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Social impact and challenges of the Krishi Bhagya scheme: Insights from Beneficiary Farmers in Karnataka

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Abstract

India being an agrarian country, the total grain production of our country is 320.21 million tons in 2022, but it has to reach nearly 370 million tons by 2050. However, the major challenge is to stash away the runoff water for agricultural crops during the dry spell. With this insight, the government of Karnataka has started flagship program, in 2015 namely "Krishi Bhagya Scheme" a pivotal step towards achieving sustainability of rain-fed agriculture to store the rainwater in the farm ponds. The scheme had been extended to malnad areas including Shivamogga district. The study was conducted in Karnataka state with the sample size of 120 farmers consisting of 60 beneficiaries and 60 non-beneficiaries from Shivamogga district. The predominant findings of the study revealed that The study reveals that the scheme has positively influenced social factors, with 53.33% of beneficiaries showing medium organizational participation and 48.33% demonstrating medium political participation. Self-sufficiency among beneficiaries was also notable, with 56.67% reporting medium levels due to increased crop yields and income from stored water use. And also that the scheme's implementation faced several constraints. The elevation of polythene sheets during the rainy season was a major issue, reported by 72.68% of beneficiaries, followed by motor nozzle clogging due to algae growth (71.07%). Suggestions for improvement include better servicing and replacement of polythene sheets and irrigation materials (78.76%), and the need to tailor farm pond construction to specific farm requirements (77.10%).The anecdotal evidence from this research will suggest policy makers a slew of appropriate strategies and interventions can be extended to other parts of the country to improve farmers income and leading to sustainable water usage.

Keywords: Krishi Bhagya scheme, social impact, constraints, suggestions

Introduction

India, now recognized as the most populous country globally, remains heavily reliant on agriculture as the primary source of income and livelihood for a vast segment of its population. Despite the critical importance of agriculture, one of the most significant challenges facing the sector is water scarcity, which poses a serious threat to crop growth and overall agricultural productivity. Addressing this challenge is essential for the sustainability and advancement of Indian agriculture. A viable and sustainable solution to this issue lies in the implementation of effective water harvesting and storage systems. By conserving rainwater, these systems can ensure a more reliable and consistent water supply for agriculture, thereby enhancing productivity and securing the livelihoods of millions of farmers. As highlighted by Ahire and Kapse (2017) [11], the conservation of rainwater is not just an environmental necessity but a strategic approach to safeguarding the future of Indian agriculture. The Krishi Bhagya Scheme, launched by the Government of Karnataka in 2014, is a landmark initiative designed to tackle the challenges faced by rain-fed farmers in India, particularly in Karnataka. This scheme underscores the critical role of water in agriculture, especially in a country where a significant portion of the population is either directly or indirectly dependent on farming for their livelihood. As noted by Abhirami (2014) [1], water scarcity, exacerbated by the high dependency on monsoons, is a pervasive issue that plagues Indian agriculture. This scarcity not only threatens food security but also jeopardizes the livelihoods of millions of farmers across the country. The KBS specifically focuses on rainwater conservation as a means to improve agricultural productivity. It targets dryland regions across 23 districts in Karnataka, with a particular emphasis on the construction of farm ponds designed to capture and store excess rainwater. This stored water can then be utilized to irrigate crops during periods of drought or dry spells, providing a critical buffer against the erratic and often unpredictable monsoon rains (Bhuriya *et al.*, 2015) [11]. In Karnataka, where more than 70% of agricultural land is dependent on rain-fed conditions, the

Krishi Bhagya Scheme has been instrumental in stabilizing crop production and providing much-needed relief to farmers. The key objectives of the Krishi Bhagya Scheme include securing farmers' income by reducing their vulnerability to climatic variations, increasing farm productivity through the efficient use of stored rainwater, promoting the adoption of modern agricultural technologies, and encouraging sustainable farming practices such as integrated farming systems and multiple cropping. The benefits of the scheme are multifaceted. They include increased farm productivity, the infusion of new technologies, improved water management practices, and the ability to cultivate high-value crops in controlled environments such as poly houses. The Government of Karnataka has invested significantly in the Krishi Bhagya Scheme. This includes providing subsidized machinery such as motor pumps to facilitate the utilization of stored rainwater, conducting Krishi Melas (agricultural fairs) to educate and inform farmers about the latest agricultural technologies and practices, and releasing substantial funds to support the scheme's implementation. The scheme has also been extended to the Malnad areas, which are known for their unique topographical challenges and where water scarcity poses a significant challenge, especially during consecutive years of low rainfall from 2016 to 2018. Despite the critical importance of the Krishi Bhagya Scheme, there has been limited research on its impact, particularly in districts such as Shivamogga. Figure 1 highlights the average rainfall trends in the Shivamogga district from 2015 to 2019, emphasizing the variability in rainfall and the consequent need for effective water management strategies.

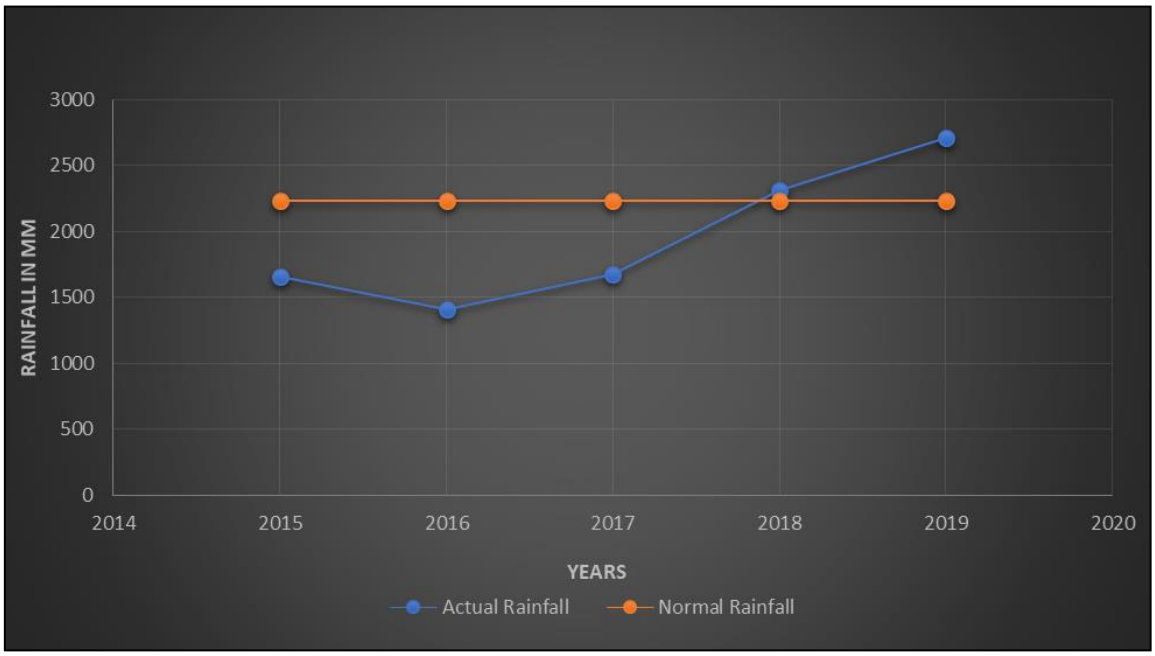

Fig 1: Average rainfall trends at Shivamogga district, Karnataka (2015-2019)

Despite its importance, there has been limited research on the impact of the Krishi Bhagya Scheme, especially in districts like Shivamogga. This research aims to fill this gap by assessing the scheme's impact on productivity, analyzing beneficiary attitudes, understanding constraints faced by farmers, and documenting success stories. Chandrakanth 2013, had found that this insight is invaluable for policymakers, helping them refine guidelines, target-farming communities effectively and promote sustainable agricultural practices. This study has the potential to contribute significantly to the enhancement of the livelihoods of rain-fed farmers and the sustainable development of agriculture in Karnataka.

Methodology

An Ex-Post Facto research design was employed to evaluate the Social impact of the Krishi Bhagya Scheme on beneficiary farmers in the Shivamogga district. This design was particularly useful for assessing the effects of the scheme after its implementation on the beneficiaries, allowing for observation and analysis without manipulating variables. Data was collected from four taluks—Shivamogga, Sorabha, Shikaripura, and Hosanagara—selected for having the highest number of scheme beneficiaries. The study included 120 respondents, evenly split between 60 beneficiary farmers (selected through purposive sampling) and 60 non-beneficiary farmers (chosen based on proximity and availability). To ensure robust analysis, several statistical tools were employed: the Chi-square test to identify differences between groups, the Mann Whitney U test and Wilcoxon signed rank test for non-parametric data comparisons, and the Garret rank test to prioritize constraints faced by farmers. These analyses provided insights into the scheme's effectiveness, highlighting differences in outcomes between beneficiaries and non-beneficiaries, and identifying challenges that need to be addressed for better implementation. The findings contribute to policy recommendations aimed at improving the livelihoods of farmers in Shivamogga and promoting sustainable agricultural development in the region.

Research Objectives

1. To analyze the impact on social factors on the beneficiaries of Krishi Bhagya scheme

2. Documentation of Success stories of the beneficiary farmers
3. To study the constraints faced by the farmers and their suggestions for improvement

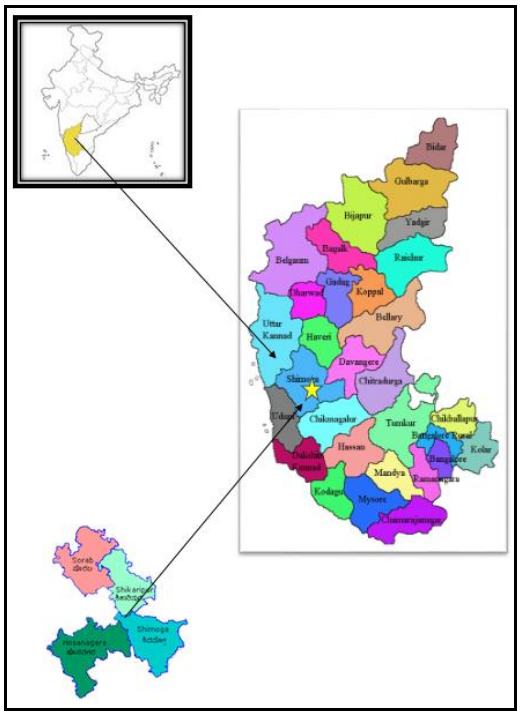

Fig 2: Map indicating study area

Results and Discussion

The results have been elaborately discussed with plausible reasons and explanations.

Table 1: Distribution of respondents based on the social Impact

a) Distribution of respondents based on the organizational participation					
Category	**Beneficiary farmers (n_1=60)**		**Non-beneficiary farmers (n_2=60)**		**Z value**
	F	**P**	**F**	**P**	
Low	12	20.00	23	38.33	3.08 NS
Medium	32	53.33	27	45.00	
High	14	23.67	10	16.67	
	Mean =2.9, ½ SD=0.74		Mean = , ½ SD=0.98		
b) Distribution of respondents based on the political participation					
Category	**Beneficiaries (n=60)**		**Non-beneficiaries (n=60)**		2.96 NS
	F	**P**	**F**	**P**	
Low	16	26.67	16	26.67	
Medium	29	48.33	29	48.33	
High	15	25.00	15	25.00	
c) Distribution of respondents based on self-sufficiency of the respondents					
Category	**Beneficiaries (n=60)**		**Non-beneficiaries (n=60)**		3.96*
	F	**P**	**F**	**P**	
Low	11	18.33	23	38.33	
Medium	34	56.67	27	45.00	
High	15	25.00	10	16.67	
	Mean =1.55, ½ SD=0.89		Mean =1.09,½ SD=0.51		

Organizational participation

A result of Table 1 (a) reveals that the participation of respondents in various organizations revealed that nearly (53.33%) belong to medium category followed by high (23.67%) and low (20.00%) organizational participation. While in case of non-beneficiaries 45.00 per cent of them had medium participation followed by 38.33 per cent low and high (16.67%) organizational participation respectively.
The calculated 'Z' value of Mann Whitney U test shows that there is no much difference in the organizational participation of the respondents.
A perusal of the results indicates that the majority of the beneficiaries (53.33%) and non-beneficiaries (45.00%) had medium organizational participation. This is due to the reason that most of the respondents participate in cooperative societies to avail loans. The daily necessity products like rice, dhal are procured in ration shops of their villages or nearby villages made them to visit regularly and also take a necessary step towards SHG, NGO, and Panchayath Raj institutions. NGOs like SKDRDP, Chaitanya rural development society and SMSSS are operating in the districts which provide an excellent platform to interact, acquire and develop more information in turn helps to take up various programs. Hence the results show moderate participation of both the beneficiaries and non-beneficiaries.

Political participation

Observation of table 1 (b) brings to the notice that a 48.33 per cent of them had medium political participation, and 26.67 per cent of them had low followed by high (25.00%) respectively. Whereas in case of non-beneficiaries majority of the had medium political participation of about 48.33 per cent and 26.67 per cent low followed by high (25.00%) respectively.
Nearly 48.33 per cent of the beneficiaries and non-beneficiaries (46.67%) had medium political participation. Generally, farmers involved in voting in general elections, interest of the individual farmers, better contact with the NGO's, and other political institutes led to better political participation.

Self-sufficiency

It is tabulated from the table 1 (c) that 56.67 per cent of the beneficiary farmers felt that they had a medium self-sufficiency and 25.00 per cent of them are having high sufficiency category followed by low of about 18.33 per cent. Whereas in case of non-beneficiaries majority of them had medium self-sufficiency of about 45.00 per cent and 38.33 per cent belong to low category followed by high (16.67%) respectively. This is due to increased production and yield of the crops using additional stored water. In turn, the rise in income results in more self-sufficiency. Whereas in the case of non-beneficiaries, 45.00 per cent of them had medium followed by 38.33 per cent self-deficiency due to the lower-income and reduced production. The z statistic shows that there is significant ($p<0.05$) difference in the self sufficiency of the farmers, due to increased annual income and better standard of living.
The calculated 'Z' shows that there is significant difference in the self-sufficiency of the respondents of KBS.

Success stories

Success story -1

Water is everything for farmers

Mr. Lingoji Nayak is an enthusiastic, traditional and passionate farmer from the Hunsodu village of Shivamogga district in Karnataka state. He possessed 12 acres of agricultural land with his family, uncomfortable with meager farm income in previous years. Even though he toiled desperately in parched farmland, he could not able to meet his needs as he had a major problem of water scarcity in his farm. He stated, "If there is no water for our crops, we have to work as daily wage laborers to make a living irrespective of how many acres of land we own" and added to that the traditional mono-cropping method protected by him over the years resulted in havoc situation.

The driving force for Lingoji Nayak was his friend's encouragement and inspiration about the Krishi Bhagya Scheme. This enabled him to construct a farm pond in his farm land in the year 2017. Then after he started cultivating paddy in 3 acres, maize in 2 acres, green leafy vegetables in 0.5 acres, he also had seven cows, five goats with an acre of fodder crops.

The total assets generated were the value of more than rupees 3,25,250.

His annual gross income raised from 6,05,500 rupees to 8,09,230 rupees per year from all the farm sources. He earned a profit of 2 lakh rupees from four crops in a year with moderate cropping pattern, and along with that in the summer, he depends on the dairy animals and sheep, a goat for his income. Lingoji Nayak realized success with adopted farm pond, which has promoted him towards self-sufficiency and boosted the annual farm income.

Success story -2

Crop diversity is the key reason for the success

Mr. Suresh is an emerging model farmer from the water-scarce region of Shivamogga district. He is an enthusiastic farmer from the Rattehalli region of Shivamogga district. During 2014-15, Shivamogga had been hit hard by drought leading to water scarcity. He had 2 acres of land with minimal crop yield and income leading to distress condition, and left his land barren for an year. He worked as a laborer in the other field, and his net income was approximately 10,000 per month.

During this exploration on his farm, he developed a close relationship with the local agriculture development officer and village-level extension workers with the technical knowledge of farm pond. They supported him with all possible technical help on how to construct a farm pond and achieve higher production of crops.

Earlier, his thought was the construction of farm pond is wasting a strip of productive land, but now he realized that farm pond as boon for cultivating crops and providing protective irrigation. He had grown crops like paddy, mustard, cowpea, field bean, bhendi, beans, multi-cut palak and fodder crops, despite all these, he has two cows and four goats. Soon, all his efforts began to pay dividends. Currently, he is experiencing the profit of nearly 2.75 lakhs from his 2 acres of land, with the cropping intensity raised to 170 per cent for further augment his earning. Even an occasional cloud burst makes them forget all the miseries they suffered when their crops failed due to drought previously.

Success story -3

Farm ponds are the Innovation to invigorate our farm sector

A commercial farmer, namely Parameshwar from the Chikkajenee village of Hosanagara taluk in Shivamogga district. He had a cultivable land of seven and a half acres. He stated that "no doubt there are several factors that can make farming sustainable, but none of them can be a simple and elegant solution as digging a farm pond." Even though it is a functional water resource area but, in summer, they experience grappling with water storing, water crisis to grow paddy and sugarcane.

Parameshwar realizing the plight of water scarce conditions and began to actively lookout for a new alternative to augment their farm income. In 2017 when he met a university scientist who visited his farm for other research purposes, he was advised to take up the Krishi Bhagya Scheme. With his decision to dig the farm pond in their land that has made all the difference. Farm ponds are shielding them from the vagaries of monsoon and helping them keep their farm activity ticking.

He had started the IFS along with the small biogas plant and compost pits, which supplemented to his income. He had also installed the drip irrigation in his field for three acres of arecanut, banana, coconut, lady's finger, beans, cashew, suvarna gadde, ginger, paddy along with that nursery of various other crops had also played a prominent role. He had turned one acre of his land completely organic in which he cultivates and market the organic banana and vegetables. He had a profit of 5.25 lakh rupees using a farm pond of size 10*10*10 ft, which is enough to irrigate up to 2 short duration crops in 3 acres land. This is a massive boost for the farmers who could do wonders provided with the water source. He says, "At last, we have found something we love to do, which helps us live with happiness and dignity."

Success story -4

Multi-purpose farm ponds

Govinda Raju is an innovative farmer from the Bannure village of Hosanagara taluk of Shivamogga district. During 2014- 15, Shivamogga was hard hit by water scarcity. He could not able to irrigate his moderate land holding of 3 acres adequately. He was cultivating arecanut as a perennial crop and paddy as a seasonal crop, but in the offseason, he worked as a school driver and wage labour in other farms, due to low technical knowledge on improved cultivation practices and water scarcity. The NGO intervened, encouraged and introduced Krishi Bhagya Scheme. Govinda Raju, who had asked for help with faint hope, was now encouraged to realize the advantage of installing farm ponds.

After the farm pond intervention, the agricultural professionals guided him towards fish rearing and integrated farming system, there was a paradigm shift in his production level. The cultivation of fish has also been practiced by feeding 3000 fingerlings in the farm pond of the size 12*12*3 ft. Farm ponds of the continuous rainfall area make the soil unfit for the cultivation of crops other than paddy. Their farm pond acts as a livelihood to grow the fodder crops in the 3 acres of lands with an acre of arecanut and banana as an intercrop along with that farmer has 40 goats, 12 cows, three buffaloes, 30 sheeps.

In the three years, Govinda Raju first tried to improve his earning, which was trebled with a profit of 3.25 lakh per year, encouraged by his success. He was also planning to adopt the apiary, added to that the area under protective irrigation to cultivate more cropping intensity. The farm pond water also utilized for feeding the livestock, has resulted in increasing the milk yield. He also purchased his agricultural machinery like weed cutter, areca nut climber. The solar light for the entire home was also being installed. He is a happy man today who counsels others to establish the farm pond and get the maximum sustainability from his farm enterprise.

Table 2: The constraints faced by beneficiaries of Krishi Bhagya Scheme

n=60

Sl. No	Constraints	Garret score	Rank
1	Elevation of polythene sheets during rainy season	72.68	I
2	Clogging of motor nozzle due to the development of green mosses and algae	71.07	II
3	Scattered and fragmented land holding	65.25	III
4	High evaporation during summer	64.85	IV
5	Wastage of productive land for farm pond construction	61.72	V
6	Farm pond sedimentation	60.85	VI
7	Lack of credit on time	53.17	VII

Constraints faced by the beneficiary farmers during the implementation of Krishi Bhagya Scheme

Garrett ranking technique was used to assess the constraints faced by beneficiaries during the implementation of Krishi Bhagya Scheme. Table 2 indicated the different constraints faced by the beneficiary farmers such as elevation of polythene sheets in the rainy season 72.68 (I rank), clogging of motor nozzle due to the development of green mosses and algae in the pond 71.07 (II rank), Scattered and fragmented land holding 65.25 (III rank), high rate of

evapo-transpiration in the summer season 64.85 (IV rank), wastage of productive land for farm pond construction 61.72 (V rank), Farm pond sedimentation 60.85 (VI rank), lack of credit facility on time 53.17 (VII rank). The results explain the various constraints faced by the beneficiaries during the execution of Krishi Bhagya Scheme. Significant difficulties felt by the farmers are the elevation of polythene sheets during rainy season (72.68). The farm pond constructed in the paddy field resulting in more seepage of water during the rainy season leading to the elevation of the sheet from the bottom of the pond. Another major difficulty is the clogging of the motor nozzle (71.07), due to the development of green mosses or algae in the farm pond leading to clogging of the nozzle. The problem of scattered and fragmented land holding was expressed by 65.25 per cent beneficiaries. In malnad areas, farmers had the recorded and unrecorded lands which are not located in the same locality. And also, that the farm pond taken up in one particular patch of land cannot be benefitted for all the scattered landholdings. High evaporation during the summer (64.85) and wastage of productive land for farm pond construction (61.72). Even though Shivamogga belongs to the malnad region during April to June, the temperature would be very high, resulting in excessive evaporation of water from the farm pond. Usually, the farm catchment area where the rainwater accumulates is a productive/fertile land resulting in the wastage of the agricultural land area.

Table 3: The constraints faced by the non-beneficiary farmers due to non- adoption of Krishi Bhagya Scheme

n=60

Sl. No.	Constraints	Garret score	Rank
1	Unable to harvest more than one crop in a growing season	78.75	I
2	Lower yield due to water scarcity	78.53	II
3	Lower income	77.00	III
4	Lack of water for domestic purposes	75.51	IV
5	Non- availability of water to provide protective irrigation	74.11	V
6	Unable to take up livestock and other allied activities	72.51	VI

The results presented in the Table 3 showed the major problems of non- beneficiaries such as inability to harvest more than one crop in a growing season 78.75 (I rank), lower yield due to water scarcity 78.53 (II rank), lower income 77.00 (III rank) followed by lack of water for domestic purposes 75.51 (IV rank), non-availability of water to provide protective irrigation 74.11 (V rank), and unable to take-up livestock and other allied activities 72.51(VI rank). The prime problem of the non-beneficiaries is that they couldn't be able to harvest more than one crop in a growing season (78.75). This is due to the reason that there is no conserved water to provide irrigation to the crops during rabi and summer. The other significant problems faced by non-beneficiary farmers are lower yield (78.53) and lower-income level (77.00). The probable reason for this might be the uneven distribution of monsoon resulting in water scarcity during the critical stages showed a drastic reduction of crop yield, in turn farm income of the farmers.

Table 4: Suggestions given by the beneficiaries to strengthen the implementation of Krishi Bhagya Scheme

n=60

Sl. No.	Suggestions	Percentage	Rank
1	Polythene sheet /sprinklers/drip irrigation materials need to be serviced when ever got damaged	78.76	I
2	Farm ponds must be managed to dig based on the farmer's needs.	77.10	II
3	Agricultural department should create awareness on various schemes among the farmers	72.48	III
4	Fencing should be provided to protect children and animals	72.28	IV
5	Subsidy should be extended to all the components covered in the scheme	71.60	V
6	Monitoring by the officials of concerned department is essential for efficient implementation of the scheme	70.28	VI
7	The selection process of eligible farmers should be made simple and transparent	70.05	VII
8	Department should arrange for exposure visits to successful farmers field	62.86	VIII

The results presented in the Table 4 highlights the suggestions given by the beneficiary farmers. The polythene sheet/sprinklers/drip irrigation materials need to be serviced and replacement of the damaged components should be made available78.76 per cent (I rank), farm ponds must be managed to dig based on their needs of the farm 77.1 per cent (II rank), the agricultural department should create a awareness on various schemes among farmers 72.48 per cent (III rank) followed by fencing should be provided to protect children and animals 72.28 per cent (IV rank), Subsidy amount should be extended to all the components covered under the scheme 71.60 per cent (V rank). They also suggested that the department officials should monitor the efficient implementation of the scheme 70.28 per cent (VI rank), selection process of eligible farmers should be made simple and transparent 70.05 per cent (VII rank) and finally the department should arrange for exposure visits to successful farmers field 62.86 per cent (VIII rank), respectively. The majority of the farming community suggested that polythene sheet/ sprinkler/drippers (78.76%) should be provided with repair services and replacement of damaged components. This might be due to the wear and tear of the various components which needs to be serviced whenever needed. Farm ponds must be managed to dig based on the farm needs (77.10%). There is a specification to dig out the farm ponds with a specific dimension of 10*10*3 or 12*12*3 for availing the benefits under the scheme which in turn results in wastage of the productive land. Hence, the pond has to be dig based on land availability and farmers need. They also suggested to create

more awareness on various schemes (72.78%) and fencing has to be provided to avoid children and animals falling in the ponds (72.28%). Unforeseen circumstances where in unknowingly children and animals may fall into pond losing their lives. Hence the fencing has to be encouraged.

Conclusion

The Krishi Bhagya Scheme has proven to be a transformative initiative for beneficiary farmers, markedly enhancing their agricultural practices, Social Impact and overall livelihood. The scheme has fostered better organizational and political participation among beneficiaries, leading to increased self-sufficiency and improved livelihoods. However, challenges such as the elevation of polythene sheets, motor nozzle clogging, and high evaporation rates during the summer have been identified as key constraints that need to be addressed. The study underscores the importance of tailoring farm pond construction to the specific needs of individual farms, enhancing awareness about government schemes, and providing timely technical support to farmers. The insights gained from this research can guide policymakers in refining the Krishi Bhagya Scheme and extending its benefits to other regions, ultimately contributing to the sustainable development of agriculture in Karnataka. The scheme's ability to mitigate the risks associated with monsoon variability has made it a valuable asset for the farming community, demonstrating its long-term benefits for sustainable agriculture.

Implications of the study

1. Since inception of the scheme, only 2,700 numbers of beneficiaries were chosen under the Krishi Bhagya Scheme. A vast majority were not covered under the scheme, so extension of the scheme to all needy farmers of the district to be ensured.
2. The components provided under the scheme are polythene sheets, motor pump, drip/sprinklers, poly houses are not availed by all the beneficiaries. So all the components have to be provided for every beneficiary farmer.
3. Krishi Bhagya Scheme has created additional employment during the offseason and promoted more enterprise combination *viz.* fishers, dairy, poultry, and other livestock. Hence such programs should be replicated to maximize the wellbeing of the farmers.
4. The relevant factors brought out by the study could be used by government officials to better target the farming community for the people working of the scheme.

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