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Economics and Employment Generating Potential of Gherkin Cultivation in Karnataka

Tanveer Ahmed*[1], B.V.C. Reddy[2], Tanveer Ahmed Khan[3],G. Govindaraj[4] and Sudheesh Kulkarni[5]

[1]UHS, Bagalkot, Karnataka, India.
[2]Department of Agricultural Economics, UAS, Bangalore, Karnataka, India.
[3]NIVEDI, Hebbal, Bangalore, India.
[4]Department of Agricultural Economics, PDADMAS, Hebbal, Bangalore, India.
[5]Dept of Spices and Plantation Crops, UHS, Bagalkot, India.

*Correspondence author: tanveer.ahmed@uhsbagalkot.edu.in

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ABSTRACT

Gherkin (*Cucumis anguria* L.) is popularly known as "pickling cucumber" belongs to the family Cucurbitaceae. The present study was conducted to assess the level of inputs use, economics and employment generating potential of gherkin cultivation in Karnataka state. Multi-stage sampling design was followed to collect primary data from Gherkin growers. Descriptive statisticsand Economic indicators like gross return,net return, B:C ratio and breakeven yield were assessed. The results revealed that, there was an inverse relationship between size of the gherkin area and output per acre. The champion farmers realized higher yields and income compared to other farmers and it was mainly due to better soil dressing and adopting appropriate cultural practices(crop rotation and border crop). Champion farmers realized positive and higher gross profit per acre (₹ 20490), whereas medium farmers realized (₹ 2076). The Low yield farmer incurred loss to a tune of ₹ 10427 per acre. The loss among low yield farmers could be attributed to the reduced crop cycle (75.33 days), harvesting days (35.63 days) and low yield (2511.20 kg/ac). The rate of return per rupee of expenditure was highest among champion farmers (1.41), followed by medium (1.03) and low yield low yield farmers (0.67).The employment generation especially for harvesting was highest among champion farmers (274 mandays) followed by medium (110 mandays) and low yield farmers (71 mandays).From the results it could be inferred that, the gherkin cultivation is not profitable always. The crop requires intensive management throughout the year and any divergence in management practices results in the huge loss to the farmers and it is difficult even to recover the variable cost of cultivation. Hence, appropriate training should be imparted to increase yield and income.

Keywords: Gherkin crop, champion farmers and management

Gherkin (*Cucumis anguria* L.) is popularly known as "pickling cucumber" or small cucumber among farmers and belongs to the family Cucurbitaceae. It is a slender, trailing, monoecious annual herb with stiff hairs all over the plant. Stem is angled with small simple tendrils. Fruits are oval to oblong, 4-5 cm long, covered with long sharp glistening hairs on warty pimples and rind is pale green turning to ivory on ripening, Flesh is greenish. Seeds are smooth and white coloured measuring 3-5 mm long (Perseglove, 1968). Cucumber is indigenous to India (Walter, 1979) and cultivated since three thousand years. In trade parlance, the term "gherkin" refers to any immature cucumber fruit, usually pickled.

Gherkin crop can be grown throughout the year in all seasons. It provides employment opportunities to the family members of both the land holders and landless labourers in rural areas. In Karnataka the gherkin crop is cultivated in Kolar, Bangalore, Tumkur, Hassan, Chitradurga, Davangere, Bellary,

Haveri, Hubli-Dharwad and Bagalkote.In Karnataka state gherkin crop is completely cultivated under "contract farming". Incontract farming, the contracting firm supplies all inputs including technical aspects of cultivation and farmer contributes his land and labour.The gherkin crop needs intense care and management throughout the crop cycle and improper managementlead to the huge loss to the farmers. Hence, profits in gherkin cultivation are positively related to the level of management. Keeping these backgrounds in focus, the present study was undertaken (i) to assess the level of inputs input use byvarious category of farmers (ii) to assess the economics of gherkin cultivation under real farm situations (iii) to assess the employment generating potential of gherkin cultivation in the study area.

Materials and Methods

Multi-stage sampling design was followed in the present study. In the first stage, Karnataka state was purposefully selected. In the second stage, among the important gherkin growing districts Bellary and Hassan districts were selected randomly. In the third stage, the list of farmers growing gherkin was collected from the export firms since gherkin was mainly cultivated under contract farming with the export firms. In the final stage about 79 gherkin cultivating farmers were randomly selected for the detailed investigation. These farmers were post classified into champion farmers (high yielding), medium and low yielding farmers based on the following criteria

1. >Mean + 0.5sd : champion farmer
2. <Mean – 0.5sd: low yield farmer
3. Mean + 0.5sd to Mean – 0.5sd: medium yield farmer

The data was collected through personal interview using the pre-tested questionnaire developed for the purpose. Descriptive statistics was used to assess the level of inputs use by various category of farmers and one way ANOVA or one way analysis of variance was employed to study the significance difference between the groups. For assessing the economics of gherkin production, both variable and fixed costs were considered. The gross profit was worked out as the difference between the total income received from gherkin production and total costs including the interest on the variable and fixed costs which is considered as the opportunity cost. Variable costwas calculated based on prevailing rates of all inputsused in the gherkin production. The value of family labour used in the production of gherkin was estimated using wage rates prevailing at the time of data collection.

Results and Discussion

The gherkin crop cultivation is high input intensive especially labour and fertilizer, hence, majority of the export firms will have contract with individual farmers for less than 1.0-1.5 acre. Hence, in the present study to assess the economics and employment generating potential of gherkin crop, the farmers were post classified into champion, medium and low yield farmers based on mean and standard deviation of productivity levels.The average size of gherkin area under real farm situations was highest among low yield farmers (1.06 acre) followed by medium yield (0.73 acre) and champion farmers (0.61 acre). It showed that there was an inverse relationship between size of the gherkin area and output per acre. That is, farmers who had smaller area under gherkin realized higher productivity per acre and this could be attributed to the intensive cultivation and better crop management practices in small area cultivation.The post classification of farmers revealed that around48 percent were medium yield farmer followed by low yield farmer (30 %) and champion farmers (22 %)(Table 1). The overall average yield of the gherkin crop was 4920.85 kg per in the study area.

Table 1. Classification of the gherkin growers based on yield

Category	Average area (acre)	Yield (kg/acre)	No. Farmers	Percent to the Total
Champion Farmer	0.61	> 6363	17	21.52
Medium Yield Farmer	0.73	3480 to 6362	38	48.10
Low Yield Farmers	1.06	< 3479	24	30.38
Total			79	
Over all mean		4920.85		
SD		2824.36		

Use of inputs including nutrients optimally is crucial for increasing the productivity of gherkin crop. Inputs used for soil dressing wereFYMand neemcake in the study area (Table 2). The champion farmers applied higher quantity of FYM (10.32 tons / ac) and neem cake (59.07 kg / ac) followed by medium yielding farmer (7.98 tons / ac and 29.46 kg / ac) and low yield farmers (7.98 tons / ac and 29.46 kg / ac) (Table 2).Thus, it could be inferred that due to better soil dressing by champion farmers, yields might have increased on their farms substantially.

Table 2. Input Management - Soil Dressing

Input	Champion Farmer	Medium Farmer	Low Farmer	Pooled	F-Value
FYM (Tons/Acre)	10.32	7.63	6.88	7.98	2.85**
Neem cake (Kg/ Acre)	59.07	56.01	29.46	48.60	1.86NS

** significant at 10 per cent level of significance, NS=Non-significant

Optimum seed rate is crucial in gherkin crop to maintain recommended level of plant population. The survey results revealed that all the category of farmers were using higher seed rate as against the recommended seed rate of 8000 seeds per acre. However, low yield farmer used higher seed rate compared to other farmers causing crowding out and thereby low yields. On the contrary, champion farmers used higher dosage of major nutrientslikenitrogen, phosphorous and potash and minor nutrient like magnesium per acre followed by medium and low yield farmers (Table 3). Similarly with respect to number of splits of fertilizer application, champion farmer applied fertilizers in more number of splits (7.59) than low yield farmers.

Table 4. Input Management – Plant Protection

Input	Champion Farmer	Medium Farmer	Low yield Farmer	Pooled	F-Value
No. of sprays (No. / ac)	9.24	8.21	8.75	8.59	1.35NS
Cost of PPC* (₹/ac)	3488.77	2070.41	1880.58	2317.96	9.85*

*significant at 5 per cent level of significance, NS=Non-significant

Here one way analysis of variance reveals that average application of nitrogen, phosphorous and potash were significantly differ at 5 per cent level of significance among the different group of farmers, which indicates that along with the organic manures inorganic manures like N, P and K application also plays a significant role in realizing the higher yield and differentiating champion farmers from other farmers.

Table 3. Input Management - Seetds and Major Nutrients

Input	Recommendation by Nunhems	Champion Farmer	Medium Farmer	Low yield Farmer	Pooled	F-Value
Seed (No./ac)	8000	9759.80	9760.34	9878.47	9796.11	1.065NS
Fertilizer Splits (No./ac)	-	7.59	6.50	6.79	6.82	1.48NS
Nitrogen (Kg/ac)	90	117.02	84.72	76.70	89.23	6.13*
Phosphorous (Kg/ac)	60	122.53	87.75	79.75	92.80	3.7*
Potash (Kg/ac)	150	156.76	116.49	101.01	120.45	4.695*
Mg (Kg/ac)	6.72	0.11	0.09	0.07	0.09	1.25NS

*significant at 5 per cent level of significance, NS=Non-significant

Gherkin is also prone to pests and disease attacks which affect gherkin yield significantly. The expenditure pattern on plant protection revealed that the champion farmers incurred an expenditure of ₹ 3488.7 per acre followed by medium (₹2070.4) and low yield farmer (₹1880.6). The higher cost among champion farmers was due to more number (9.24) of plant protection sprays and also use of costly chemical/molecules (Table 4).The mean value of cost of PPC was significantly differing at 5 per cent level of significance between the different groups of farmers.

Timely cultural operations including weeding and irrigations are necessary for longer crop cycle and good harvest. From table 5 it is evident that, champion farmers were adopting timely and intensively cultural practices such as, staking, weed control, irrigations, border crop and crop rotation. About 94 percent of champion farmers were practicing border crop where as it was less in medium and low yielding farmers. Similarly, champion farmers undertook weed control more number of times than other category of farmers. The number of irrigations was also highest among champion farmers vis-à-vis the low yield category farmers.The right irrigation schedule coupled with application of high nutrients might have led to improved photo synthetic ability and dry matter production of the crop which in turn resulted in realizing higher yield.

The champion farmers yield was around 8997 kg per acre, whereas medium farmers and low yield farmers harvested 4619 kg and 2511 kg per acre, respectively (Table 6). Thus, it could be inferred that due to better input management, timely and intensive cultural operations, champion farmers were able to realize highest yields.

Table 6. Gherkin Yield (kg/ac)

Category of farmer	Yield (kg/ac)	F-Value
Champion Farmer	8997.40	72.28*
Medium Farmer	4619.03	
Low Farmer	2511.20	
Average	4920.85	

* significant at 5 per cent level of significance

Labour is an important input in the gherkin production especially for timely harvest of the crop. It is interesting to note that as number of harvesting days increased, the total yield realized by the farmers also increased substantially as shown in table 7. In the case of champion farmers due to extended crop cycle (81.47 days) and harvesting days (47.53), these farmers realized higher yield per day (189.30 kg/ac) and higher total yield (8997.40 kg/ac) as compared other category of farmers. The total employment of labour for harvesting of the crop was highest among champion farmers (274 mandays) followed by average (113) and low yield farmers (112). The female labour use was higher vis-à-vis male labour in all the category of farmers indicating employment equity. Thus, it could be inferred that the crop is not only higher income generating crop but also it generates higher employment especially for the women. The one way analysis of variance reveals that harvesting days, labour for harvest, yield per day, employment of men and women labour were significantly differ at 5 per cent level of significance among the different group of farmers, which infers that as a result of better management of crop by the champion farmers they are enjoying higher number harvesting days and ensuing the higher yield per acrewhen compare to other groups of farmers.

Table 5. Cultural operations

Input	Champion Farmer	Medium Farmer	Low Farmer	Average	F-Value
Crop Rotation (Percent of farmers)	100.00	97.00	70.83	92.10	1.53NS
Border crop (Percent of farmers)	94.00	71.00	75.00	77.00	1.83NS
Staking (D A S)	23.00	23.89	23.96	23.72	1.45NS
Weed control (No. of times)	3.18	2.87	2.83	2.92	1.42NS
Irrigation (No. of times)	50.06	39.47	39.71	41.82	2.99**
Irrigation interval (Days)	1.63	2.00	1.90	1.89	2.65**

**significant at 10 per cent level of significance, NS=Non-significant

Table 7. Gherkin Yield and Labour usage Pattern

Particulars	Champion Farmer	Medium Farmer	Low Farmer	Average	F-Value
Crop cycle (Days)	81.47	80.05	75.33	78.92	1.94NS
Harvesting days (Days)	47.53	42.18	35.63	41.34	7.86*
Labour for harvesting (Mandays)	273.68	190.92	112.93	185.04	21.29*
Yield per day (Kg)	189.30	109.51	70.48	119.03	31.00*
Men Labour (No.)	108.07	76.00	59.92	78.02	11.55*
Women Labour (No.)	347.00	261.37	173.60	253.13	16.98*
Bullock Pair (No.)	11.42	9.22	8.79	9.57	1.15NS

*significant at 5 per cent level of significance, NS=Non-significant

Table 8. Economics of Gherkin production (₹/ac)

	Particulars	Champion Farmer	Percent	Medium Farmer	Percent	Low Farmer	Per cent	Total / Average	Per cent
	Variable cost								
1.	Seeds	3220.74	6.49	3601.67	9.09	3259.90	10.37	3232.72	8.28
2.	Nutrients	7073.57	14.25	5060.23	12.77	4401.18	14.00	5293.26	13.57
3.	FYM	3277.45	6.60	3112.28	7.85	3038.84	9.67	3125.51	8.01
4.	Neem Cake	348.50	0.70	330.47	0.83	173.79	0.55	286.75	0.73
5.	PPC	3488.77	7.03	2185.97	5.52	1880.58	5.98	2317.96	5.94
6.	Border Crop	114.81	0.23	52.59	0.13	40.33	0.13	62.25	0.16
7.	Staking	5454.06	10.99	4386.62	11.07	2696.23	8.58	4102.79	10.51
8.	Labour Cost	20415.61	41.14	15397.27	38.86	11065.17	35.21	15150.54	38.83
9.	Miscellaneous	89.41	0.18	6.58	0.02	8.08	0.03	24.86	0.06
10.	Interest on working capital	3043.81	6.13	2389.34	6.03	1859.49	5.92	2351.77	6.03
	Sub Total (TVC)	46526.73	93.75	36523.04	92.17	28423.59	90.44	35948.41	92.13
	Fixed Cost								
1.	Land revenue	18.00	0.04	16.24	0.04	17.50	0.06	17.00	0.04
2.	Depreciation charges	875.00	1.76	838.32	2.12	689.50	2.19	801.00	2.05
3.	Rental value	1876.00	3.78	1914.71	4.83	1976.00	6.29	1925.00	4.93
4.	Interest on fixed capital	332.28	0.67	332.31	0.84	321.96	1.02	329.16	0.84
	Sub total (TFC)	3101.28	6.25	3101.58	7.83	3004.96	9.56	3072.16	7.87
C.	Total cost (A+B)	49628.01	100.00	39624.62	100.00	31428.55	100.00	39020.57	100.00
D.	Returns								
	Gross return	70118.30		40805.29		21001.49		41096.81	
E.	Net returns	20490.29		1180.69		-10427.06		2076.24	
	B:C ratio	1.41			1.03	0.67		1.05	
	Average Price	8.11			8.82	8.46		8.56	
G.	Breakeven Yield (Kg/ac)	5361.64		3968.21		3139.96		3924.84	

The economics of gherkin cultivation revealed that, the total cost incurred per acre was ₹49628,₹39625 and 31429 by champion, medium and large category of farmers. The variable cost account for more than 90%indicating the need of high working capital in gherkin cultivation. Among various variable cost components, labour formed the major cost accounting for more than 35 per cent among all the

category of farmers. The next important cost item was nutrients, which ranged between 14 and 14.25 per cent. This result is consisted with Baliyan *et al.*, 1998 they reported in their study on costs and returns in sugarcane production that the share of variable cost was 60.77 per cent in total cost of production.

The gross income obtained by champion, medium and low yield farmer was ₹ 70118, ₹ 40805 and ₹ 21001 per acre, respectively. The differential income levels across the category of farmers could be attributed not only to the higher yield but also timely harvesting of premium quality gherkins. Champion farmers and medium yield farmers realized positive and higher gross profit whereas low yield farmers incurred loss to a tune of ₹ 10427 per acre in gherkin cultivation. The loss among low yield farmers could be attributed to the reduced crop cycle, (75.33 days), harvesting days (35.63 days) and total yield (2511.20 kg/ac). The rate of return per rupee of expenditure was highest among champion farmers (1.41), followed by medium (1.03) and low yield farmers (0.67). The break even yield for entire sample was 3924.84 kg per acre, that is, farmers must realize this much of minimum yield to recover their cost and any yield above this level will ensure profit to farmers.

Conclusion

From this study it could be inferred that gherkin crop is not profitable always. The gherkincrop required intensive management throughout the year and any divergencein management practices might result in the huge loss and it might be difficult even to recover the variable cost incurred by the farmer. The employment generating potential was high in gherkin cultivation and hence, in areas where unemployment is a recurrent problem, the cultivation gherkin might reduce its severity. Besides improving the income of different stakeholders involved in gherkin cultivation, it helps in augmenting foreign exchange earnings and also promotes investments in processing units intended for export of gherkins.

References

Baliyan, SP, Bhogal, TS and Archana, K. 1998. A study of costs and returns in sugarcane production vis-à-vis its competing crops in Muzaffarnagar district, Western Uttar Pradesh. Agri. *Situation in India*, **55**(4): 209-214.

Beharell, B. 1981. Farm size, labour absorption and soil fertility in agricultural development-some methodological issues. *Indian J. of Agr. Econ.* **36**(3):56.

Dhongade and Dangat, 1985. Cost and income structure of farm business in Sina Command area. *Progressive Farmer*, **17**(2): 54-59.

Perseglove, JW. 1968. Tropical crops, Dicotyledens-*I.* Longmans Green and Co. Ltd.: 109-110.

Walter, ES, 1979. In vegetable growing hand book. The AVI Publishing Company ING: 194-198.