Acta Scientific AGRICULTURE (ISSN: 2581-365X)

Volume 7 Issue 7 July 2023

Research Article

Constraints Perceived by the Farmers of Koramangala-Challagatta (K.C.) Valley Project and Suggestions Expressed by the Farmers

Chaithrashree J[1]*, YN Shivalinagaiah[2] BS Hanumantharaya[3] and Swetha BS[4]

[1]*PhD Scholar, Department of Agricultural Extension, University of Agricultural sciences, Bangalore, India*

[2]*Professor and Head, Department of Agricultural Extension, University of Agricultural sciences, Bangalore, India*

[3]*Assistant Professor, Department of Horticulture, College of Agriculture, UAS, GKVK, Bengaluru, India*

[4]*Extension Leader and Assistant Professor of Agricultural Extension, Regional Horticulture, Research and Extension Centre (RHREC), UHS Campus, GKVK, Bangalore, India*

***Corresponding Author:** Chaithrashree J, PhD Scholar, Department of Agricultural Extension, University of Agricultural sciences, Bangalore, India

DOI: 10.31080/ASAG.2023.07.1279

Received: May 31, 2023

Published: June 21, 2023

Abstract

The K.C. Valley project comes up as an ever lasting solution to the sewage water problem of Bangalore city as well as relatively advantageous to farmers of Kolar who were facing droughts over the years. The present study was purposively carried out in Kolar district of Karnataka State. The ex-post facto research design was employed. random sampling method was employed for the selection of respondents. The primary data were collected from 180 farm households, consisting of 90 farm households in Kolar taluk and 90 from Srinivaspura taluk. From each taluk, 30 marginal, 30 small and 30 big farmers were selected. The data were collected from the respondents through personal interview method using pre-tested and well-structured schedules. The result found that cultural, religious and social objections in using treated water ranked first with Garrett score 61.13 in case of social constraints, consumers will hesitate to buy products where treated waste water was used unless it is proven to be safe as the major production constraint which ranked first with Garatte score 51.94. in case of production constraints, occurrence of microbial diseases and infections ranked first with Garatte score of 61.13 in case of Health constraints, Water contains some industrial waste and metals ranked first with Garatte score 60.92 in case of Technological constraints. Cent per cent of the farmers suggested that education and outreach activities to be conducted for farmers about usage of treated water followed by food grown using treated water must be tested frequently (94.44%), frequent water testing needs to be done at least once in a month (88.88%).

Keywords: K.C. Valley; Constraints; Suggestions; Garratte Ranking; Farmers

Introduction

The Bangalore Municipal Corporation is the first largest corporation in Karnataka state. It has implemented Koramangala-Challaghatta Valley (KC Valley) project, which is deemed to be a unique project in the country. It's a rare Irrigation project and first of its kind in the entire country. Under this project treated sewage water is used to fill irrigation tanks in Kolar and Chikkaballapura district. The KC Valley project comes up as an ever lasting solution to the sewage water problem of Bangalore city as well as relatively advantageous to farmers of Kolar who were facing droughts over the Years. However, quantum of Bangalore city's sewage multiplies with rapid growth of population posing a serious threat to the urban ecosystem. To overcome this threat, Kormangala- Challaghatta Valley Project has successfully implemented in Kolar during November 2016. And so far two phases of works have been completed. For ensuring uninterrupted power supply to the project the Mega Engineering and Infrastructures Limited (MEIL) had established six power sub stations of 66 KV capacity, along with six

pump houses and a large surge tank to the K.C. Valley Project. The Government has planned to supply treated sewage water to a total of 126 irrigation tanks situated in different clusters of Kolar and Chikkaballapura district in a phased manner. Keeping these aspects in view, the present study has been conceptualized with the objective of identifying the major constraints encountered by farmers in the project area and to seek their suggestions to overcome the constraints.

During the last four decades, groundwater table in Kolar and Chikkabaallapura districts has drastically decreased due to over extraction of groundwater by the farmers resulting in drying up of borewells and openwells. These districts are worst affected with drought for decades forcing people and farmers live in misery. The KC Valley project thus has been designed to fill most of the tanks in Kolar and Chikkaballapura districts. The sewage water from the Bangalore city is being treated and supplied to fill tanks, which helps to recharge the ground water table and support a substantial increase in water bodies to irrigate the parched farms even during the drought. So rejuvenation of bore wells and open wells would be the only way to bring the parched lands back into agriculture operations. Treated sewage water reuse in agriculture is considered an efficient tool for managing scarce water resources with regulated supply that compensates for water shortages caused by rainfall shortage, uneven distribution of the rain throughout the hydrological year.

Methodology

The present study was purposively carried out in Kolar district of Karnataka State. Kolar and Srinivaspura taluks were selected purposively for the study. The numbers of tanks filled through KC Valley project were more in these two taluks compare to other taluks of Kolar District. The ex-post facto research design was used. Purposive sampling was employed for selection of Taluks and random sampling method was employed for the selection of respondents. The primary data were collected from 180 farm households, consisting of 90 farm households in Kolar taluk and 90 from Srinivaspura taluk. From each taluk, 30 marginal, 30 small and 30 big farmers were selected. The data were collected from the respondents through personal interview method using pre-tested and well-structured schedules**.** The responses were scored, classified, analyzed to calculate the Garrett score. Pilot Survey was carried out to identify the problems covering financial, input, management, social, technical and social constraints. Garrett's ranking technique was used to rank the factors of constraints. This technique provides the facility to ascertain numerical scores to constraints. This would bean advantage to arrange the constraints based on respondent's priority. Ranks wereconverted to per cent using Garrett's formula.

$$\text{Percent position} = \frac{100\,(R_{ij}-0.50)}{N_j}$$

Where, R is the rank given for i^{th} item by j^{th} individual and N is the number of items ranked by j^{th} individual.

The percent position of each rank was converted into scores referring to table given by [3] Garrett and Woodworth (1969. For each factor of constraint, the scores of individuals were added together and divided by the total number of the respondents. Thus, the mean scores for all the factors were ranked by arranging in descending order, rank were assigned and most important factor of constraint were identified.

Suggestions are the ideas put forward by the beneficiaries to overcome the constraints and to improve the development programmes for higher levels of welfare. The suggestions were asked to beneficiaries in open-ended questionnaire. All the suggestions werepooled and discussed based on frequency analysis.

Results and Discussion

Constraints as perceived by farmers of K.C. Valley project area

Constraints as perceived by farmers are analyzed using garret ranking and categorized into following sub categories viz., social constraints, production constraints, health constraints and technological constraints and are presented in table 1.

Social constraints

Among the total number of farmers by cultural, religious and social objections in using treated water ranked first with followed by lack of confidence on local management ranked second and acceptance of farmers is the most sensitive and important issue (Rank III). The probable reason for the above trend may be that, farmers think that treated water is dirty, because treated water contains human excreta as well as some trace elements if improperly treated it may affect their belief. That's why they are not ready to accept the sewage water for religious and cultural function. (Table 1).

Production constraints

Overall it was evident from table 1 that, consumers will hesitate to buy products where treated waste water was used unless it is proven to be safe as the major production constraint which ranked first. Groundwater pollution (Rank II), waste water causes salinity with the (Rank III), growth of undesirable aquatic species with the

Sl. No	Constraints	MF (n_1 = 60)		SF (n_2 = 60)		BF (n_3=60)		Total (n =180)	
		Score	Rank	Score	Rank	Score	Rank	Score	Rank
I	Social constraints								
1	Acceptance of farmers is the most sensitive and important issue	61.08	II	59.87	III	59.87	III	60.27	III
2	Cultural, religious and social objections in using treated water	62.38	I	60.42	II	60.60	II	61.13	I
3	Lack of confidence on local management	60.73	III	61.70	I	60.92	I	61.12	II
II	Production constraints								
1	Excessive vegetative growth, delayed maturity	49.22	IV	50.23	III	48.97	V	49.47	V
2	growth of undesirable aquatic species	49.07	V	49.55	V	50.45	II	49.69	IV
3	Groundwater pollution	51.07	II	49.70	IV	49.40	IV	50.06	II
4	Turbidity of water	50.82	III	49.07	VI	46.78	VI	48.89	VI
5	Consumers will not buy products where Treated Waste Water was used unless it is proven to be safe.	51.80	I	50.50	II	53.52	I	51.94	I
6	Wastewater causes salinity	48.10	VI	51.02	I	50.23	III	49.78	III
III	Health constraints								
1	Water is harmful for consumption	60.73	III	61.70	I	60.92	I	61.12	II
2	Food-borne outbreaks (Human) associated with the consumption of fresh Produce Irrigated with wastewater	55.37	IV	56.88	IV	56.55	IV	56.27	IV
3	Rural health and safety problems of farmers working on land	61.08	II	59.87	III	59.87	III	60.27	III
4	Occurrence of microbial diseases and infections	62.38	I	60.42	II	60.60	II	61.13	I
IV	Technological constraints								
1	Lack of trust and confidence on technologies	55.37	IV	55.95	IV	56.55	IV	56.27	IV
2	Plugging of irrigation system and Equipment	61.08	II	58.89	III	59.87	III	60.27	III
3	Lack of monitoring of wastewater treatment plant	62.38	I	59.43	II	60.60	II	61.13	I
4	Contains some industrial waste and heavy metals	60.73	III	60.69	I	60.92	I	61.12	II

Table 1: Constraints as perceived by farmers of K.C. Valley project area. n = 180.

(Rank IV), excessive vegetative growth and delayed maturity (Rank V) and turbidity of water with the Garatte score 48.89 ranked sixth were the other major production constraints as expressed by the farmers.

[4] Kalra., *et al.* (2014) noticed that majority (85.00 to 100.00%) of the respondents strongly endorsed that the poor maintenance of irrigation channels, canal siltation and weed growth, seepage from the distributaries and minors and irregular supply of canal water were the major factors responsible for waterlogging and subsequent land degradation in the command area. [1] Anon., (2014) reported that user should have prior information on effluent supply and its quality, to ensure the formulation and adoption of an appropriate on-farm management strategy.

Health constraints

Occurrence of microbial diseases and infections ranked first with Garatte score of 61.13, water is harmful for consumption with Garatte score 61.12 ranked second, health and safety problems of farmers working on land ranked third with Garatte score of 60.27, and food-borne outbreaks (human) associated with the consumption of fresh produce irrigated with wastewater with Garatte score 56.27 ranked as fourth were the other major constraints of all the farmers irrespective of marginal, small and big farmer category. (Table 1).

The results were in conformity with [8] Raja., *et al*., (2015) expressed that in this study, one of the drawbacks of using waste-

water for irrigation is heavy metal pollution in the soil and water along with the toxic elements which enter into the food chain.

[12] Trang., *et al*., (2007) revealed that human health risks from wastewater irrigation include firstly farmers' and consumers' exposure to pathogens, including helminth infections, and secondly, organic and inorganic trace elements.

Treated water may contain some microorganisms which causes diarrhea and also farmers working in the field has faced itching during irrigations. Generally, farmers irrigating with treated water have higher rates of helminth infections than farmers using freshwater, but there are exceptions. That may be the probable reason for above reasons.

[9] Raschid-Sally and Jayakody (2007) found that vegetables (32.00% frequency of responses) are besides cereals (27.00%) the most common crops produced with diluted or raw wastewater.

Technological constraints

It was evident from table 1 that, lack of monitoring of wastewater treatment plant as major technological constraint which ranked first (Garatte score = 61.13), contains some industrial waste and metals ranked second (Garatte score = 61.12), plugging of irrigation system and equipment (Rank III, Garatte score = 60.27) and lack of trust and confidence on technologies (Rank IV, Garatte score = 56.27) were the major technological constraints. Findings are in line with [7] Nonvide., *et al*. (2017) as they expressed flooding of fields and specific constraints in the irrigation scheme of Malanville include the high cost of irrigation and unavailability of water.

[5] Malge and Kulkarni (2017) noticed the problems faced by the head reach farmers in the command area were water logging and salinity problems, pest and disease attack, non-availability of sufficient labors was found in the agriculture operations during the peak period in the command area and lack of technical guidance among the farmers.

Suggestions as expressed by the farmers of K.C Valley project area

In total, cent per cent of the farmers suggested that education and outreach activities to be conducted for farmers about usage of treated water followed by food grown using treated water must be tested frequently (94.44%), frequent water testing needs to be done at least once in a month (88.88%), government should work in an integrated manner to avoid groundwater contamination (86.11%), and management committees needs be to formed at local level to monitor treatment plants (61.11%) respectively (Table 2).

Sl. No	Suggestions	MF (n1 = 60)		SF (n2 = 60)		BF (n3=60)		Total (n =180)	
		F	P	F	P	F	P	F	P
1	Frequent water testing needs to be done at least once a month	45	75.00	55	91.66	60	100.00	160	88.88
2	Food grown using treated water must be tested frequently	60	100.00	60	100.00	60	100.00	180	100.00
3	Frequent soil testing must be done	53	88.33	60	100.00	57	95.00	170	94.44
4	Education and outreach activities to be conducted for farmers about usage of treated water	60	100.00	60	100.00	60	100.00	180	100.00
5	Government should work in an integrated manner to avoid groundwater contamination	45	75.00	54	90.00	56	93.33	155	86.11
6	Management committees needs to be formed at local level to monitor treatment plants	30	50.00	38	63.33	42	70.00	110	61.11

Table 2: Suggestions as expressed by the farmers of K.C Valley project area.

Responses are mutually inclusive.

The suggestions are in line with [13] Umali (1993) had suggested that the government undertake corrective measures regarding project planning, extension services, water management by irrigation agencies and initiate policies with respect to water pricing.

[10] Srivastava., *et al.* (2000) reported that farmers were convinced through awareness campaigns, village meetings, demonstration days and visits to research sites. They participated in restoring fields after drainage installation and contributed labour and money for drain desilting.

[2] Drechsel., *et al*., (2002) revealed that less than 7.00 per cent of the area under wastewater irrigation is cultivated with vegetables because government officials uproot vegetables found to be growing there.

[6] Mccornick., *et al*., (2004) reported that public authorities often do not have sufficient knowledge of the technical and management options available for reducing environmental and health risks, or the capacity to enforce regulations.

[11] Toze (2006) suggested the policies to reduce the negative impacts of wastewater use while supporting its benefits can target the situations before the wastewater is generated, while it is being used, and after crops have been irrigated and products are prepared for sale and consumption.

Conclusion

In the project region, farmer's social acceptance to use sewage treated water is low. Farmers lacks trust and confidence in public agencies and no longer have faith in government institutions, and think that the no greatest technologies can clean up pollutants and pathogens. In this regard, there is a need of interdisciplinary effort in educating farmers to develop trust and confidence about agencies in this process. Upgraded technologies to be developed to purify the water and appropriate educational measures to use the sewage treated water in a significant way.

Bibliography

1. Anonymous. "Irrigation with waste water, FAO (2014).

2. Drechsel P., *et al.* "Balancing health and livelihoods: adjusting wastewater irrigation guidelines for resource-poor countries". *Urban Agriculture Management* 8 (2002): 7-9.

3. Garrett HE And Woodworth RS. "Statistics in psychology and education". Vakils, Feffer and Simons Pvt. Ltd. Mumabi (1969).

4. Kalra BS., *et al.* "Farmers' perception on water management and land degradation in the tail reach of western yamuna canal command". *Journal of Rural Development* 33.3 (2014): 343-350.

5. Malge PL And Kulkarni GN. "Impact analysis of water distribution on income and irrigation pattern in Indi branch canal of Upper Krishna Project". *International Journal of Research in Applied, Natural and Social Sciences* 5.7 (2017): 39-44.

6. Mccornick PG., *et al.* "From waste water reuse to water reclamation: progression of water reuse standards in Jordan". *Wastewater Use in Irrigated Agriculture*. CABI Publishing, UK (2004).

7. Nonvide GMA., *et al.* "Farmers' perceptions of irrigation and constraints on rice production in Benin: a stakeholder-consultation approach". *International Journal of Water Resources Development* 34.6 (2017): 1001-1021.

8. Raja S., *et al.* "Socio-economic background of wastewater irrigation and bioaccumulation of heavy metals in crops and vegetables". *Agricultural Water Management* 158 (2015): 26-34.

9. Raschid-Sally L and Jayakody P. "Understanding the drivers of wastewater agriculture in developing countries-results from a global assessment". In: Comprehensive Assessment Research Report Series, IWMI, Colombo, Sri Lanka (2007).

10. Srivastava DM., *et al.* "Farmers' participation in drainage works in Chambal Command, Rajasthan". India, in proceedings of the 8th ICID international drainage workshop, New Delhi (2000).

11. Toze S. "Reuse of effluent water-benefits and risks". *Agriculture. Water Managment* 80 (2006): 147-159.

12. Trang DT., *et al.* "Skin disease among farmers using waste water in rice cultivation in Nam Dinh, Vietnam". *Tropical Medicine and International Health* 12 (2007): 51-58.

13. Umali D. "Irrigation induced salinity: A growing problem for development and the environment". World Bank technical paper No. 215, the World Bank, Washington, D C (1993).