



Research Article

PRODUCTIVITY OF MAJOR CROPS IN CANAL COMMANDS OF KARNATAKA STATE

JALIKATTI V.* AND PODDAR R.

Department of Agricultural Economics, College of Agriculture, University of Agricultural Sciences, Dharwad, 580 005, Karnataka, India

*Corresponding Author: Email - vinayak5255@gmail.com

Received: January 04, 2020; Revised: January 24, 2020; Accepted: January 27, 2020; Published: January 30, 2020

Abstract: The area and production have been reported based on the study of Almatti left bank canal, Bhadra left bank canal and Vishwesvarayya left bank canal command areas of the Karnataka state. Multi stage random sampling method was used to select the farmers. The major crops grown in Almatti Canal Command area are sugarcane, *rabi* sorghum, red gram, ground nut, cotton and sunflower while paddy, sugarcane, finger millet, banana, arecanut and coconut are the major crops in Bhadra command area. Similarly, in Vishwesvarayya command area, paddy, sugarcane, finger millet and coconut crops occupy major area in the total irrigated area. It is observed from the study that, the farmers in the canal command areas have violated the recommended cropping pattern and hence, the productivity of crops like sorghum, finger millet, sunflower, groundnut, is less in the head region where water availability is more. Whereas the productivity of more water intensive crops like sugarcane, paddy, arecanut, etc. is more in head region than tail region.

Keywords: Crop productivity, Canal command area

Citation: Jalikatti V. and Poddar R. (2020) Productivity of Major Crops in Canal Commands of Karnataka state. International Journal of Agriculture Sciences, ISSN: 0975-3710 & E-ISSN: 0975-9107, Volume 12, Issue 2, pp.- 9442-9444.

Copyright: Copyright©2020 Jalikatti V. and Poddar R. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution and reproduction in any medium, provided the original author and source are credited.

Academic Editor / Reviewer: Yasir Afzal Beigh

Introduction

Karnataka is the eighth largest state with total geographical area of 190.50 lakh ha which constitutes 5.83 percent of total geographical area of the country. Agriculture being the main occupation of the state, irrigation plays significant part in obtaining increased yields from the land. The total water availability in the state is 41.81 BCM which includes surface and subsurface water resources. But the overall water demand of all the sectors works out to be 70.1 BCM and will increase to 80.17 BCM by 2020. Thus, the overall water balance of the state indicates a negative balance of 28.29 BCM and which is expected to rise up to 38.36 BCM by 2020 [1]. From various past studies, it is learnt that, the farmers from head region of the canal are receiving more irrigation water than middle and tail region farmers due to positional advantage. In addition to this, the supply of canal water is not regular. Therefore, farmers in the command area are using tube well water for irrigating the crops as and when canal water is not available. Further, due to the effect of frequent drought, failure of monsoon and wastage of water at upper reaches of the command area managing the water in canal commands has become a difficult task and at the same time necessitates the need for regular monitoring of water supply, enhancing crop productivity and adaption of suitable cropping pattern to improve the crop productivity. Hence, the study on 'Productivity of major crops in canal commands of Karnataka' was undertaken with an objective to document the area, production and productivity of major crops in selected canal command areas of the Karnataka state [2].

Materials and methods

There are seven major irrigation projects in Karnataka state viz, Upper Krishna project (UKP), Malaprabha and Ghataprabha project, Tungabhadra project, Cauvery basin project, Bhadra reservoir project and Irrigation Project Zone. Multi-stage sampling design was adopted to study the area, production and productivity of major crops in selected canal command areas of the state. In first stage out of seven irrigation projects in the state, three projects viz, UKP from North region, Bhadra from middle region and Cauvery from the South region of the state were selected purposively.

In second stage, left bank canals (LBC) of three projects were selected, since length of the LBC in each project is more than the length of Right Bank Canal and every selected canal was divided into three regions viz., head, middle and tail regions. In the final stage of sampling, 15 farmers from each region were selected. Thus, from each selected LBC, 45 farmers were selected purposively. Thus, the total sample investigated for the study was 135 farmer respondents. Simple statistical tools like tabular analysis of averages and percentages were used to analyse the area, production and productivity of major crops in command areas.

Results and discussion

Productivity of major crops in Almatti command area

Average productivity of major crops in Almatti command area is presented in [Table-1]. The results are based on the primary information collected from 45 respondents from the command area. The command area was divided into three regions i.e., head, middle and tail regions and from each region 15 respondents were selected for collecting the information. It is observed from the table that sugarcane, *rabi* sorghum, red gram, groundnut, cotton and sunflower were the major crops grown in command area. The average area under sugarcane crop in Almatti command area was 1.91 acre with the production of 87 tonnes and productivity of 45.33 tonnes per acre. Productivity of sugarcane in middle region of the command area was recorded maximum i.e., 50 tonnes per acre followed by tail region i.e., 45 tonnes per acre. In the head region, same was 40 tonnes per acre only. The reason might be that, in the head region availability of irrigation water is more and hence farmers utilize excess water than the requirement of the crop. In case of *rabi* sorghum, the average productivity in the command area was 5.07 qtls per acre. The productivity trend from head to tail region was increasing i.e., in head region the productivity of *rabi* sorghum was 4.78 qtls per acre, in middle region it was 5.15 qtls per acre and in tail region same was 5.28 qtls per acre. Since the water requirement of *rabi* sorghum was less, the maximum productivity was recorded in tail region of the command area, where the availability of the water was less than middle and head region.

Table-1 Average Productivity of major crops in Alamatti command area (n=45)

Crop	Head region (n=15)			Middle region (n=15)			Tail region (n=15)			Overall (n=45)		
	Area (Acre)	Production (Quintals/ton)	Productivity (Quintals/per acre)	Area (Acre)	Production (Quintals)	Productivity (Quintals/per acre)	Area (Acre)	Production (Quintals)	Productivity (Quintals/per acre)	Area (Acre)	Production (Quintals)	Productivity (Quintals/per acre)
Sugarcane	1.75	70.00	40.00	1.75	87.50	50.00	2.25	103.50	46.00	1.91	87	45.33
Rabi Sorghum	1.84	8.81	4.78	1.65	8.50	5.15	2.06	10.88	5.28	1.85	9.40	5.07
Redgram	3.00	15.40	5.13	3.20	19.84	6.20	3.75	25.39	6.77	3.32	20.21	6.03
Ground nut	2.00	9.50	4.75	3.60	13.12	3.64	1.75	9.50	5.43	2.45	10.70	4.60
Cotton	2.30	12.88	5.60	3.00	25.50	8.50	3.60	26.28	7.30	2.96	21.55	7.13
Sunflower	1.50	6.00	4.00	2.30	11.86	5.16	2.00	11.60	5.80	1.93	9.82	4.99

Table-2 Average Productivity of major crops in Bhadra command area (n=45)

Crop	Head region (n=15)			Middle region (n=15)			Tail region (n=15)			Overall (n=45)		
	Area (Acre)	Production (Quintals/ton)	Productivity (Quintals/per acre)	Area (Acre)	Production (Quintals/ton)	Productivity (Quintals/per acre)	Area (Acre)	Production (Quintals/ton)	Productivity (Quintals/per acre)	Area (Acre)	Production (Quintals/ton)	Productivity (Quintals/per acre)
Paddy	1.80	24.30	13.50	2.6	29.77	11.45	3.18	33.40	10.50	2.52	29.15	11.56
Sugarcane	1.20	51.12	42.60	2.60	117.0	45.00	3.18	131.30	41.30	2.32	99.80	43.01
Finger millet	1.84	18.58	10.10	1.65	20.50	12.42	2.06	30.82	14.96	1.85	23.30	12.50
Banana	3.00	64.92	21.64	1.34	27.34	20.40	2.03	26.80	13.20	2.12	25.26	18.41
Areca nut	1.60	12.82	8.01	1.96	13.72	7.00	3.33	24.98	7.50	2.30	17.26	7.50
Coconut (Nos)	2.03	8993	4430	2.34	9669	4132	1.33	5520	4150	1.90	8050	4237

Table-3 Average Productivity of major crops in VC command area (n=45)

Crop	Head region (n=15)			Middle region (n=15)			Tail region (n=15)			Overall (n=45)		
	Area (Acre)	Production (Quintals/ton)	Productivity (Quintals/per acre)	Area (Acre)	Production (Quintals/ton)	Productivity (Quintals/per acre)	Area (Acre)	Production (Quintals/ton)	Productivity (Quintals/per acre)	Area (Acre)	Production (Quintals/ton)	Productivity (Quintals/per acre)
Paddy	1.50	15.75	10.50	2.30	24.10	10.48	2.00	34.00	17.00	1.93	24.43	12.66
Sugarcane	3.00	123.96	41.32	2.80	143.80	51.36	3.20	137.05	42.83	3.00	135.51	45.17
Finger millet	1.30	14.30	11.00	2.15	26.70	12.41	1.80	26.90	14.94	1.75	22.63	12.78
Coconut (Nos)	1.70	7058.4	4152	3.33	13306	3996	1.96	5993.7	3058	2.33	8703	3735.3

Similar trends were also observed in case of red gram crop *i.e.*, the productivity of red gram was increasing from head to tail region. The average productivity of red gram was recorded to the tune of 6 qtls per acre. In case of productivity of groundnut also same trend as in case of rabi sorghum and red gram was observed. In head region, the productivity of groundnut was 4.75 qtls per acre which increased to 5.43 qtls per acre in tail region. The average productivity recorded was 4.6 qtls per acre. But, in case of cotton, maximum productivity was recorded in middle region of the command area *i.e.*, 8.5 qtls per acre followed by tail region 7.3 qtls per acre and head region 5.6 qtls per acre. The average productivity of cotton in the command area was 7.13 qtls per acre. Regarding productivity of sunflower crop decreasing trend was observed from head to tail region *i.e.*, in head region the productivity of sunflower was 4 qtls per acre, in middle region it was 5.16 qtls per acre while in tail region same was 5.8 qtls per acre. The average productivity of sunflower in the command area was 4.99 qtls per acre.

Productivity of major crops in Bhadra command area

Productivity of major crops in Bhadra command area is presented in [Table-2]. It was revealed from the [Table-2] that paddy, sugarcane and finger millet were the agronomical crops and banana, areca nut, coconut were the horticultural crops grown popularly in Bhadra command area. The productivity of paddy in Bhadra command area showed decreasing trend from head region to tail region. In the head region, productivity of paddy was 13.50 qtls per acre, while in the tail region it was 10.50 qtls per acre. In the head region, the availability of irrigation water is more and since paddy is water intensive crops, decreasing trend in productivity of paddy is observed from head to tail region.

Regarding sugarcane crop, the average productivity of the command area was 43.01 tonnes per acre. The highest productivity of sugarcane (45 tonnes per acre) was recorded in middle region followed by head region (42.60 tonnes per acre) and tail region (41.30 tonnes per acre). In case of finger millet increasing trend from head to tail region was observed with average productivity of 12.50 qtls per acre. In case of banana crop, productivity was decreasing from head to tail region. The overall productivity of banana in command area was 18.41 qtls per acre. The productivity of areca nut was maximum in head region (8.01 qtls per acre) followed by tail region (7.50 qtls per acre) and middle region (7.00 qtls per acre) with the overall productivity of 7.50 qtls per acre in command area. In case of coconut also similar trend was observed as in areca nut. In the head region, productivity of coconut was 4430 nuts per acre, while in middle region it was 4132 nuts per acre and in tail region the same was 4150 nuts per acre with overall productivity of 4237 nuts per acre in the Bhadra command area.

Productivity of major crops in Vishwesvarayya canal command area

The productivity of major crops in VC command area is depicted in [Table-3]. It was clear from the table that in case of paddy, the productivity was more in tail region with 17 qtls per acre followed by middle and head regions of the command area. The farmers are having a thought that standing water always required in paddy for more productivity but excess of water also decreases the productivity in head region, where water availability is more. Similarly, in case of sugarcane crop highest productivity was in the middle region *i.e.*, 51.36 tonnes per acre followed by 42.83 tonnes per acre in tail and 41.32 tonnes per acre in head region of command area. The average productivity of finger millet in overall level of the VC command area was 12.78 qtls per acre and it was highest in tail region 14.94 qtls per acre and then reduced to 12.41 qtls per acre and 11 qtls per acre in middle and head regions, respectively. Productivity of coconut was more in head region with 4152 nuts per acre followed by 3996 nuts per acre in middle and 3058 nuts per acre in tail region of command area but at overall level of command area, the productivity of coconut was 3735 nuts per acre.

Conclusion

It is observed from the study that crop productivity largely influenced by irrigation. The study revealed that farmers are growing high water requiring crops. The productivity of sugarcane and paddy was maximum in the head regions as compared to middle and tail regions of the command areas. Sugarcane and paddy are more water intensive crops and in head region availability of irrigation water was more than middle and tail regions. Therefore, the productivity of both the crops was maximum in head region followed by middle and tail regions. As against, the crops which are recommended for dry region *i.e.*, sorghum, finger millet, sunflower, groundnut showed less productivity in head region and maximum productivity in tail regions. Thus, to improve the productivity of different crops in canal command areas recommended cropping pattern must be followed by the farmers.

Application of research: This study helps in studying area, production and productivity of major crops in canal command areas of Karnataka. The results can be used for policy regarding the use of water in head, middle and tail regions of the command areas and increasing the productivity of crops.

Research Category: Agriculture Economics

Abbreviations: CADA: Command Area Development Authority
FICs: Field Irrigation Channels, BCM: Billion Cubic Meter

UKP - Upper Krishna project, LBC: Left Bank Canal
BRP: Bhadra Reservoir Project, CBP: Cauvery Basin Project

Acknowledgement / Funding: Authors are thankful to Department of Agricultural Economics, College of Agriculture, University of Agricultural Sciences, Dharwad, 580 005, Karnataka, India

***Research Guide or Chairperson of research: Prof Dr Rajendra Poddar**

University: University of Agricultural Sciences, Dharwad, 580 005, India

Research project name or number: PhD Thesis

Author Contributions: All authors equally contributed

Author statement: All authors read, reviewed, agreed and approved the final manuscript. Note-All authors agreed that- Written informed consent was obtained from all participants prior to publish / enrolment

Study area / Sample Collection: Secondary data collected from offices of CADA, Irrigation and Agricultural Departments, Bhadra Command Area of Karnataka

Cultivar / Variety / Breed name: Maize, Finger Millet, Sorghum and Cotton

Conflict of Interest: None declared

Ethical approval: This article does not contain any studies with human participants or animals performed by any of the authors.
Ethical Committee Approval Number: Nil

References

- [1] Gade A.D. and Chavan S.M. (2014) *J. Shivaji Univ. Sci. and Tech.*, 41(1), 4-9.
- [2] Lashari B. and Mahesar M.A. (2012) *Sixteenth International Water Technology Conference, Istanbul, Turkey*.
- [3] Montazar A. (2009) *Iran, International Sci. Index*, 3(9), 408-412.
- [4] Raut S., Panda D.K. and Kannan K. (2014) *J. Agric. Phys.*, 10(2), 21-27.
- [5] Singh Y.V., Gajja B.L. and Chand K. (2006) *Agric. Econ. Res. Review*, 19(1), 83-94.
- [6] Siva Sankar A., Reddy B. And Ravi Kumar K. (2014) *J. Int. Academic Res. for Multidisciplinary*, 2(1), 527-545.