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Economics of Cropping Pattern in Upper Krishna Project (UKP) and Malaprabha Ghataprabha Project (MGP) Command Areas of Karnataka

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A B S T R A C T

The Upper Krishna Project (UKP) and Malaprabha Ghataprabha Project (MGP) are the major irrigation projects in Karnataka and is the most prestigious multipurpose (irrigation and power) project An attempt was made to study the economics of cropping pattern in the four command areas. The study made use of both primary data and secondary data. Primary data was obtained from the farmers in the villages under the command areas while the secondary data was obtained from agriculture department offices in the project zones. In case of ALBC command area were results revealed that there was a difference in net returns of Rs. 10,215 per ha existing between Head and Tail region across all the seasons and all the crops. In case of IBC the average net returns per ha across all the seasons and crops was higher in Head region than the Tail region with a difference of about Rs. 10,810. In case of MLBC the average net returns per ha across all the seasons and crops was higher in the Head region than the Tail region with a difference of about Rs. 11,657. In case of GRBC command area it was found that the average net returns earned per ha across all the seasons and crops was higher in Head region than in Tail region with a difference of Rs. 11,125. Thus, overall the per hectare net returns in different crops were higher in Head region as compared to Tail region in all commands.

Introduction

The Upper Krishna Project (UKP) is one of the major projects in Karnataka and is the most prestigious multipurpose (irrigation and power) project. It is the economic lifeline of chronically drought hit districts of North Karnataka, as it would irrigate a command area of 1 m. ha on full development. The irrigation water was first let out in September 1982. The intensity of irrigation originally envisaged in Stage-I was 107.5 per cent.

Almatti Left Bank Canal (ALBC)

It is a lift irrigation canal proposed on the left flank foreshore of the Almatti reservoir.

It provides irrigation to an area of 20,235 ha of Bijapur district.

Indi Branch Canal (IBC)

It is a bifurcation of Narayanpur Left Bank Canal (NLBC) at 78 km, i.e. Indi. It covers Indi and Sindagi taluks. It has highest length of 175 km with an irrigable command area of 76,416 ha.

Malaprabha Ghataprabha Project

The Malaprabha Irrigation Project is located in the northern part of Karnataka State, India. It comes under the northern dry region-II, zone 3 and located at 15^0-$48^{|}$-0^{II}N latitude and 75^0-6^{I}-0^{II} E longitude with an altitude of about 600 meters above the mean sea level.

Malaprabha Irrigation Project covers eight taluks namely, Bailhongal, Ramdurga and Saudatti of Belgaum district, Hubli and Navalgund taluks of Dharwad district, Nargund and Ron taluks of Gadag district and Badami taluk of Bagalkot district. The total command area under the project is 2,20,028 hectares.

The Malaprabha Irrigation Project at present has two main canals *viz.,* Malaprabha Right Bank Canal and Malaprabha Left Bank Canal.

Malaprabha Left Bank Canal

The length of the canal is 150 kms. The works are generally completed upto the 150 kms and water has been let out for irrigation upto km 132 upto the end of March 2011.

The irrigable command area under this canal is 53,134 hectares. It has a discharge capacity, at head, of 38.91 cumecs.

In addition to these canals, there are ten lift irrigation schemes with a view mainly to benefit the rehabilitated people. The irrigable command area under these ten lift irrigation schemes is 26,971 hectares.

Ghataprabha project

Ghataprabha project is taken up on the Ghataprabha river basin near Hidkal in Hukkeri village of Belagavi district, Karnataka.

It has a total catchment area of 1412 Km^2 with a yield of 69.60 Tmc capacity. It comprises of two canals viz., Ghataprabha Right Bank (GRBC) and Ghataprabha Left Bank Canal (GLBC)

Ghataprabha Right Bank Canal (GRBC)

The length of the canal is about 202 km and it has a total irrigated area of 169129 ha with a capacity of 66.56 cumecs. It covers Belagavi and Bagalkote districts.

Materials and Methods

Both primary and secondary data were used for the study. The secondary data on area coverage of different crops grown in both the project command areas was obtained from the Agriculture Offices of the project zones.

The primary data on cropping pattern was obtained from farmer respondents using a well-structured and pre tested questionnaire in the selected villages coming under the Head and Tail regions of UKP and MGP command areas (ALBC, IBC, MLBC and GRBC areas).

The data obtained was analyzed using the simple tabular analyses and the costs and returns of the cropping pattern followed were estimated.

The total number of sample farmers selected for the study was 30 farmers and among them 15 were from Head region and 15 were from Tail region for each command area. Therefore in total 120 sample farmers were selected for the study.

Results and Discussion

Economics of cropping pattern in ALBC command area

Table 1 indicates the different crops grown in ALBC command area. In Kharif season Pigeon pea, bajra, green gram and maize were grown both Head and Tail regions. An economic analysis involving cost and returns revealed that on an average the net returns per ha across the crops was higher in the Head region (Rs.52,942.97) compared to those in Tail region (Rs. 38,926.31).

In the Head region pigeon pea was found to be earning highest net returns per ha (Rs. 61,546) followed by other crops whereas in Tail region bajra was more profitable (Rs. 43,171.25) compared to other crops.

Sorghum, chick pea, sunflower and ground nut were the crops grown in rabi in both Head and Tail regions. The average net returns per ha across the crops was higher in Head region (Rs. 33,965) as compared to those in Tail region (Rs. 28,381.25).

In the Head region sunflower was found to be earning higher net returns per ha (Rs. 43,710) followed by other crops whereas in Tail region ground nut was more profitable (Rs.36,150) compared to other crops.

Vegetables like tomato, brinjal and bhendi were grown in summer in both Head and Tail regions. The average net returns per ha across the crops was higher in Head region (Rs.41,479) as compared to those in Tail region (Rs. 33,750).

Sugarcane was the bi-seasonal crop grown in both Head and Tail regions. The average net returns per ha for sugarcane was higher in Head region (Rs.97,500) as compared to those in Tail region (Rs. 76,500).

In general across the seasons and crops the average net returns in the Head region was higher (Rs. 47,464.07) than those in Tail regions (Rs. 37,248.67).

Economics of cropping pattern in IBC command area

Table 2 indicates the different crops grown in IBC command area. In Kharif season Pigeon pea, bajra and green gram were grown both Head and Tail regions. An economic analysis involving cost and returns revealed that on an average the net returns per ha across the crops was higher in the Head region (Rs. 44,597) compared to those in Tail region (Rs.40,713.34).

Pigeon pea was found to be earning highest net returns per ha in Head and Tail regions followed by other crops. The average net returns per ha in Head region was Rs.47,796.25 while that of in Tail region was Rs. 44,195.

Wheat, Bengal gram and sorghum were the crops grown in rabi in both Head and Tail regions. The average net returns per ha across the crops was higher in Head region (Rs.25,741) as compared to those in Tail region (Rs.24,216.67).

Wheat was found to be earning highest net returns per ha in Head and Tail regions followed by other crops. The average net returns per ha in Head region was Rs.32,100 while that of in Tail region was Rs. 31,250.

A few vegetables were grown in summer in both Head and Tail regions. The average net returns per ha across the crops was higher in Head region (Rs.37,500) as compared to a loss in Tail region (Rs. 21,750).

Sugarcane was the bi-seasonal crop grown in both Head and Tail regions.

Table.1 Economics of cropping pattern in the ALBC command area

(n=30)

Seasons	Head region				Tail region			
	Yield (per ha)	Total cost (Rs per ha)	Total returns (Rs per ha)	Net returns (Rs per ha)	Yield (per ha)	Total cost (Rs per ha)	Total returns (Rs per ha)	Net returns (Rs per ha)
Kharif								
Pigeon pea	15.66	24625.00	86171.25	61546.00	12.15	24750.00	66783.75	42033.75
Bajra	29.66	8625.00	57851.63	49225.00	24.66	8625.00	51796.5	43171.25
Green gram	11.25	7250.00	56250.00	49000.00	7.50	7000.00	37500.00	30500.00
Maize	71.25	33500.00	85500.00	52000.00	62.5	35000.00	75000.00	40000.00
Subtotal A.	-	-	-	**211771.88**	-	-	-	**155705.25**
Average	-	-	-	**52,942.97**	-	-	-	**38,926.31**
Rabi								
Sorghum	23.75	22500.00	52250.00	29750.00	19.75	22500.00	41475.00	18975.00
Chick pea	18.00	15000.00	41400.00	26400.00	16.25	15000.00	37375.00	22375.00
Sunflower	31.66	19625.00	63335.00	43710.00	2.825	19625.00	55650.00	36025.00
Ground nut	26.25	37500.00	73500.00	36000.00	24.55	37500.00	73650.00	36150.00
Sub total B.	-	-	-	135860.00	-	-	-	113525.00
Average	-	-	-	33,965.00	-	-	-	28,381.25
Summer								
Tomato	25.00	62500.00	120000.00	57500.00	25.00	62500.00	120000.00	57500
Brinjal	45.00	50000.00	94500.00	44500.00	37.5	50000.00	78750.00	28750
Bhendi	8.75	37500.00	59937.00	22437.00	7.5	37500.00	52500.00	15000
Sub total C.	-	-	-	**124437.00**	-	-	-	**101250**
Average	-	-	-	**41,479.00**	-	-	-	**33,750**
Bi seasonal								
Sugarcane	100.00	112500.00	210000.00	97500.00	95.00	112500.00	190000.00	76500.00
Sub total D.	-	-	-	**97500.00**	-	-	-	**76500.00**
Total (A+B+C+D)	-	-	-	**569568.88**	-	-	-	**446980.25**
Average				**47,464.07**				**37,248.67**

Table.2 Economics of cropping pattern in the IBC command area

(n=30)

Seasons	Head region				Tail region			
	Yield (per ha)	Total cost (Rs per ha)	Total returns (Rs per ha)	Net returns (Rs per ha)	Yield (per ha)	Total cost (Rs per ha)	Total returns (Rs per ha)	Net returns (Rs per ha)
Kharif								
Pigeon pea	13.17	24625.00	72421.25	47796.25	12.50	24625.00	68750.00	44195.00
Bajra	24.67	8625.00	51801.75	43176.75	20.92	8625.00	43890.00	35265.00
Green gram	10.00	7250.00	50000.00	42730.00	10.00	7250.00	50000.00	42750.00
Subtotal A	-	-	-	**133793.00**	-	**40500.00**	**162640.00**	**122140.00**
Average	-	-	-	**44,597.00**	-	-	-	**40,713.34**
Rabi								
Wheat	25.75	40000.00	72100.00	32100.00	23.75	40000.00	71250.00	31250.00
Chick pea	17.50	20000.00	40250.00	20250.00	18.00	20000.00	41400.00	21400.00
Sorghum	23.75	25000.00	49875.00	24875.00	22.50	25000.00	45000.00	20000.00
Sub total B.	-	**85000.00**	**162225.00**	**77225.00**	-	**85000.00**	**157650.00**	**72650.00**
	-	-	-	**25,741.00**	-	-	-	**24216.67**
Summer								
Vegetables	25.00	62500.00	100000.00	37500.00	12.5	50000.00	31250.00	-21250.00
Sub total C.	-	**62500.00**	**100000.00**	**37500.00**	-	**50000.00**	**31250.00**	**-21750.00**
	-	-	-	**37500.00**	-	-	-	**-21750.00**
Bi seasonal								
Sugarcane	95.00	125000.00	200000.00	75000.00	90.00	125000.00	189000.00	64000.00
Sub total D.	-	**125000.00**	**200000.00**	**75000.00**	**90.00**	**125000.00**	**189000.00**	**64000.00**
Total (A+B+C+D)	-	**313000.00**	**636448.00**	**323518.00**	-	**300500.00**	**544040.00**	**237040.00**
	-	-	-	**40,439.75**	-	-	-	**29,630.00**

Table.3 Economics of cropping pattern in the MLBC command area

(n=30)

	Head region				Tail region			
Seasons	**Yield (per ha)**	**Total cost (Rs per ha)**	**Total returns (Rs per ha)**	**Net returns (Rs per ha)**	**Yield (per ha)**	**Total cost (Rs per ha)**	**Total returns (Rs per ha)**	**Net returns (Rs per ha)**
Kharif								
Maize	75.00	37500.00	90000.00	52500.00	71.25.00	37500.00	85500.00	48000.00
Ground nut	30.00	50000.00	96000.00	46000.00	26.25.00	50000.00	81375.00	31375.00
Sunflower	35.00	20000.00	70000.00	50000.00	30.00	20000.00	60000.00	40000.00
Green gram	12.50	8750.00	62500.00	53750.00	11.25	8750.00	56250.00	47500.00
Sub total A		**116250.00**	**318500.00**	**202250.00**		**116250.00**	**283125.00**	**166875.00**
				50,562.5.00				
Rabi								
Maize	75.00	37500.00	90000.00	52500.00	66.25	37500.00	79500.00	42000.00
Ground nut	31.25	45000.00	93750.00	48750.00	25.00	50000.00	75000.00	25000.00
Chick pea	20.00	20000.00	46000.00	26000.00	18.00	20000.00	41400.00	21400.00
Sub total B		**102500.00**	**229750.00**	**127250.00**		**107500.00**	**195900.00**	**88400.00**
				42,416.67.00				
Summer								
Vegetables	30.00	62500.00	150000.00	87500.00	25.00	62500.00	125000.00	62500.00
Sub total C		**62500.00**	**150000.00**	**87500.00**		**62500.00**	**125000.00**	**62500.00**
Bi seasonal								
Chilli	15.00	50000.00	87000.00	37000.00	15.00	50000.00	90000.00	40000.00
Cotton	25.00	50000.00	100000.00	50000.00	21.25	50000.00	85000.00	35000.00
Sugarcane	95.00	125000.00	199500.00	74500.00	90.00	125000.00	199500.00	74500.00
Sub total D		**125000.00**	**199500.00**	**161500.00**		**125000.00**	**199500.00**	**149500.00**
				248500.00				**49.833.34**
Total (A+B+C+D)				**470500.00**				**342275.00**
				42772.73.00				**31,115.90**

Table.4 Economics of cropping pattern in the GRBC command area

(n=30)

Seasons	Head region				Tail region			
	Yield (per ha)	Total cost (Rs per ha)	Total returns (Rs per ha)	Net returns (Rs per ha)	Yield (per ha)	Total cost (Rs per ha)	Total returns (Rs per ha)	Net returns (Rs per ha)
Kharif								
Maize	75.00	37500.00	90000.00	52500.00	71.25	37500.00	85500.00	48000.00
Ground nut	30.00	50000.00	96000.00	46000.00	26.25	50000.00	81375.00	31375.00
Sunflower	35.00	20000.00	70000.00	50000.00	30.00	20000.00	60000.00	40000.00
Subtotal A.				**148500.00**		**107500.00**	**226875.00**	**119375.00**
Average				**49,500.00**				**39,958.34**
Rabi								
Maize	75.00	37500.00	90000.00	52500.00	66.25	37500.00	79500.00	42000.00
Ground nut	31.25	45000.00	93750.00	48750.00	25.00	50000.00	75000.00	25000.00
Chick pea	20.00	20000.00	46000.00	26000.00	17.50	20000.00	40250.00	20250.00
Sunflower	30.00	20000.00	60000.00	40000.00	30.00	20000.00	60000.00	40000.00
Subtotal B.				**167250.00**		**127500.00**	**254750.00**	**127250.00**
Average				**41,812.50**				**31812.50**
Summer								
Vegetables	30.00	62500.00	150000.00	87500.00	25.00	62500.00	125000.00	62500.00
Subtotal C				**87500.00**		**62500.00**	**125000.00**	**62500.00**
Average				**87500.00**				**62,500.00**
Bi seasonal								
Sugarcane	95.00	125000.00	199500.00	74500.00	90.00	125000.00	189000.00	64000.00
Subtotal D.				**74500.00**		**125000.00**	**189000.00**	**64000.00**
Average				**74500.00**				**64000.00**
Total (A+B+C+D)				**473250.00**				**373125.00**
				52583.34.00				**41458.34**

The average net returns per ha for sugarcane was higher in Head region (Rs. 75,000) as compared to those in Tail region (Rs. 64,000).

In general across the seasons and crops the average net returns in the Head region was higher (Rs. 40,439.75) than those in Tail regions (Rs. 29,630.50).

Economics of cropping pattern in MLBC command area

Table 3 indicates the different crops grown in MLBC command area. In Kharif season maize, ground nut, sunflower and green gram were grown both Head and Tail regions. An economic analysis involving cost and returns revealed that on an average the net returns per ha across the crops was higher in the Head region (Rs.50,562.5) compared to those in Tail region (Rs. 41,718.75).

In the Head region green gram was found to be earning highest net returns per ha (Rs. 53,750) followed by other crops whereas in Tail region maize was more profitable (Rs.48,000) compared to other crops.

Maize, ground nut and chick pea were the crops grown in rabi in both Head and Tail regions. The average net returns per ha across the crops was higher in Head region (Rs. 42,416.67) as compared to those in Tail region (Rs. 29,466.67).

Maize was found to be earning highest net returns per ha in Head and Tail regions followed by other crops. The average net returns per ha in Head region was Rs.52,500 while that of in Tail region was Rs. 42,000.

Vegetables were grown in summer in both Head and Tail regions. The average net returns per ha across the crops was higher in Head region (Rs.87,500) as compared to those in Tail region (Rs. 62,500). Sugarcane, cotton and chilli were the bi-seasonal crops grown in both Head and Tail regions. The average net returns per ha across the crops were higher in Head region (Rs. 53,833.34) as compared to those in Tail region (Rs. 49,833.34).

Sugarcane was found to be earning highest net returns per ha in Head and Tail regions followed by other crops. The average net returns per ha in Head region was Rs.74,500 while that of in Tail region was Rs. 64,000.

In general across the seasons and crops the average net returns in the Head region was higher (Rs. 52,590.90) than those in Tail regions (Rs. 42,479.55).

Economics of cropping pattern in GRBC command area

Table 4 indicates the different crops grown in GRBC command area. In Kharif season. Maize, ground nut and sunflower were grown both Head and Tail regions. An economic analysis involving cost and returns revealed that on an average the net returns per ha across the crops was higher in the Head region (Rs. 49,500) compared to those in Tail region (Rs. 39,791.67).

Maize was found to be earning highest net returns per ha in Head and Tail regions followed by other crops. The average net returns per ha in Head region was Rs.52,500 while that of in Tail region was Rs. 48000.

Maize, ground nut, Bengal gram and sunflower were the crops grown in rabi in both Head and Tail regions. The average net returns per ha across the crops was higher in Head region (Rs. 41,812.5) as compared to those in Tail region (Rs.31,812.50).

Maize was found to be earning highest net returns per ha in Head and Tail regions followed by other crops. The average net returns per ha in Head region was Rs.52,500 while that of in Tail region was Rs. 42,000.

A few vegetables were grown in summer in both Head and Tail regions. The average net returns per ha across the crops was higher in

Head region (Rs.87,500) as compared to those in Tail region (Rs. 62,500).

Sugarcane was the bi-seasonal crop grown in both Head and Tail regions. The average net returns per ha for sugarcane was higher in Head region (Rs. 74,500) as compared to those in Tail region (Rs. 64,000).

In general across the seasons and crops the average net returns in the Head region was higher (Rs. 53,083.34) than those in Tail regions (Rs. 41,458.34).

Economics of cropping pattern in the four canal command areas was worked out and the results are presented in Tables 1, 2, 3 and 4.

In case of ALBC command area were results revealed that there was a difference in net returns of Rs. 10,215 per ha existing between Head and Tail region across all the seasons and all the crops.

In case of IBC the average net returns per ha across all the seasons and crops was higher in Head region than the Tail region with a difference of about Rs. 10,810. In case of MLBC the average net returns per ha across all the seasons and crops was higher in the Head region than the Tail region with a difference of about Rs. 11,657. In case of GRBC command area it was found that the average net returns earned per ha across all the seasons and crops was higher in Head region than in Tail region with a difference of Rs. 11,125. Thus, overall the per hectare net returns in different crops were higher in Head region as compared to Tail region in all commands.

This is mainly due to the fact that the farmers in the Tail region were realizing lower yields compared to their counter parts in the Head region. The cost of cultivation remaining nearly same in both Head and Tail regions created disparity among the farmers in the form of lesser net returns earned per ha crops all the seasons and all the crops.

The findings obtained in the study of economics of major crops were similar to those obtained by Sivashankar *et al.*, (2014) in Krishna Western Delta (KWD) of Andhra Pradesh for crops like paddy, Bengal gram, ground nut, cotton, chilly, maize, and sugarcane.

It could be concluded from the study that the command areas have an alternative cropping pattern that can be followed. The overall net returns per hectare were higher in tail regions than in the head regions.

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