



ISSN (E): 2277- 7695
 ISSN (P): 2349-8242
 NAAS Rating: 5.23
 TPI 2022; SP-11(2): 1910-1912
 © 2022 TPI
www.thepharmajournal.com
 Received: 28-12-2021
 Accepted: 30-01-2022

Omesh Thakur
 College of Agriculture &
 Research Station, IGKV,
 Raipur, Chhattisgarh, India

Dwarikadish Churpal
 College of Agriculture &
 Research Station, IGKV,
 Raipur, Chhattisgarh, India

Cost-benefits analysis of water chestnut cultivation in Gariaband district of Chhattisgarh

Omesh Thakur and Dwarikadish Churpal

Abstract

The study entitled Cost-Benefits analysis of Water chestnut Cultivation in Gariaband District of Chhattisgarh. The study was confined to Gariaband district of Chhattisgarh state for the year 2021-22. It compiled and processing of primary as well as secondary data, which were obtained from well structured interview schedule and by various government published sources. The study revealed that the farmers of the concern district are getting a good source of income by cultivation of Water chestnut. Water chestnut (*Trapa natans*) is an aquatic annual herb, and its fresh, edible fruit is a valuable crop. *Trapa natans* is a highly competitive floating leaves aquatic plant that forms dense, mats over the water surface such as ponds and lakes. They are nutritious as well as easily digestible. These are useful for patient's sufferings from Jaundice, abdominal pain diarrhoea. From the empirical analysis it was found that on an average cost of cultivation rupees per ha of water chestnut was estimated to be Rs. 72543.18 and Benefit –cost ratio was 2.07. The average cost of production of water chestnut was Rs. 740.24 per quintal.

Keywords: Cost-benefits analysis, water chestnut cultivation, *Trapa natans*

Introduction

Water chestnut is one of the importance minor fruit crops grown in India. Water chestnuts (*Trapa natans*) belong to the monogeneric family Trapaceae. It is an annual, floating leaves aquatic plant found in freshwater wetlands, ponds and sluggish reaches of rivers in India particularly in M.P, U.P, Bihar and some parts of C.G. The fruits are generally consumed as fresh and also used after boiling. Water chestnut is also known as singhara or water caltrops. The ideal environment for the cultivation of this crop is mainly during kharif season in the cropping year. (Roy Chowdhury *et al.*, 2006) ^[2].

Water chestnut grows at the root of marshes & is small, rounded corn with crunchy white flesh. It is eaten raw, boiled & grilled after the outer skin is removed. With the water bodies shrinking, its cultivation is on the decline but on the contrary, the same being sold after processing. WC possess different medicinal properties such as anti microbial, analgesic, anti-inflammatory and anti-diabetic (Das *et al.*, 2011) ^[1]. Due to its aquatic nature, crop has resurrection ability despite exposure to brief submergence or flash flood. The crop gradually maintains itself with the rising of water level to keep its leaf crown a float (Roy Chowdhury *et al.*, 2003) ^[3].

Material and Methodology

The study was confined to Gariaband district of Chhattisgarh state because Water chestnut is grown in the *Kharif* season. From the 5 block of the district namely Gariaband, Fingeshwar, Mainpur, Chhura and Deobhog. Fingeshwar block was selected purposively due to availability of cropping area. Water chestnut growers were identified and farmers were selected on the basis of the availability of the secondary data provided by the Department of Agriculture. The selected group represented the marginal and small landholding farm. The interview schedule and questionnaires were developed to take needed primary data. The simple average and percentage statistical tools were applied to analyze the data and the outcome of the study which are followings

$$\text{Input output ratio} = \frac{\text{Gross Income}}{\text{Total Cost}}$$

$$\text{Benefit Cost ratio} = \frac{\text{Net Income}}{\text{Total Cost}}$$

Corresponding Author
Omesh Thakur
 College of Agriculture &
 Research Station, IGKV,
 Raipur, Chhattisgarh, India

Result and Discussion

Input materials cost for cultivation of water chestnut

The input material cost for cultivation of water chestnut was estimated in Rs./ha, which is presented in table 1. It explains that the input materials cost was Rs./ha 30935.52. The cost for purchasing seed was noticed to be highest Rs./ha 13500 and which contributed the share of 43.64 per cent to the total input material cost followed by plant protection chemicals (20.85%), fertilizer cost (18.17%) interest of working capital (10.71%), farm yard manure (6.63%), respectively. It was also noticeable that the yield of water chestnut was found 98 q/ha.

Table 1: Input material cost of cultivation of water chestnut

S. No.	Particular	Farm Size (In Ha.)	Share (%)
	Yield (q/ha)	98 qt	
A	Input material cost		
1	Seed	13500	43.64
2	Manures	2050	6.63
B	Fertilizer		
1	Urea	651	2.10
2	SSP	3450	11.15
3	Potash	1520	4.91
	Total of fertilizer cost	5621	18.17
C	Plant protection chemicals	6450	20.85
D	Interest of working capital	3314.52	10.71
	Total	30935.52	100

Human labour and Power cost for cultivation of water chestnut

Power cost included human as well as machinery labour used in the production process. This is included in the table 2. It is important to account the total cost Rs. 24113.31 and Rs. 15466.6 for total hired labour and total family labour respectively on labour use per hectare for cultivation of water chestnut. The hired labour cost was registered as Rs. Per ha 22018.9 and input value of family labour cost was Rs. Per ha 14499.9. The share of hired and family labour cost to the total labour cost was calculated as 60.29% and 39.71%, respectively. The total labour cost was incurred maximum in the harvesting of the nut and was 35.82 per cent followed by transportation (31.21%), transplanting (11.40%) field preparation (5.29%), plant protection & intercultural operation (2.44%), manure/fertilizer application (2.04%) and irrigation (1.63%) respectively. The share of family and hired

labour cost to the total cost of harvesting were 40.91 and 59.09 per cent. However, the share of family and hired labour cost to total cost of transplanting were 79.13 and 20.87 per cent respectively. It indicates that hired labour was participated more in the major operation of water chestnut cultivation as compare that of family labour. From the total cost of cultivation of water chestnut machinery power cost was contributed 7.73 per cent and accounted Rs. Per ha 3061.09.

Table 2: Human labour and machinery cost in cultivation of water chestnut (Rs per ha.)

S. no.	Operation	Farm Size		Total cost (Rs.)
		Family labour	Hired labour	
1	Field preparation	1450 (9.38)	644.444 (2.67)	2094.44 (5.29)
2	Manure/fertilizer application	644.44 (4.17)	161.11 (0.67)	805.55 (2.04)
3	Transplanting	1933.32 (12.50)	2577.76 (10.69)	4511.08 (11.40)
4	Intercultural operation	644.44 (4.17)	322.22 (1.34)	966.66 (2.44)
5	Irrigation	644.44 (4.17)	0 (0.00)	644.44 (1.63)
6	Plant protection	805.55 (5.21)	161.11 (0.67)	966.66 (2.44)
7	Harvesting	5799.96 (37.50)	8377.72 (34.74)	14177.7 (35.82)
8	Transporting	2577.76 (16.67)	9774.54 (40.54)	12352.3 (31.21)
9	Sub total	14499.9 (93.75)	22018.9 (91.31)	36518.8 (92.27)
10	Machinery labour	966.66 (6.25)	2094.43 (8.69)	3061.09 (7.73)
11	Total labour	15466.6 (100)	24113.3 (100)	39579.9 (100)

Fixed cost for cultivation of water chestnut

The fixed cost comprised of land revenue & taxes, depreciation on land, building and interest on fixed capital, which were worked out in Rs. Per ha and given in table 3. The fixed cost incurred on cultivation of water chestnut accounted to be Rs. Per ha 2027.76 depreciation on land and building was found to be highest, which shared 61.64 per cent to the total fixed cost followed by land revenue and taxes (27.64%), and interest on fixed capital (10.71%).

Table 3: Fixed cost for cultivation of water chestnut

S. no.	Fixed cost	Farm size
1	Land revenue and taxes	560.50 (27.64)
2	Depreciation on land and building	1250 (61.64)
3	Interest on fixed capital@18	217.26 (10.71)
	Total fixed cost	2027.76 (100)

Costs and Returns in cultivation of water chestnut

The total cost in cultivation of water chestnut is given in table 4. The total cost of cultivation of water chestnut was accounted Rs. per ha 72543.18, which shared of Input-materials cost by 42.64% Labour use cost 54.56% and fixed cost 2.80% respectively. On an Gross income in water chestnut cultivation was Rs. per ha 222950. The net income

was received Rs./ha 150406.82. The return on per rupee investment was (1:3.07). At overall level, the cost of production per quintal of water chestnut was registered to be Rs. 740.24 per quintal.

Table 4: Cost and return of cultivation of water chestnut

S. no.	Particulars	Farm size
A		
Total costs on		
1	Input- materials cost	30935.52 (42.64)
2	Labour use cost	39579.9 (54.56)
3	Fixed cost	2027.76 (2.80)
	Total cost	72543.18 (100)
B		
Returns		
1	Gross income	222950
2	Net income	150406.82
3	Input-Output ratio	1: 3.07
4	Benefit-Cost ratio	2.07
5	Cost per quintal of production	740.24

Conclusions

The Net income, Input – output ratio and Benefit cost ratio were worked out in Rs/ha. and given in table 4. From the above data it is found that the Net income was Rs. 150406.82. So the input – output ratio was 1:3.07 and the farmers of the water chestnut benefited with Rs. 2:07 in per rupee investment on Water chestnut cultivation.

Acknowledgement

With sincere respect & gratitude, we would like to thank the Dean, College of Agriculture & Research Station, Gariaband (C.G.) for providing facilities, support & valueable guidance for the research work.

References

1. Das SN, Ray B, Mahapatra SK, Pothal RK. Microbiological potentiality of *Ipomoea sepiaria* Roxb (Convolvulaceae). I.J.R.P.B.S. 2011;2(2):500-502.
2. Roy Chowdhury S, Kumar Ashwani, Sahoo N, Kundu DK, Anand PSB, Reddy GP. Growth environment and production physiology of water chestnut under shallow waterlogged condition and swamp taro in marshy land. Research Bulletin No. 37, Water Technology Centre for Eastern Region (Indian Council of Agricultural Research), Bhubaneswar, Odisha, 2006, 25p.
3. Roy Chowdhury S, Sahoo N, Verma HN. Growth behavior and yield of five water chestnut varieties under waterlogged condition. Indian Journal of Plant Physiology. 2003;8:369-371.