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RESEARCH PAPER

Performance of Krishi Bhagya: A sustainable approach for farming in rainfed areas of Karnataka

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Abstract : Krishi Bhagya Scheme (KBS) has been an ambitious flagship programme of Government of Karnataka launched during 2014-15. The scheme exhibits special features of convergence and integration of various activities in farming especially water management. It includes components like farm pond, polythene lining sheets, field bunds, diesel pump sets and micro irrigation sets. The present study was an attempt to analyze the physical and financial progress of KBS, its adoption and constraints in adoption. Both primary and secondary data were collected from various published sources. An overall picture of district wise physical and financial progress of the scheme showed that share of study area in the state was fairly satisfactory and there was variation among the districts within the study area. The study revealed that most of the components have been implemented and that progress was more in the initial years. There was variation in adoption of different components too as farm ponds dominated the scheme. Implementation of the scheme appeared to be holistic as it focused on *in situ* rain water collection during rainy season, effective storage in protected farm ponds and lifting water for irrigation through a lifting mechanism. Further, the scheme emphasized on utilizing water effectively through micro irrigation facility to reap full benefits for crop production. The study brought out the fact that farmers belonging to general category availed larger benefits. Therefore, selection procedure for beneficiaries has to be more transparent for ensuring social inclusiveness. There is a need for educating farmers for adapting to the new technology in terms of crops, varieties and irrigation methods. There is also need for streamlining the official procedures. It was noticed that most of the problems arose due to poor understanding about the scheme, which calls for creating mass awareness and educating the beneficiaries regarding official procedures.

Keywords: Adoption, Constraints, Farm pond

Introduction

Karnataka is predominantly an agrarian state, where in nearly 70 per cent of the cultivated area is under rain fed farming. There are ten agro climatic zones in the state of which five agro-climatic zones receive an average annual rainfall ranging between 450 to 850 mm. This too has become more erratic in the recent years. These zones account for 63 per cent of the total geographical area of the state (120.3 lakh ha) and only about 60 per cent area is under cultivation (74.5 lakh ha), the reamaining 40 per cent is barren or uncultivable or under fallows. Percentage of gross rain fed area in these five zones ranges from 55 to 76 per cent. It is 76 per cent in Northeastern Dry Zone, 74 per cent in Central Dry Zone and 72 per cent in Eastern Dry Zone. Percentage of gross rain fed area in northern dry zone is 57 per cent while 55 per cent in Southern Dry Zone. Cropping intensity ranges from 108 to 130 per cent.

The productivity levels of different crops in rain fed areas are very low and there is an urgent need to provide thrust on improving the productivity, enhancing the income levels of farmers and agricultural laborers, besides, conserving the precious natural resources such as soil and water. While the farmers in the irrigation command area are benefitted by public source of irrigation and have received additional benefits through subsidies, inputs and credit while the dry land farmers are deprived of these benefits.

To overcome these challenges, the Government of Karnataka formulated a comprehensive Rain fed Farming Policy in 2015. The policy aims at convergence of various policy options and achieving higher productivity, increased income and improved livelihood securities for rural population. Overall objective of the policy is to improve rain fed agriculture scenario in the state by climate resilient agriculture, effective utilization of rain water, strengthening farm production and post harvest handling and improved productivity, income and livelihood options. An ambitious scheme called Krishi Bhagya Scheme (KBS) was being launched under this policy during 2014-15 (Anon., 2014). Main components of the scheme include, among others, *in situ* moisture conservation and *ex situ* rain water management through farm ponds, water lifting devices, micro irrigation, soil fertility improvement, crop diversification, farming systems, quality seeds, organic farming, horticulture, animal husbandry and allied activities. It also involves improvements in production and post production infrastructure facilities, extending marketing and crop insurance services. The scheme, through its convergence approach with other line departments was expected to improve management of natural resources like land and water and improve agricultural productivity and improve incomes of farm families. KBS was launched after sufficient consultation and preparation and grounded during summer 2014-15 (Anon., 2016). However, there could be gaps while implementing the scheme at the field level. The present study focused upon performance of the scheme and constraints in implementing the same. Outcomes of the study are expected to provide inputs for effective implementation of KBS and adopt amendments, if any, for the existing institutional model and official procedure.

Material and methods

The study collected data from both primary and secondary sources. Secondary data were collected from the Departments of Agriculture and District at a Glance and from other published sources for analysis of physical and financial progress of the scheme during 2014-15 and 2016-17 (Anon., 2016a, 2016b, 2016c, 2016d, 2016e). Primary field data relating to 2016-17 were collected through pre tested questionnaire from 120 sample farmers chosen randomly from 10 selected taluks in five districts of northern Karnataka under the jurisdiction of UAS, Dharwad. Information relating to adoption of the scheme and constraints in adoption and other related aspects were collected from the respondents. Constraints in adoption of the scheme were studied with the help of Garrett's Ranking Technique. The data pertaining to constraints in adoption of the scheme were ranked using Garrett scores. This technique is useful for quantifying interval scaled data. This helped in identifying most important factors influencing particular choice process. Respondents were asked to assign ranks for the listed factors and problems of such ranking had been converted in to score values with the help of the following formula:

Percentage position $=100(R_{ij}-0.5)/ N_j$

Where,

R_{ij} = Rank given for the i^{th} factor by the j^{th} respondent

N_{ij} = Number of factors ranked by the j^{th} respondent

By referring the Garett's table the percentage position estimated is converted into scores. Then, for each factor the score of each individual are added and then mean values are computed for each factor in order to assign rank (Laxmi, 2015).

Results and discussion

Physical and financial progress of Krishi Bhagya Scheme

Table 1 depicts component wise physical and financial progress of KBS over the years namely, farm pond, polythene lining sheets, field bunds, diesel pump sets and micro irrigation sets.

During three years period from 2014-15 to 2016-17 a total of 98,868 farm ponds were constructed in the state. In this about 43 per cent were constructed during 2014-15 and 43 per cent 2015-16 and remaining 14 per cent during 2016-17. A total of 40,232 polythene lining units were distributed during three years period in which about 50 per cent were distributed during 2014-15. 56,418 field bunds works have been taken up during the period in which 44 per cent belonged to first year and 50 per cent belonged to second year and the remaining 6 per cent to the third year. A total of 33,709 diesel pump sets units have been distributed to the beneficiaries. About 41 per cent were distributed in the first year followed by 44 per cent in the second year and remaining 14 per cent during three years. Micro irrigation units numbering 45,413 were given to the beneficiaries during three year period. In this 44 per cent units were distributed during first year 45 per cent second year and the remaining 11 per cent during third year. It can be seen from the table that those farmers who constructed farm ponds did not adopt all the schemes.

Table 1 depicts financial progress of the scheme. Various levels of amount were expended on five components of the scheme in the state. A total of about ₹ 32,698 lakhs have been spent on construction of farm ponds during the three years period. The year wise share of expenditures was about 43 per cent (2014-15), about 33 per cent (2015-16) and the remaining 25 per cent (2016-17). ₹ 9,996 lakhs were spent for polythene lining during the three years period, which was distributed year wise 2014-15 (53.3%), 2015-16 (34.22%) and 2016-17 (15.42%). Money spent on construction of field bunds amounted to ₹ 3,858 lakhs during the period. Of which amount about 46 per cent was spent during 2014-15 followed by 37.41 per cent during 2015-16, 16.45 per cent during 2016-17. During period an amount of ₹ 6,046 lakhs was spent on distribution of diesel pump sets in which about 45 per cent was spent during 2014-15 and about 40 per cent during 2015-16 while the remaining 15 per cent during 2016-17. An amount ₹ 7,792 lakh was invested in micro irrigation sets during three year period. Of this about 52 per cent was spent during 2014-15 followed by 37.41 per cent during 2015-16 and the remaining 10.66 per cent during 2016-17. Arvindakumar and Poddar (2015), adopting a similar approach assessed performance of micro irrigation scheme in Karnataka.

District wise physical and financial progress of Krishi Bhagya Scheme

District wise analysis of physical and financial progress in various components of the schemes in the study area was carried out and compared among districts and with the state

Table 1. Component wise physical and financial progress of Krishi Bhagya Scheme in Karnataka expressed in numbers

Component	2014-15		2015-16		2016-17		Total	
	Physical	Financial	Physical	Financial	Physical	Financial	Physical	Financial
Farm Pond	42,191	14,080.3	42,837	10,738.1	13,840	8,150.2	98,868	32,968.6
	(42.67)*	(42.71)*	(43.33)	(32.57)	(14.00)	(24.72	(100.00)	(100.00)
Polythene	19,910	5,033.5	14,897	3,420.8	54,25	1,541.6	40,232	9,995.9
lining sheets	(49.49)	(50.36)	(37.03)	(34.22)	(13.48)	(15.42)	(100.00)	(100.00)
Field Bunds	24,877	1,780.2	28,283	1,443.4	3,258	634.7	56,418	3,858.3
	(44.09)	(46.14)	(37.03)	(37.41)	(5.77)	(16.45)	(100.00)	(100.00)
Diesel Pump	13,916	2,704.3	14,976	2,414	4,817	927.4	33,709	6,045.7
sets	(41.28)	(44.73)	(44.43)	(39.93)	(14.29)	(15.34)	(100.00)	(100.00)
Micro	20,126	4,046.8	20,435	2,914.6	4,852	830.6	45,413	7,792
Irrigation sets	(44.32)	(51.94)	(45.00)	(37.41)	(10.68)	(10.66)	(100.00)	(100.00)

*Figures in the parentheses indicate percentage to the total.

Table 2. District wise physical and financial progress of Krishi Bhagya Scheme (2014-15 to 2016-17) in numbers

District	Farm pond		Polythene lining		Field bunds		Micro-irrigation		Diesel pump sets	
	Physical	Financial	Physical	Financial	Physical	Financial	Physical	Financial	Physical	Financial
Bagalkote	8,850	2,527.4	2,046	618	3,824	354.7	3,983	586	858	143.8
	(8.95)*	(7.67)*	(5.09)	(6.18)	(6.78)	(9.19)	(7.05)	(7.52)	(2.55)	(2.38)
Belagavi	6,499	1,711.9	4,162	1,496.6	5,995	350.4	4,623	692.5	3,630	731.1
	(6.57)	(5.19)	(10.34)	(14.97)	(10.63)	(9.08)	(8.18)	(8.89)	(10.77)	(12.09)
Dharwad	3,334	1,881.1	3	1.8	3,334	133.3	1,590	131.3	658	85.7
	(3.37)	(5.71)	(0.01)	(0.02)	(5.91)	(3.45)	(2.81)	(1.69)	(1.95)	(1.42)
Gadag	5,049	2,742.4	354	69.9	2,871	128.2	2,812	356.8	1,651	196.5
	(5.11)	(8.32)	(0.88)	(0.70)	(5.09)	(3.32)	(4.98)	(4.58)	(4.90)	(3.25)
Vijayapura	8,950	3,208.1	1,837	689	8,950	772.4	3,047	290.3	2,461	178.5
	(9.05)	(9.73)	(4.57)	(6.89)	(15.86)	(20.02)	(5.39)	(3.73)	(7.30)	(2.95)
District Total	3,2682	12,070.9	8,402	2,875.3	24,974	1,739	16,055	2056.9	9,258	1,335.6
	(33.06)	(36.61)	(20.88)	(28.76)	(44.27)	(45.07)	(28.41)	(26.40)	(27.46)	(22.09)
State Total	98,868	32,968.7	40,232	9,995.9	56,418	3,858.3	56,518	7792	33,709	6,045.7
	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)

*Figures in the parentheses indicate percentage to the total

level data (Table 2). Of the total farm ponds (98,868) created their share in the study area out was 33.6 per cent. Similarly, the share of study area in the polythene lining units (8,402) distributed in the state was about 21 per cent. With regard to field bund construction, share of study area in the state total (56,418) was 44.27 per cent. About 28 per cent of the total micro irrigation units distributed at the state level (58,518) were found in the study area. While a total of 33,709 diesel pump set units were distributed among beneficiaries in the state and share of the study area was 27.46 per cent. Performance of Belagavi, Vijayapura and Bagalkote districts was found to be much better compared to Dharwad and Gadag.

An amount of ₹ 32,968 lakhs was spent on construction of farm ponds in the state, in which share of the study area comprising five districts was about 37 per cent. In the case of polythene lining units an amount of ₹ 9,996 lakhs was spent in the whole state in which share of study area was 28.76 per cent. An amount ₹ 3,858 lakhs was spent on construction of field bunds in the state during three years period, of which major part (45%) was shared by the study area. With respect micro irrigation units, of the total expenditure of ₹ 7,792 lakhs in the state, the share of study area was 26.40 per cent. Total expenditure on diesel pump set units in the state during the period was ₹ 6,046 lakhs, in which the share of study area was 22.09 per cent. Arvindakumar and Poddar (2015) adopting a similar approach assessed performance of micro irrigation scheme in Karnataka.

An overall picture of district wise physical and financial progress of the scheme showed that share of study area in the state was fairly satisfactory. Belagavi district received greater share of benefits within the study area. Performance of Belagavi, Vijayapura and Bagalkote districts was found to be much better compared to Dharwad and Gadag. Dharwad and Gadag being districts with large dry farming area need more concentrated efforts in implementing the scheme.

Table 3. Adoption pattern of components of Krsihi Bhagya Scheme

Particulars	Total	Input distribution	
	Farmers	Adaption	Percentage
Farm pond	120	120	100.00
Polythene ling	120	90	75.00
Diesel pump set	120	40	33.33
Micro irrigation set	120	45	37.5

Source: Primary data

Adoption pattern of components of KBS in study area

An analysis of adoption of different components of KBS by the beneficiaries in study area was carried out and results are presented in Table 3. Of the 120 farmers surveyed all of them adopted farm pond component (100 %). The polythene sheet component was adopted by 75 per cent of the beneficiaries and diesel pump set was adopted to an extent of 33 per cent of the total sample respondents, 37.5 per cent respondents adopted the micro irrigation units. However, while farm ponds were fully adopted by beneficiaries, of take of other complimentary components was up to the desired extent. This trend calls for efforts to push for off take of the remaining components of the scheme to ensure full impact of the scheme.

A social category wise analysis of implementation of different components of KBS showed that in the case of farm ponds, out of 120 sample beneficiaries, about 66 per cent belonged to general merit (GM), 21 per cent to Schedule Caste (SC) and Schedule Tribe (ST) and rest 13 per cent to Other Backward Class (OBC) category. With respect to adoption of polythene linings, of the 90 farmer beneficiaries 33 per cent belonged to GM category, 28 per cent belonged to SC/ST and 19 per cent to OBCs. In the case of implementation of micro irrigation components, of the total 45 units distributed about 40 per cent belonged to SC/STs while the remaining 33.33 per cent belonged to GM and the records depicts social category wise beneficiaries of diesel pump sets under the Krishi Bhagya Scheme. Of the total sample size of the study (120) only 33 per cent availed the benefits of diesel pump sets for irrigating crops with water from farm pond. In the total beneficiaries of diesel pump sets a maximum number of beneficiaries (37.5 %) belonged to SC/ST, followed by GM (32.5 %) and OBC (30 %) categories.

Table 4. Constraints in implementation of Krishi Bhagya Scheme

Constraints	Garret ranks
Problem with installing agency and service providers	I
Lengthy procedure to avail benefits	II
Poor cooperation of officials	III
Delay in providing inputs	IV
Difficulty in adopting to the changing cropping pattern	V
Delay in amount transfer of subsidy amounts	VI
Poor quality of inputs	VII

Source: Primary data

In general, it can be observed that the GM category farmers had larger share of benefits in some of the components, while SC / ST category farmers closely followed them. Other backward class farmers stood at third position. This reflects upon the fact that, farmers belonging to GM category garnered the benefits. Therefore, selection procedure for beneficiaries has to be more transparent for ensuring social inclusiveness and success of the scheme.

Constraints in implementation of Krishi Bhagya Scheme

Table 4 indicates major constraints, as elicited from the respondents, in implementation of the KBS. One of the major problems was the issue with material suppliers and service providers which scored first rank in the Garrett scoring. Next important constraint was lengthy procedure followed in availing benefits under the scheme (Rank II). Poor co-operation of officials with the beneficiaries was another constraint (Rank III). Delay in providing inputs secured (Rank IV). Farmers also expressed difficulty in adopting changing cropping pattern with availability of farm pond water (Rank V). Delay in transfer of benefits was also expressed by beneficiaries (Rank VI). Lastly, the quality of input supplied was found to be of poor quality by few respondents (Rank VII). Similar findings were reported by Jainapur *et al.* (2015) in related studies. These findings point to the need for fine tuning implementation aspects of the scheme. There is a need for educating farmers for adapting to the new technology in terms of crops, varieties and irrigation methods. There is also need for streamlining the official procedures. Arvindakumar and Poddar (2015) in a similar study suggested adopting simplified procedure with the help of modern information and communication technology tools. It was noticed that most of the problems arose due to poor understanding about the scheme, which calls for creating mass awareness and educating the beneficiaries regarding official procedures.

Conclusion

The present study focused upon physical and financial progress of the scheme, adoption pattern and constraints in adoption the same. Outcomes of the study are expected to provide inputs for effective implementation of Krishi Bhagya Scheme and adopt amendments, if any, for the existing institutional model and official procedure.

The fact that about one lakh farm ponds were constructed within a span of three years during (2014-2017) is a commendable performance. Implementation of the scheme appeared to be holistic as it focused on *in situ* collection of rain water during rainy season, effective storage in protected farm ponds and lifting of water for irrigation through a lifting mechanism. Further, the scheme emphasized on utilizing water effectively through micro irrigation facility to reap full benefits for crop production. It was also discernible that the scheme was executed earnestly as most of the components were implemented in the initial period. The study found out that even though the components of the scheme were supposed to be complimentary, farmers who constructed farm ponds did not adopt all the schemes. This trend calls for efforts to push for off take of the remaining components of the scheme to ensure fullest impact of the scheme.

An overall picture of district wise physical and financial progress of the scheme showed that share of study area in the state was fairly satisfactory. Among the districts, Belagavi

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