Visit us - www.researchjournal.co.in ■ DOI : 10.15740/HAS/IRJAES/9.1/43-48
International Research Journal of Agricultural Economics and Statistics
Volume 9 | Issue 1 | March, 2018 | 43-48 ■ e ISSN-2231-6434

Research Paper

Economics of crops cultivating in North Eastern Dry Zone of Karnataka

■ **G. V. Rohith, Afrin Zainab Bi, K.S. Rashmi, K.R. Hamsa and Jaganath Olekar**

See end of the paper for authors' affiliations

Correspondence to :
G.V. Rohith
Department of Agricultural Economics, University of Agricultural Sciences,
Bengaluru (Karnataka) India
Email : rohithgv789@gmail.com

Paper History **:**
Received **:** *21.08.2017;*
Revised **:** *07.01.2018;*
Accepted **:** *21.01.2018*

ABSTRACT : This study was conducted to analysis the share of different expenditure incurred and profitability of crops in the North Eastern Dry Zone of Karnataka. A simple random sample of 30 farmers each under rainfed condition, borewell irrigation and canal irrigation are studied. Simple tabular analysis technique was used to estimate cost and returns of crops .The result of the study shows that human labour cost was accounted higher proportion (35-50 %) than other components followed by cost for bullock labour except in paddy where machine labour cost accounted (20%).The highest net returns were realized in paddy with borewell irrigation (Rs.49577/ha) followed by paddy with canal irrigation (Rs.44134 /ha), cotton with borewell irrigation (Rs.40442 /ha) compared to other crops in Raichur district.The benefit cost ratio for paddy cultivation was found higher (2.16) in case of canal irrigated due to less cost incurred (Rs. 38,004) compared to borewell irrigated paddy cultivation (Rs. 45,368) due to more energy cost for water pumping Rs.4110 (9.16 %).Among rainfed crops the most favourable returns per rupee cost was found cotton followed by redgram,chickpea and groundnut ranging from 1.72 to 1.61.

KEY WORDS : Cost, Return, Tabular analysis, Water rate, Cost of pumping ground water, B: C ratio

HOW TO CITE THIS PAPER : Rohith, G.V., Bi, Afrin Zainab, Rashmi, K.S., Hamsa , K.R. and Olekar, Jaganath (2018). Economics of crops cultivating in North Eastern Dry Zone of Karnataka. *Internat. Res. J. Agric. Eco. & Stat.,* **9** (1) : 43-48, **DOI : 10.15740/HAS/IRJAES/9.1/43-48.**

INTRODUCTION :

Karnataka is the eighth largest state in the country with geographical area of 19.04 M.ha. The cultivable area is 10.41 M.ha. accounting 54 per cent of the geographical area. Average rainfall is 1,139 mm. The study area of Raichur district is in North-Eastern Dry Zone (NEDZ) with geographical area of 1.76 M ha forming 9.25 per cent of Karnataka area receiving rainfall of 720 mm. About 55 per cent of the rainfall is received during Rabi season. About 71 .2 per cent of the total area in North-Eastern Dry Zone (NEDZ) of Karnataka are under Agriculture. This zone covers parts of Raichur, Gulbarga and Yadgir districts with eleven taluks Manvi, Raichur, Afzalpur, Chitapur, Sedam, Shorapur, Yadgir, Shahpur, Devadurga, Jewargi and Kalaburagi. The soils are deep to very deep black clay in major areas and shallow to medium black in minor pockets.Crop area allocated to different crops by farmers depends upon, inter alia market forces for specific crops dictated by road, rail, vehicular infrastructure, rural-urban influence, availability of water resource, especially groundwater, availability of electricity for pumping groundwater, on farm endowments of the farmers, degree of awareness

and exposure to agricultural technology, access to credit and information, extent of rainfall, temperature and other climatic factors, extent of subsidies received and used (Chandrakanth *et al.,* 2013). However the extent to which the principle of comparative advantage determines or dictates the crop pattern and land use is an economic puzzle. While agro climatic, socio-economic, and biophysical factors rule the cropping pattern.

The cost of cultivation of the crop is total expenditure incurred on various inputs which were used in the production process and also return calculation of the crop, it is being taken as important economic indicator and policy formations related to the farmers. In the cost of cultivation, still some improper notion in the proportion of various expenditure incurred on the labour, bullock, machinery, seeds, water rate in canal, energy cost in pumping in borewell irrigated crops, fertilizer, manure, ppc, etc. in the production process and profitability of the crops. So this study was conducted to analysis the share of different expenditure incurred and profitability of crops in the North Eastern Dry Zone of Karnataka.

MATERIALS AND METHODS :

Raichur district has been chosen in North-Eastern Dry Zone of Karnataka (NEDZ) for field work in two taluks namely Raichur and Manvi which have around 15 per cent each of the area sown in the district. Random sampling method was adopted for the selection of sample farmers. Data were collected from 30 rainfed farmers, 30 farmers who are using groundwater and 30 farmers who are using canal irrigation. Thus total sample size comprised was 90 farmers. The farmers using underground water irrigation was identified based on the criteria that 50 per cent of the total cultivated area was irrigated through underground water. Similar classification was made for the selection of the canal irrigated farmer where in which 50 per cent of irrigated area under total cultivated area is through canal irrigation. Likewise the rainfed farmers were identified if the cultivated area with no source of irrigation is more than 50 per cent of the total cultivated land. Simple tabular analysis technique was used to estimate cost and returns of crops in the North Eastern Dry Zone of Karnataka. The cost of cultivation of crops includes the cost of seeds, fertilizers, manure, human labour (hired, attached and family), animal labour (hired and family), machine labour (hired and family), cost of canal irrigation, (The water rate fixed by the Water Resources Development Organization, Government of Karnataka is Rs. 100 per acre of paddy, and Rs. 35 per acre for semi-arid crops such as cotton , groundnut, sorghum, pulses) according to the Water Resources Development Organization, Bangalore, plant protection chemicals, interest on working capital at 12.5 per cent for the duration of crop, land revenue, taxes, cesses, depreciation on implements and farm buildings. Since the farmers are not paying for electricity in the case of tube (bore) well irrigated crops, the pumping expenditure is estimated (Cost of pumping groundwater = working hours of irrigation pumpset * Horse power of the Irrigation pumpset * 0.75 KWH * Rs. 3.5 per KWH).

RESULTS AND DATA ANALYSIS :

Cotton is one of the important commercial crop of Raichur district in NEDZ of Karnataka, grown under rainfed, borewell and canal irrigated condition. The cost of cultivation of cotton under different situations is worked out and results are presented in the Table 1. Considering the cost of cultivation of cotton across the three situations such as rainfed, borewell and canal irrigation, human labour cost formed around 40 per cent of the cost of cultivation followed by seed cost, fertilizer cost and bullock labour. At overall level, the cost of cultivation analysis found that human labour cost and seed cost were found to be major cost associated with the cultivation of cotton. The results revealed that the human labour cost was higher in canal irrigated cotton cultivation (45.43 %) because of more labour requirement for weeding and harvest compared to borewell irrigated cotton (38.48 %). In contrary, the cost of bullock labour was found higher in rainfed cotton cultivation (11.31 %) followed by borewell (10.10 %) and canal irrigated (8.32 %) cotton cultivation .The seed cost (14.09 %) also found higher with respect to rainfed cotton cultivation due to higher rate of seed requirement. The minimum seed cost was found in canal irrigated cotton cultivation because of assured irrigation which enables the greater germination percentage. Another important cost in cotton cultivation is for plant protection chemicals where it accounts for 5.8 per cent in borewell irrigated cotton followed by canal irrigated cotton cultivation.The highest net returns was found in borewell irrigated cotton (Rs.40442) than canal irrigated cotton (Rs. 33704) and cotton under rainfed (Rs.24424).The benefit cost ratio was found to be higher for borewell irrigated cotton (2.05) followed by canal

irrigated cotton (1.82) and rainfed situations (1.72) due to higher crop yield in borewell irrigated cotton compared to other cotton cultivation conditions(Table 1).

Paddy is most important crop of Raichur district, grown purely under the irrigated (canal and borewell) condition, the costs of cultivation of paddy under both the situations are presented in the Table 2. The cost of cultivation was Rs.45368 under borewell irrigated paddy as against Rs.38004. Net return was Rs. 49577 in case of borewell irrigated paddy, while it was Rs. 44134 under canal irrigated paddy. Among the different cost components, cost of labour was vital one as it had about 63 per cent and 55 per cent share in the total cost of cultivation under canal irrigated and rainfed irrigated paddy cultivation, respectively. At overall level, human labour cost and machine labour cost constitutes major cost incurred which accounts about 60 per cent in both the situations of paddy cultivation. The second most important cost components was machine cost both in canal (19.12%) and borewell irrigated (17.69%) paddy cultivation which is mainly because of higher machine usage for ploughing the land, inter cultivation and threshing followed by fertilizer and human labour cost. The prominent cost associated with borewell irrigated paddy cultivation includes the energy cost for pumping irrigation where it constitutes to an account of 9.06 per cent out of total cost. Since water is assured for cultivation, the water rate (0.6 %) for canal irrigated paddy cultivation *i.e.* 100 Rs. per acre as fixed Water Resources Development Organization, Government of Karnataka. The incurring of energy cost for pumping irrigation of Rs. 4,110 enhanced the total cost to Rs. 45,368 in borewell irrigated paddy cultivation. The total return was found to be higher (Rs. 94,944) in case of borewell irrigated paddy compared to canal irrigated (Rs. 82,138) paddy cultivation. The benefit cost ratio was slightly higher in canal irrigated paddy (2.16) than the canal irrigated paddy (2.09). This imparts there is no significant difference in the benefit cost ration between canal irrigated and borewell irrigated paddy cultivation.

The cost of cultivation was calibrated for the crops being cultivated in the Raichur districts and the results are furnished in the Table 3. The results revealed that human labour cost was found to be the prominent cost associated with cultivation of all crops such as redgram, chickpea, *Bajra*, sorghum and sunflower under rainfed

Table 1: Cost of cultivation of cotton in Raichur district (Rs./ha)(2014-15)

Particulars	Rainfed cotton	Borewell irrigated cotton	Canal irrigated cotton
Human labour (Man days)	14814 (44.05)	15331 (38.48)	18619 (45.43)
Bullock labour (BP days)	3804 (11.31)	4023 (10.10)	3411 (8.32)
Machine labour (hours)	1484 (4.41)	1064 (2.67)	2321 (5.66)
Seed (kg)	4739 (14.09)	5085 (12.76)	4657 (11.36)
Fertilizer (kg)	3943 (11.72)	4858 (12.19)	4775 (11.65)
Manure (tonnes)	286 (0.85)	901 (2.26)	979 (2.39)
Plant protection chemicals	1468 (4.36)	2327 (5.84)	1978 (4.83)
Energy cost for pumping (borewell)/ Water rate (canal irrigation)	-	1779 (4.47)	86 (0.21)
Miscellaneous	892 (2.65)	1380 (3.46)	1100 (2.68)
Interest on working capital	1964	2297 (5.77)	2370 (5.78)
Depreciation	227 (0.67)	770 (1.93)	667 (1.63)
Land revenue and taxes	15 (0.04)	25(0.06)	25(0.06)
Total variable cost	33392 (99.28)	39047 (98.0)	40296 (98.31)
Total fixed cost	242 (0.72)	795 (2.00)	692 (1.69)
Total cost	33633 (100)	39842 (100)	40988 (100)
Main product (Qtl)	13.9	18.8	16.4
Main product value	58057	80284	74692
Gross return	58057	80284	74692
Net return	24424	40442	33704
Returns per rupee of expenditure	1.72	2.05	1.82

Note: Figures in the parentheses are percentage share to the total Rental value of land is not considered for further analysis

Table 2: Cost of cultivation of paddy in Raichur district (Rs./ha) (2014-15)

Particulars	Canal irrigated paddy	Bore-well irrigated paddy
Human labour (Man days)	13392 (35.24)	14224 (31.35)
Bullock labour (BP days)	3308 (8.70)	2817 (6.21)
Machine labour(hours)	7265 (19.12)	8027 (17.69)
Seed (kg)	2301 (6.05)	1864 (4.11)
Fertilizer (kg)	7097 (18.67)	7707 (16.99)
Manure (tonne)	600 (1.58)	653 (1.44)
Plant protection chemicals	1666 (4.38)	1296 (2.86)
Energy cost for pumping (borewell)/ Water rate (canal irrigation)	247 (0.65)	4110 (9.06)
Miscellaneous	1230 (3.24)	1253 (2.86)
Interest on working capital	2460 (6.47)	2622 (5.78)
Depreciation cost	667 (1.76)	770 (1.70)
Land revenue and taxes	25 (0.07)	25 (0.06)
Total variable cost	37312 (98.18)	44572 (98.25)
Total fixed cost	692 (1.8)	795 (1.75)
Total cost	38004 (100)	45368 (100)
Main product (Qtl)	53.6	55.2
By product (tonne)	5	4
Main product value (Rs.)	83888	89310
By product (Rs.)	5710	5634
Total Return (Rs.)	82138	94944
Net return (Rs.)	44134	49577
Returns per rupee of expenditure	2.16	2.09

Note: Figures in the parentheses are percentages to the total Rental value of land is not considered for further analysis

Table 3: Cost of cultivation of crops in Raichur district (Rs./ha) (2014-15)

Particulars	Redgram (RF)	Chickpea (RF)	Sorghum (RF)	Bajra (RF)	Sunflower (RF)	Borewell irrigated ground nut
Human labour (Mandays)	8488 (40.66)	6793 (35.63)	7823 (47.25)	6154 (48.0)	6163 (38.41)	11794 (36.62)
Bullock labour (BP days)	2600 (12.46)	1927 (10.13)	2889 (17.32)	2032 (15.9)	2779 (17.32)	2408 (7.48)
Machine labour(hours)	2493 (11.94)	1729 (9.07)	1699 (10.26)	1531 (12.0)	1250 (7.79)	1945 (6.04)
Seed (kg)	746 (3.57)	3938 (20.65)	544 (3.29)	330 (2.6)	1737 (10.83)	7564 (23.48)
Fertilizer (kg)	2022 (9.69)	1911 (10.02)	1608 (9.71)	1941 (15.1)	2370 (14.77)	2753 (8.55)
Manure (tonne)	459 (2.22)	-	186 (1.12)	0	0 (0.0)	1158 (3.60)
Plant protection chemicals	2230 (10.68)	1563 (8.20)	376 (2.27)	-	309 (1.93)	560 (1.74)
Miscellaneous	381 (1.83)	281 (1.47)	607 (3.67)	311 (2.4)	633 (3.95)	772 (2.40)
Energy cost for pumping (borewell)/ Water rate (canal irrigation)	-	-	-		-	1438 (4.46)
Interest on working capital	1214 (5.82)	756 (3.97)	656 (3.96)	384 (3.0)	635 (3.96)	1266 (3.93)
Depreciation cost	227 (1.09)	154 (0.81)	154 (0.93)	113 (0.9)	154 (0.96)	523 (1.62)
Land revenue and taxes	15 (0.07)	15 (0.08)	15 (0.09)	15 (0.1)	15 (0.09)	25 (0.08)
Total variable cost	20633 (98.84)	18897 (99.11)	16389 (98.98)	12683 (99.0)	15875 (98.95)	31659 (98.30)
Total fixed cost	242 (1.16)	169 (0.89)	169 (1.02)	128 (1.0)	169 (1.05)	548 (1.70)
Total cost	20875 (100)	19066 (100)	16558 (100)	12812 (100)	16044 (100)	32208 (100)
Main product (Qtl)	8.4	9.9	10.9	9.8	6.4	12.8
By product (tonne)	1	1	3	4	-	2.2
Main product value	34078	28750	21056	14994	22083	48640
By product	1171	2081	4590	1553	355	3354
Total return	35249	30831	25646	16547	22438	51990
Net return	14375	11766	9088	3735	6395	19782
Returns per rupee of expenditure	1.68	1.61	1.55	1.29	1.39	1.61

Figures in the parentheses are percentage to the total Rental value of land is not considered for further analysis

situation and ground nut with borewell irrigation. The results indicated that human labour cost, bullock labour cost and machine labour cost were found to be major cost incurred in cereal crops such as sorghum (47.25 %) and *Bajra* (48.0 %). The major costs associated with chickpea and borewell irrigated ground nut cultivation were human labour cost followed by seed cost. The seed cost plays significant role in crops like sunflower (10.83%), chickpea (20.65 %), groundnut (23.48 %) because of higher per unit seed cost. Per hectare cost of cultivation higher in borewell irrigated groundnut (Rs. 32208) because of higher labour cost, seed cost and energy cost for pumping irrigation (Rs.1438 per ha). Per hectare total cost of cultivation in rainfed was found to be highest (Rs. 20,875) for redgram and least for bajra (Rs. 12,812). The highest total returns per hectare in rainfed condition was found in case of redgram (Rs. 35,249) and least in case of *Bajra* (Rs. 16,547). Among the different crops, redgram (1.68) realized the highest net return per rupee cost followed by chickpea (1.61), sorghum (1.61), sunflower (1.39) and borewell irrigated ground nut (1.61). The least returns per rupee cost was observed in and Bajra (1.29) due to lower per unit output price realized for the respective year (Table 3). Similar work related to the present investigation was also carried out by Anonymous (2010); Devi Sita and Ponnarasi (2009).

Conclusion:

In the cost of cultivation of all crops, human labour cost was accounted higher proportion (35-50 %) than other components followed by cost for bullock labour except in paddy. Machine labour cost accounted (20%) after human labour cost in paddy cultivation. Seed cost accounted for 20 per cent of the cost in chickpea, 23 per cent in groundnut, 12 per cent in cotton, 10 per cent in sunflower and 4 per cent in redgram. The energy cost for pumping irrigation accounted was for 5-10 per cent of the cost after the human labour, bullock, machine, fertilizer and seeds in borewell irrigated crops. The highest net returns were realized in paddy with borewell irrigation (Rs.49577/ha) followed by paddy with canal irrigation (Rs.44134 /ha), cotton with borewell irrigation (Rs.40442 /ha) compared to other crops in Raichur district. The benefit cost ratio for paddy cultivation was found to be higher (2.16) in case of canal irrigated due to less cost incurred (Rs. 38,004) compared to borewell irrigated paddy cultivation (Rs. 45,368) due to more energy cost for irrigation. The benefit cost ratio was found to be higher for borewell irrigated cotton (2.05) followed by canal irrigated cotton (1.82) due to higher crop yield in borewell irrigated cotton compared to other cotton cultivation conditions. In case of rainfed situation, higher net returns were realized in rainfed cotton Rs. 24424/ha followed by redgram Rs.14374 /ha and chickpea Rs.11766 /ha. The most favourable returns per rupee cost was found in redgram followed by chickpea and groundnut ranging from 1.68 to 1.61. The least returns per rupee cost was observed in and bajra (1.29) due to lower per unit output price realized for the respective year.

Authors' affiliations:
Afrin Zainab Bi, K.S. Rashmi, K.R. Hamsa and Jaganath Olekar, Department of Agricultural Economics, University of Agricultural Sciences, **Bengaluru (Karnataka) India**

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