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Short communication

Optimal use of resources in ginger cultivation – A comparative study on paddy fields and upland situations

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Ginger is a tropical plant originated in South Asia. The name 'Zingiber' is derived from a Sanskrit word 'Sringabera' meaning 'horn shaped' was brought to Mediterranean region from India by traders not later than first century A.D. The Arabs took ginger to east Africa in 13th century AD and the Portugese later carried to west Africa, where it established as a commercial crop. Ginger has been one of the most economically viable crop both under high elevations and plains of India (Gaikwad *et al.*, 1; Kanjlal *et al.*, 2; Korikanthimath *et al.*, 5, Nair *et al.*, 6). In South India, though ginger cultivation was confined mostly to Kerala state in the earlier years, it is making fast inroads in the paddy fields of Karnataka for the last 8-10 years (Korikanthimath and Govardhan Rao, 4). It can be successfully cultivated on the uplands (locally called - Bane/open and vacant areas) where there is adequate natural drainage specially on hill and hilly slopes, while it needs a perfect drainage system in paddy fields.

In the recent years, right in Coorg district of Karnataka, nearly 4,000 ha of paddy land is converted for cultivation of ginger (Korikanthimath and Govardhan Rao, 3) as it is found to be economically more viable compared to the cultivation of paddy. Since, no published information is available on the comparative performance of ginger with regard to optimality in the usage of resources, a field investigation was taken up in Coorg district, Karnataka to collect information on the ginger cultivation in two selected situations - paddy fields (low lying areas) and upland situations from 15 farmers representing from each of the two situations accounting to a total sample size of 30 farmers to study a comparative optimality to economise the yield/returns.

The normal spacing adopted by the farmers in flat/gentle sloppy lands is 22.5 cm × 22.5 cm with four lines in each bed whereas the spacing adopted in the paddy fields for ginger is 30 cm × 30 cm. To analyse the resource optimality in ginger cultivation, the data was collected from 15 farmers from each of the two selected situations. All these farmers were interviewed randomly with the help of well structured schedules to elicit the information on cash inputs in ginger cultivation with respect to yield, extent of resource use and price realised etc. For evaluating the resource productivities, Cobb-Douglas type of production function was employed to the farm level data with a view to determine the extent to which the resources explains the variability in its yield/returns. Thereby an attempt is made to draw distinction of optimal level of use of resources in two different situations *viz.,* low lying (paddy field) and upland areas. After estimating the marginal value product (MVP) of each cash input, it is compared with its marginal factor cost (MFC). Marginal factor cost (MFC) for all the inputs has been considered as one rupee since the regression function is run for the farm level data in the value terms. To arrive at a decision of comparative view on the extent to which various resources used in the production explains the variability in its yield/returns.

It was observed that for both situations (paddy fields and upland areas), seed use and plant protection measures found to exert a greater influence on the returns and provide further scope for increased use of the same enabling an optimal level of yield by using optimum level of resources to an extent of Rs. 40,895.52 and Rs. 52,477.24 (seed value) and Rs. 3151.12 and Rs. 2690.98 (plant protection measures value per ha) in the respective paddy field and upland situations (Tables 1 & 2). Apart from these two inputs irrigation in paddy fields (low lying areas) and manures in upland situations with a production elastivity of 0.18 and -1.27 found to bear a positive and negatively significant influence on the yield from the respective inputs. This has resulted in greater scope for increased level resources use in seed (+ Rs.13,448.86 and Rs. 26,369.16/ha), plant protection measures (+ Rs. 480.68 and Rs. 176.05/ha) and mulching (+ Rs. 95.00 and Rs. 130.36/ha) in the respective situations while a decline in the resources use was stressed upon manures by Rs. 597.08 and Rs. 1773.42/ha and fertilizers by Rs. 79.10 and Rs. 506.16/ha in the respective situations so as to get an optimum level of

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Table 1. Optimality in the use of resources in ginger cultivation in low lying (paddy fields) areas.

Sl. No.	Input	Existing mean level of resource use (Rs.)	Regression coefficient (bi)	Optimum level of resource use (Rs.)	Difference in existing to optimum resource use (Rs.)
1.	Seed	27446.66	1.22**	40,895.52	+13,448.86
2.	Manures	6634.24	-0.09	6,037.16	-597.08
3.	Fertilizers	1130.03	-0.07	1,050.93	-79.10
4.	Plant protection measures	2670.44	0.18**	3,151.12	+480.68
5.	Irrigation	387.61	-0.55**	213.19	-174.42
6.	Mulching	678.58	0.14	773.58	+95.00
7.	Labour	37421.47	0.11	41,537.836	+4,116.36

Y = Rs. 2,65,667.29.

Note: * Significant at 5% level of significance.

** Significant at 1% level of significance.

Student 't' test was employed to test the significance of regression coefficients.

Table 2. Optimality in the use of resources in ginger cultivation in upland areas.

Sl. No.	Input	Existing mean level of resource use (Rs.)	Regression coefficient (bi)	Optimum level of resource use (Rs.)	Difference in existing to optimum resource use (Rs.)
1.	Seed	26108.08	2.01 **	52477.24	+ 26369.16
2.	Manures	6568.23	-1.27*	4794.81	-1773.42
3.	Fertilizers	1012.32	-0.50	506.16	-506.16
4.	Plant protection measures	2514.93	1.07*	2690.98	+ 176.05
5.	Irrigation	376.15	0.59	598.08	+221.93
6.	Mulching	566.80	0.23	697.16	+130.36
7.	Labour	37049.12	-1.07	34455.68	- 2593.44

Y = Rs. 1,285,027.45.

Note: * Significant at 5% level of significance.

** Significant at 1% level of significance.

Student 't' test was employed to test the significance of regression coefficients.

output. Hence, from this comparative efficiency in the ginger cultivation on different situations as per the findings shows that on the whole most of the resources used in ginger production bear a significant influence on the yield and provides a greater scope for their increased use on both the situations. Still by and large, upland situations has an upper hand over the paddy field situations for intensification in the use of such work is carried out earlier. It was also evident that about 99 per cent of the variation in the yield was due to the variables included in the production of ginger while only 85 per cent of influence on the output in the production was due to the various inputs used in the production in case of upland situations. This function was found to be significant (F test). Ultimately, this study draws the comparative optimal utilisation pattern of the resources in the two different situations and thereby to provide opportunities for the farmers to decide upon intensification of the selected resources to realise optimum profits.

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