*, age, education, farming experience, extension contact, extension participation, social participation and mass media utilization coupled with their positive attitude towards agricultural might have influenced to obtaine the above results the results were similar with Sunitha (2015) and Ashok (2020).

2. Measurement of agriculture sustainability achieved through *Krishi Bhagya* scheme under different dimensions

2.1 Technological dimension

The data in Table 2 revealed that among the nine statements studied under technological dimension, the beneficiary farmers assigned highest score of 720 and 626 by ranking as first and second to the statement "Farm pond facilitated to increase the water availability for protective irrigation" and "Farm pond enables recharge of ground water table", respectively. Similarly, the "Use of polythene mulching for lining farm pond" scored 596 with a third rank, followed by the "Use of diesel pump set for protective irrigation in addition to drinking water supply for dairy/fish farming" were given score of 535 with a fourth rank. The other statements under technological dimension such as "Use of shade nets for raising fruits and vegetables seedlings", "Practicing animal rearing provides an additional income to the beneficiaries", "Polyhouse protect crops from natural weather disturbance such as wind, rain, birds and insects", "Compartmental bunding can't conserve rain water *in-situ*" and "Micro irrigation system minimizes crop yield through lower water use efficiency", were ranked fifth, sixth, seventh, eighth and ninth, with a score of 443, 404, 345, 338 and 280, respectively.

This results was due to the fact that water collected in farm pond enables the farmer for supplement irrigation without waiting for rainfall and also reduces soil erosion considerably. At one point of discussion with beneficiary farmers they have expressed that it has improved ground water level apart from use of collected water in farm pond for other purposes specially spraying and also to meet the animals' requirement. Therefore, the feature of the programme itself is an indication of generation of additional income through raising seedlings, livestock rearing, extension of irrigation facilities might be the reasons for the present findings.

Comment [A7]: It would be better if in this section the authors compare the results of research and or findings from previous studies.

2.2 Economic dimension

It is noticed from Table 2 that among the five statements studied under economic dimension that the beneficiary farmers were assigned highest score of 585 to the statement "Farm pond minimize the dependence on bore well or other source of water for obtaining better crop yield" and ranked first. "*Krishi Bhagya* scheme improve overall income of the beneficiaries" was scored 539 with a second rank. Similarly, the statement "Facilitate to get diversified income from farm" scored 537 followed by "It enables the beneficiaries to attain

self-sufficiency in long run" was given score of 488 with third and fourth rank, respectively. The statement "*Krishi Bhagya* scheme cannot provide increased employment opportunity for family members as well as outsiders" was scored 199 and ranked fifth by the beneficiaries.

These findings of the present study were due to the efforts of the project officials in organising extension activities through demonstration, field days, training programmes in the study area enriched changing in their prevailing cropping system. Thus, influenced beneficiaries in taking up of one or the other crop enterprises for higher returns. Further, the market accessibility for the beneficiaries were an additional advantage in increasing overall income of the beneficiaries.

Comment [A8]: Same as above, in this section the authors compare the results of research and or findings from previous studies.

2.3 Social dimension

It is indicated from Table 2 that among the four statements studied under social dimension, the beneficiary farmers were assigned highest score of 575 and 569 to the statement "*Krishi Bhagya* scheme beneficiaries gain opportunities for social empowerment" and "It has enabled for mobilization and facilitation of the farming community" with a rank of first and second. Similarly, the statement "It gives social status for having micro irrigation, protective cultivation etc on farm" with a score of 520 ranked third. The statement "This programme has promoted vulnerable groups/local groups to participate in farming" was given a score of 487 and ranked fourth under social dimension.

This is due to fact that majority of the farmers were able to participate in farming taking the advantages of *Krishi Bhagya* scheme by utilization of micro irrigation facilities, protective cultivation, farm pond etc, resulted in appreciation of the beneficiaries coupled with higher self confidence for better future in farming. Further, this programme has given an equal opportunity for individual and collectively to change social relationship with project officials to avail the benefits of the programme over a period of time. The other possible reason for the above result is that the innovative farmers of the local actively participated and influenced the others to avail the benefits of the programme in general and expansion of irrigation provision in particular for higher yields. In nutshell, the efforts of the project officials and beneficiary farmers gave increased social empowerment, under *Krishi Bhagya* scheme.

Comment [A9]: Same as above, in this section the authors compare the results of research and or findings from previous studies.

2.4 Ecological dimension

It is evident from Table 2 that among the six statements studied under ecological dimension, the beneficiary farmers assigned highest score of 645 to the statement "Farm pond increases crop productivity" and was ranked first. "This scheme provided increased fodder production and its availability to the beneficiaries" was scored 601 and ranked second. Similarly, the statement "It sustains farm ecological environment" was scored 594 and ranked third. The statement "Farm pond facilitate drinking water for animals and birds" was given score of 565 and ranked fourth. The other statements under ecological dimension such as "*In-situ* soil moisture conservation practice helps to conserve soil fertility" and "Farm pond increases cropping intensity and land utilization" were ranked fifth and sixth with a score of 542 and 418, respectively.

The possible reasons for higher crops production and productivity under ecological dimension is that scheme beneficiaries visualize farming as a part of development process with a goal to empower farmers organization through promoting of development skills such as *in-situ* soil moisture conservation, protective cultivation, farm pond etc and ability on farm based agro ecological issues. In this scheme extension functionaries made considerable efforts to sensitize the farmers about farm ecological environment as ultimate goal the results are in line with Rasul and Thapa (2004) and Zhen and Routray (2003).

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Comment [A10]: Sub-chapter CONCLUSION is needed here, please complete it.

Add also the policy implications for the development of sustainable agriculture going forward.

Reference

Comment [A11]: References should be at least 15 and taken from primary sources such as journals.

Ashok, K., 2020, A study on sustainability of redgram based farming system in North-Eastern Karnataka. *Ph. D. Thesis*, Univ. Agric. Sci., Raichur (India).

Brodt, S., Six, J., Feenstra, G., Ingels, C. and Campbell, D., 2011, Sustainable agriculture. *Nat. Edu. Know.*, 3 (10):1-20.

Rasul. G. and Thapa. G. B., 2004, Sustainability of ecological and conventional agricultural systems in Bangladesh: An assessment based on environmental, economic and social perspectives. *Agric. Systems*, 79: 327–351.

Terano, R.., Mohamed, Z., Shamsudin, M. N. and Latif, I. A., 2014, Farmers sustainability index: the case of paddy farmers in state of Kelantan Malaysia. *J. Int. Soc. S. E. Asian. Agri. Sci.*, 21 (1): 55-67.

Comment [A12]: Used commas, consistency.

Sunitha, A. B., 2015, Sustainability of farming systems in selected agro-climatic zones of Karnataka. *Ph. D. Thesis*, Univ. Agric. Sci., Bengaluru (India).

Zhen, L. and Routray, J. K., 2003, Operational indicators for measuring agricultural sustainability in developing countries. *Environ. Mgt.*, 32 (1): 34-46.

Table 1. Distribution of beneficiaries according to overall agriculture sustainability achieved through *Krishi Bhagya* scheme

(n=180)

Sl. No.	Categories	Frequency	Per cent
1.	Low (Mean-0.425*SD)	54	30.00
2.	Medium (Between mean ± 0.425*SD)	70	38.89
3.	High (Mean+0.425*SD)	56	31.11
	Total	180	100.00
		Mean = 67.22	**SD = 2.75**

Table 2. Measurement of agriculture sustainability achieved through *Krishi Bhagya* scheme under different dimensions

(n=180)

Sl. No.	Dimensions	Beneficiaries	
		Score	Rank
I.	**Technological dimension**		
1.	Farm ponds facilitated to increase the water availability for protective irrigation	720	I
2.	Farm pond enables recharge of ground water table	626	II
3.	Use of polythene mulching for lining farm pond	596	III
4.	Use of diesel pump set for protective irrigation in addition to drinking water supply for dairy/fish farming	535	IV
5.	Micro irrigation system minimizes crop yield through lower water use efficiency	280	IX
6.	Polyhouse protects crops from natural weather disturbance such as wind, rain, birds and insects	345	VII
7.	Use of shade nets for raising fruits and vegetables seedlings	443	V
8.	Compartmental bunding can't conserve rain water *in-situ*	338	VIII
9.	Practicing animal rearing provides an additional income to	404	VI

	the beneficiaries		
II.	**Economic dimension**		
10.	KBS improve overall income of the beneficiaries	539	II
11.	Farm pond minimize the dependence on bore-well or other source of water for obtaining better crop yield	585	I
12.	It enables the beneficiaries to attain self sufficiency in long run	488	IV
13.	Facilitates to get diversified income from farm	537	III
14.	KBS can't provide increased employment opportunity for family members as well as outsiders	199	V
III.	**Social dimension**		
15.	It has enabled for mobilization and facilitation of the farming community	569	II
16.	This programme has promoted vulnerable groups/local groups to participate in farming	487	IV
17.	It gives social status for having micro irrigation, protective cultivation etc on farm	520	III
18.	KBS beneficiaries gain opportunities for social empowerment	575	I
IV.	**Ecological dimension**		
19.	*In situ* soil moisture conservation practice helps to conserve soil fertility	542	V
20.	It sustains farm ecological environment	594	III
21.	Farm pond increases cropping intensity and land utilization	418	VI
22.	Farm pond increases crop productivity	645	I
23.	This scheme provided increased fodder production and its availability to the beneficiaries	601	II
24.	Farm pond facilitate drinking water for animals and birds	565	IV

KBS = *Krishi Bhagya* scheme