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Identification of Spice Based Cropping Sequences for Alluvial Plains of West Bengal

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Abstract

An investigation was carried out to assess the yield and quality of different spices to identify suitable spice based sequence under eight cropping sequences like T_1—Garlic-mint-coriander (leaf), T_2—Black cumin-ginger, T_3—Fenugreek-turmeric, T_4—Coriander-ginger, T_5—Capsicum-chilli, T_6—Onion (seed)-turmeric, T_7—Garlic-chilli, T_8—Coriander-mint-coriander (leaf) in the alluvial soils of West Bengal. The growth data, yield and quality have been presented crop wise. Benefit : cost ratio indicated highest value (5.16) with capsicum-chilli sequence and lowest value with (0.49) black cumin-ginger. The benefit : cost ratio was in the order as $T_5>T_7>T_1>T_8>T_6>T_3>T_4>T_2$.
Key words : Spice bassed, Cropping sequence, Capsicum-chilli sequence.

Spices can advantageously be grown by the farmers as land demand for growing such crops will be minimum. The land resources of the country are limited (0.12 ha per capita) and it is expected to further decrease by the turn of this century due to ever increasing population. So for efficient land utilization, different spice based cropping sequences may be practiced to increase spice production per unit area of land and time. The demand for spices both in domestic and foreign markets are increasing day by day. Therefore, any judicious planning of cropping sequence with spice crop may be a boon particularly to the small and marginal farmers with minimum land holdings. The present investigation was undertaken with the objective to assess the yield and quality of different spices under eight cropping sequences like T_1—Garlic-mint-coriander (leaf); T_2—Black cumin-ginger; T_3—Fenugreek-turmeric; T_4—Coriander-ginger; T_5—Capsicum-chilli; T_6—Onion (seed)-turmeric; T_7—Garlic-chilli and T_8—Coriander-mint-coriander (leaf).

Methods

The field trial was conducted at the Horticultural

Table 1. Growth and yield of fenugreek in fenugreek-turmeric cropping sequence.

	Plant height (cm)	SE	Sowing-flowering interval (days)	SE	Flowering-harvest interval (days)	SE	Yield/ plant (g)	SE	Yield/ plot (g)	SE	Yield/ ha (q)	SE	Test weight (g)	SE
Year														
2002-03	42.04	0.35	68a	0.006	51a	0.00	2.78	0.009	208.25	0.25	4.17	0.003	12.71	0.007
2003-04	40.59	0.58	62.67b	0.167	45.33b	0.167	2.74	0.126	205.50	0.87	4.11	0.018	12.71	0.003
Days after Sowing														
60	23.06c	0.40												
90	37.22b	0.79												
120	63.67a	1.01												

Table 2. Influence of different cropping sequences on growth and physiology of coriander.

	Sequence		Year		Days after planting		
	Coriander-ginger (T_4)	Coriander-mint-coriander (leaf) (T_8)	2002-03	2003-04	60	90	120
Plant height (cm)	60.68b	61.13a	62.02a	60.39b	22.92c	70.00b	80.19a
SE	0.38	0.36	0.43	0.40	0.15	0.52	0.57

Table 3. Effect of different cropping sequences on flowering, harvesting and yield of coriander.

	Sowing-flowering interval (days)	SE	Flowering-harvest interval (days)	SE	Yield/plant (g)	SE	Yield/plot (g)	SE	Yield/ha (q)	SE	Test weight (g)	SE
Sequence												
Coriander-ginger (T_4)	64.89	0.14	50.28b	0.13	2.39b	0.02	359b	3.37	7.18b	0.07	11.5	0.002
Coriander-mint-coriander (leaf) (T_8)	64.44	0.14	53.56a	0.13	2.46a	0.03	365a	3.30	7.3a	0.06	11.5	0.002
Year												
2002-03	66.89a	0.07	50.11b	0.07	2.41b	0.02	362.83b	5.19	7.29b	0.104	11.5	0.002
2003-04	62.44b	0.17	53.72a	0.16	2.44a	0.02	358.58a	1.26	7.22a	0.067	11.5	0.002

Research Station of Bidhan Chandra Krishi Viswavidyalaya, Mondouri, Nadia, West Bengal during the years 2002-03 and 2003-04.

The experiment was laid out with completely randomized design (CRD) with three replications. The individual plot size was 3 × 1.5 m^2. All crops were grown under general agronomic practices.

Plant morphological characters like plant height, plant girth, number of leaves, number of tillers and yield components like time of flowering, harvesting, number of fruit per plant, dry recovery percentage of the crops were recorded.Benefit : cost ratio was also calculated.

The observations recorded at different stages

Table 4. Growth and yield of coriander leaf in different cropping sequences.

	Plant height cm	SE	Leaf number	SE	Plant weight (g)	SE	Yield/plant (g)	SE	Yield/ha (g)	SE
Sequence										
Garlic-mint-coriander (leaf) (T_1)	16.03	0.18	14.53	0.28	1.13	0.002	10.77	0.15	21.55	0.31
Coriander-mint-coriander (leaf) (T_8)	17.11	0.18	14.36	0.28	1.13	0.002	10.78	0.15	21.56	0.31
Year										
2002-03	16.19	0.16	13.22b	0.32	1.11	0.002	10.57	0.16	21.14	0.32
2003-04	16.94	0.2	15.67a	0.34	1.14	0.001	10.99	0.06	21.97	0.13
Days after sowing										
30	14.47b	14	9.69b	0.24	1.03b	0.002				
60	18.67a	12	19.19a	0.35	1.13a	0.001				

Table 5. Growth and yield of black cumin in black cumin-ginger cropping sequence.

	Plant height (cm)	SE	Sowing flowering interval (days)	SE	Flowering harvest interval (days)	SE	Yield/ plant (g)	SE	Yield/ plot (g)	SE	Yield/ ha (q)	SE	Test weight (g)	SE
Year														
2002-03	41.78a	0.41	69.00b	0.000	43a	0.000	1.25a	0.003	185.9a	0.1	3.72a	0.003	1.803	0.003
2003-04	39.00b	0.15	71.44a	0.176	41.44b	0.176	1.21b	0.005	181.5b	0.87	3.63b	0.017	1.803	0.003
Days after sowing														
60	28.33c	0.30												
90	42.72b	0.38												
120	50.11a	0.38												

were statistically analyzed by the analysis of variance (ANOVA) method (1). Complete statistical analysis was done following SPSS (var. 7.5) on a desktop PC (2).

Results and Discussion

Growth and Yield

Fenugreek. Significant variation with respect to growth was observed only when days after sowing (60, 90 and 120) was considered. Fenugreek plant came to flowering stage (62.67 days) and harvesting stage (45.33 days) earlier during the second year (Table 1).

The two different years of investigation did not show much positive effect on yield and test weight of fenugreek. The crop combinations in sequences and optimum date of sowing are important factors in influencing yield. Dua et al. (3) reported higher yield in sequence with turnip, methi or pea after harvesting of potato.

Coriander (Seed). Coriander was used twice in two different sequences i.e. T_4 and T_8. A significant positive change with time with respect to plant height was observed (Table 2). Table 3 shows that coriander

Table 6. Growth and yield of chilli in different cropping sequences.

	Plant height (cm)	SE	Days from planting to flowering	SE	Days from flowering to harvesting	SE	Yield/ plant (g)	SE	Yield/ plot (g)	SE	Yield/ha (q)	SE
Sequence												
Capsicum-chilli (T_5)	52.39	0.12	58.28	0.22	36.89	0.21	55.89	0.60	1491.67	5.47	29.83	0.11
Garlic-chilli (T_7)	52.33	0.12	56.17	0.22	35.83	0.21	55.67	0.60	1494.17	5.47	28.81	0.12
Year												
2002-03	52.37	0.16	57.89	0.18	37.11	0.18	57.94a	0.65	1495.83a	6.56	28.82	0.13
2003-04	52.35	0.16	58.56	0.23	35.31	0.21	53.61b	0.28	1490.00b	3.33	30.42	0.11
Days after planting												
60	44.63c	0.14										
90	54.42b	0.17										
120	58.64a	0.18										

Table 7. Growth and yield of capsicum in capsicum-chilli cropping sequence.

	Plant height (cm)	SE	Planting-flowering interval (days)	SE	Flowering-harvest interval (days)	SE	Yield/ plant (g)	SE	Yield/ plot (kg)	SE	Yield/ ha (t)	SE
Year												
2002-03	26.52	0.71	66.56a	0.18	30.67b	0.17	658a	14.0	13.3a	0.08	26.85a	0.76
2003-04	26.85	0.58	58.78b	0.28	38.33a	0.24	629b	1.63	12.59b	0.05	25.19b	0.10
Days after planting												
60	19.39c	0.48										
90	24.94b	0.28										
120	35.72a	0.32										

took more or less same time (64.89 and 64.44 days) to come into flowering stage in the two different sequences (T_4 and (T_8). It was further recorded that coriander took less time to come into harvesting stage in the T_4 sequence (50.28 days) compared to T_8 sequence (53.56 days). The sequence T_8 proved to be superior and showed significant variation in yield per plant (2.46 g), per plot (365 g) and per hectare (7.3 q). But test weight of the crop remained unaltered irrespective of year and cropping sequences (Table 3). It may be mentioned that coriander produced greater seed yield when sowed after sesame than after groundnut (4). Hence, crop combination in a sequence has a definite role in influencing the yield.

Coriander (Leaf). Coriander was grown for leaf purposes for utilization of the land as also due to its present high demand and was included in the cropping sequences namely garlic-mint-coriander (leaf) (T_1) and coriander-mint-coriander (leaf) (T_8).

Table 4 showed that both the sequences had little effect on plant height, leaf number and plant weight. Though plant height, leaf number and plant weight exhibited significant variation when days after sowing (30 and 60) were considered. There was no significant variation in green herbage yield of coriander in T_1 and T_8 cropping sequences during both the years (Table 4).

Balck Cumin. plant height of black cumin (T_2) varied significantly in both the years and it was highest (41.78 cm) in 2002-03 (Table 5). The plant height of black cumin varied substantially in the three different dates of observation (Table 5). Plant height (50.11

Table 8. Influence of onion-turmeric cropping sequence on growth and flowering of onion.

	Plant height (cm)	SE	Leaf number	SE	Sowing flowering interval (days)	SE	Flowering harvest interval (days)	SE	Number of tillers	SE	Number of flower head/ plant	SE
Year												
2002-03	65.41a	0.57	7.94	0.23	53.44	18	56.56	.18	2.56	.18	2.44	.18
2003-04	53.74b	0.27	6.89	0.22	53.33	.17	56.67	.17	2.44	.18	2.33	.17
Days after planting												
60	57.11c	0.26	7.25b	0.2								
90	67.66b	0.38	8.96a	0.25								
120	71.44a	0.32										

Table 9. Yield of onion seed in onion-turmeric cropping sequence.

	Number of flowers/ head	SE	Length of flowering stalk (cm)	SE	Yield/ plant (g)	SE	Yield/ plot (g)	SE	Yield/ ha (q)	SE	Test weight (g)	SE
Year												
2002-03	56.67	.47	56.89	0.54	3.69a	0.19	718a	22.3	10.89a	0.26	2.7	.003
2003-04	56.33	.73	57.44	0.34	3.2b	0.08	612b	2	9.47b	0.05	2.7	.003

cm) of black cumin was recorded maximum at 120 days after sowing.

Flowering in black cumin was observed 69 days after sowing and it took another 43 days to come into harvesting stage in the first year (2002-03). In the second year it was 71.44 and 41.44 days respectively. Table 5 indicated that black cumin produced highest yield per plant (1.25 g), per plot (185.9 g) and per hectare (3.72 q) during 2002-03. The test weight of black cumin was however remained same (1.803 g) in both the years.

Chilli. Chilli was considered in T_5 and T_7 sequences. Table 6 revealed that both the sequences and years did not show any significant variation with respect to plant height. Plant height (58.64 cm) was recorded to be maximum when observations were recorded 120 days after planting.

Cropping sequences and years had no significant effect on the time taken for planting to flowering and flowering to harvesting. Number of fruit per picking and total fruits per picking were almost same in two sequences (T_5 and T_7). The sequences could not influence the yield due to variation with yield parameters (Table 6). The year had however significant effect on yield per plant, per plot and per hectare as 2002-03 exhibited the higher values. It may be due to favorable climatic conditions prevailed during the first year.

Capsicum. Capsicum was grown in single sequence with chilli (T_5). Table 7 shows that year had no significant effect on plant height of capsicum. Further, capsicum took more time to come into flowering stage (66.56 days) but took less time to come into first harvesting (30.67 days) when the years were considered. Day interval between two pickings was also significant.

The genetically controlled characters like fruit length, diameter, weight did not show any statistical difference due to years. It was observed that yield of capsicum significantly varied with year. Capsicum gave better yield (26.85t/ha) during 2002-03.

Onion. Onion was grown for seeds in a single sequence with turmeric (T_6). Variation was recorded with plant height within years (Table 8). For days from sowing to flowering (53.44 and 53.33), days from flowering to harvesting (56.56 and 56.67), number of tillers per plant (2.56 and 2.44) and length of flowering stalk (56.89 and 57.44 cm) (Tables 8 and 9) both the years should statistically similar result. Number of flower heads per plant and test weight of onion seed had no significant variation. While seed yield of onion showed significant variation.

Table 10. Growth characters of garlic in different cropping sequences.

	Plant height (cm)	SE	Leaf number	SE	Plant girth (cm)	SE
Sequence						
Garlic-mint-coriander (leaf) (T_1)	47.44	0.15	6.11	0.12	3.43	0.01
Garlic-chilli (T_7)	47.69	0.15	6.09	0.12	3.43	0.01
Year						
2002-03	48.22a	0.14	6.15	0.16	3.44	0.01
2003-04	46.91b	0.17	6.06	0.06	3.42	0.01
Days after Sowing						
60	35.19c	0.23	4.5c	0.11		
90	50.03b	0.27	5.9b	0.14		
120	57.47a	0.14	7.9a	0.15		

Table 11. Bulb characters and yield of garlic in different cropping sequences.

	Days for 75% maturity	SE	Shoot/ bulb ratio	SE	Bulb weight (g)	SE	Clove weight (g)	SE	Yield /ha (t)	SE
Sequence										
Garlic-mint-coriander (leaf) (T_1)	100.94b	0.11	17.28	0.24	20.4	0.04	1.23	0.01	6.12b	0.03
Garlic-chilli (T_7)	104.11a	0.12	17.28	0.24	22.43	0.06	1.24	0.01	6.20a	0.04
Year										
2002-03	102.5	0.12	17.39	0.28	23.43a	0.06	1.23	0.01	6.13b	0.05
2003-04	103.56	0.15	17.17	0.19	20.41b	0.04	1.24	0.01	6.20a	0.04

Garlic. Garlic was grown in sequences T_1 and T_7. Some of the morphological and physiological parameters like plant height, leaf number and plant girth did not exhibit significant variation due to sequence (Table 10). In both the year of experimentation, the plant height of garlic was found significant (Table 10). The maximum plant height was recorded in the first year (48.22 cm). Plant height (57.47 cm) and leaf number (7.9) were recorded to be maximum after 120 days of sowing.

Table 11 indicated that shoot : bulb ratio, bulb weight and clove weight did not vary much in different sequences (T_1 and T_7) and due to years. Garlic took less time (100.94 days) in T_1 sequence to come into 75% maturity while T_7 sequence took 104.11 days for the same.

Garlic-chilli (T_7) sequence was proved to be superior with respect to yield per hectare (6.20 t). During 2003-04 garlic yield was maximum (6.20 t/ha). The climatic condition possibly favored the crop for its better vegetative growth and was reflected through higher yield.

Ginger. Ginger was grown in combination with black cumin (T_2) and coriander (T_4). Plant height and

Table 12. Growth and rhizome characters of ginger in different cropping sequences.

	Plant height (cm)	SE	Leaf number	SE	Number of tillers	SE	Primary rhizome number	SE	Primary rhizome weight (g)	SE	Secon-dary rhizome number	SE	Secondary rhizome weight (g)	SE
Sequence														
Black cum-ginger (T_2)	52.04	0.24	14.46	0.11	2.33	0.19	2.39	0.01	18.37	0.23	3.39a	0.12	11.64	0.06
Coriander-ginger (T_4)	51.93	0.24	14.63	0.11	2.17	0.19	2.33	0.01	18.32	0.23	3.28b	0.13	11.63	0.062
Year														
2002-03	53.22a	0.27	15.69a	0.15	2.89a	0.21	2.44a	0.12	19.13a	0.09	3.22b	0.01	11.62	0.01
2003-04	5.74b	0.21	13.41b	0.08	1.6b	0.12	2.28b	0.13	17.56b	0.27	3.44a	0.12	11.65	0.05
Days after sowing														
60	38.94c	0.31	11.03c	0.16										
90	52.11b	0.24	15.47b	0.10										
120	64.89a	0.21	17.14a	0.13										

Table 13. Effect of different cropping sequences on yield of ginger.

	Dry recovery (%)	SE	Yield/ plant (g)	SE	Yield/ plot (kg)	SE	Yield/ ha (t)	SE
Sequence								
Black cumin-ginger (T_2)	13.39	0.23	136.28	0.29	5.11	0.008	10.16	0.04
Corian-der-ginger (T_4)	13.61	0.22	135.83	0.29	5.10	0.008	10.20	0.04
Year								
2002-03	13.50	0.19	137.17 a	0.04	6.16a	0.01	12.26a	0.06
2003-04	13.50	0.18	134.94 b	0.19	4.05b	0.005	8.09b	0.01

Table 14. Influence of different cropping sequences on growth characters of turmeric.

	Plant height (cm)	SE	Leaf number	SE
Sequence				
Fenugreek-turmeric (T_3)	148.91	0.46	8.44	0.13
Onion (Seed)-tumeric (T_6)	148.85	0.46	8.52	0.13
Year				
2002.03	149.15	0.37	8.32	0.09
2003-04	148.61	0.33	8.65	0.13
Days after sowing				
60	130.31c	0.65	6.97c	0.14
90	146.69b	0.4	8.69b	0.10
120.	169.64a	0.27	9.78a	0.14

leaf number did not show any significant variation amongst the two sequences (Table 12). Significant variation was found with respect to plant height and leaf number when the crop was grown in two successive years. The data taken 120 days after sowing of ginger rhizome proved to be best in all the growth characteristics (plant height, leaf number) of the crop.

Dry recovery percentage and yield of ginger did

Table 15. Rhizome characters and yield of turmeric in different cropping sequences.

	Number of tillers	SE	Primary rhizome number	SE	Primary rhizome weight (g)	SE	Secondary rhizome number	SE
Sequence								
Fenugreek-turmeric (T_3)	3.28	0.15	7.56a	0.07	148.59	0.08	8.69	0.06
Onion (seed)-turmeric (T_6)	3.22	0.15	7.37b	0.07	148.73	0.08	8.53	0.06
Year								
2002-03	3.33	0.14	7.27b	0.05	148.65	0.05	8.57	0.06
2003-04	3.17	0.15	7.68a	0.09	148.58	0.1	8.65	0.02

Table 15. Continued.

	Secondary rhizome weight (g)	SE	Dry recovery (%)	SE	Yield/ plant (g)	SE	Yield/ plot (kg)	SE	Yield/ha (t)	SE
Sequence										
Fenugreek-turmeric (T_3)	126.13	0.91	26.43	0.01	342.29	0.3	16.17	0.07	31.83	0.14
Onion (seed)-turmeric (T_6)	125.39	0.91	26.37	0.03	342.5	0.31	16.20	0.07	33.12	0.16
Year										
2002-03	124.85	0.93	26.41	0.02	340.91b	0.28	15.32b	0.05	30.64b	0.09
2003-04	126.67	0.70	26.39	0.03	343.89a	0.33	17.05a	0.07	34.12a	0.13

Table 16. Growth and yield of mint in different cropping sequences.

	Plant height (cm)	SE	Leaf number	SE	Fresh stem : leaf ratio	SE	Yield/ plant (g)	SE	Yield/ plot (kg)	SE	Yield/ ha (t)	SE
Sequence												
Garlic-mint-coriander (leaf) (T_1)	41.69	0.21	461.02	0.38	1.68	0.04	37.78	0.08	0.958	0.003	1.92	0.006
Coriander-mint-coriander (leaf) (T_8)	42.04	0.21	463.13	0.38	1.71	0.04	39.81	0.08	0.981	0.003	2.01	0.006
Year												
2002-03	41.70b	0.24	460.59	0.34	1.66	0.03	37.63	0.05	0.950	0.00	1.89	0.00
2003-04	43.15a	0.17	464.56	0.35	1.73	0.03	40.97	0.09	0.990	0.004	2.15	0.008
Days after Planting												
60	34.25c	0.18	425.28c	0.17								
90	39.25b	0.24	452.81b	0.70								
120	52.08a	0.29	508.14a	0.36								

not exhibit variation in the sequences (T_2 and T_4) studied (Table 13). But the first year (2002-03) proved best for ginger yield per plant (137.17 g), per plot (6.16 kg) and per hectare (12.26 t). The higher yield in the first year is possibly due to favorable climatic conditions that enjoyed the crop during its growing period.

Turmeric. Turmeric was grown in cropping sequences, namely fenugreek-turmeric (T_3) and onion (seed)-lurmeric (T_6). Table 14 showed that different sequences and years had no significant effect on plant height and leaf number. But these characters exhibited highly significant variation when days after sowing of rhizome was considered and in all cases, the highest value, was recorded on 120 days of crop growth.

The data on primary rhizome number showed variation although, primary rhizome weight and secondary rhizome number and weight were statistically at par in both the sequences and the years under investigation (Table 15). However, irrespective of sequence and year, dry recovery percentage of turmeric remained almost unchanged. In rhizome yield, variation was appreciable when the years were compared.

Mint. Mint was grown as a second crop in garlic-mint-coriander (leaf) (T_1) and coriander-mint-coriander (leaf) (T_8) sequences. The two different sequences (T_1 and T_8) did not influence much on the plant height and leaf number (Table 16). Plant height of mint showed positive variation as examined from data of two years (Table 16).

A positive significant change with time after planting was marked with growth and physiological parameters like all other crops. The highest plant height (52.08 cm) and leaf number (508.14) were obtained 120 days after planting of mint plant.

Fresh stem : leaf ratio of mint was almost similar

Table 17. Quality parameters under different cropping sequences with spice crops.

Crop	Quality parameter	Amount present
Fenugreek	Volatile oil	0.02%
Coriander	Volatile oil	1.425%
Black cumin	Volatile oil	1.225%
Chilli	Ascorbic acid	75 mg/100 g
	Capsaicin	0.44 (moisture free basis)
Capsicum	Ascorbic acid	82.6 mg/100 g
Garlic	Ascorbic acid	7.375 mg/100 g
	Total soluble solid	32.25%
	Moisture	63%
Ginger	Ascorbic acid	9.01 mg/100 g
	Protein	7.296 g/100 g
	Fat	5.076 g/100 g
	Fibre	6.7 g/100 g
	Oleoresin	4.885%
Turmeric	Ascorbic acid	44.3 mg/100 g
	Protein	7.28 g/100 g
	Fat	6.4 g/100 g
	Fibre	6.9 g/100 g
	Curcumin	4.89%
Mint	Volatile oil	0.347%

Table 18. Benefit : cost ratio as influenced by different cropping sequences.

Sequence	Benefit : cost ratio
Garlic-mint-coriander (leaf)	1.35c
Black cumin-ginger	0.49h
Fenugreek-turmeric	0.6f
Coriander-ginger	0.53g
Capsicum-chilli	5.16a
Onion (seed)-turmeric	0.66e
Garlic-chilli	1.55b
Coriander-mint-coriander (leaf)	1.1d

(Table 16) in 2002-03 and 2003-04 for the sequences T_1 and T_8. Green herbage yield per plant, per plot and per hectare were not influenced to that extent due to sequence and year.

According to Singh and Nand (5) herbage yield of mint was found to be highest in mint-methi cropping sequence at Pantnagar, India. Singh et al. (6) reported that mint-based rotation proved always superior with respect to yield.

Quality Parameters. Some important quality parameters were evaluated and are presented in Table 17.

Benefit : Cost Ratio

Table 18 showed that capsicum-chilli cropping sequence registered the highest (5.16) benefit : cost ratio followed by garlic-chilli sequence (1.55) and T_1 sequence (1.35). Black cumin-ginger sequence recorded lowest value (0.49) of benefit : cost ratio. The benefit : cost ratio was in the order of $T_5>T_7>T_1T_8>T_6>T_3>T_4>T_2$. Raju and Reddy (7) recorded highest net return from pearl millet-safflower and pearl millet-coriander sequences (Rs 3,339.00 and Rs 3,338.00/ha respectively). Kurlekar et al. (8) obtained highest net return and production efficiency with chilli-groundnut cropping sequence in *kharif* season. Raskar et al. (9) also found highest productivity and profitability with sorghum-chilli cropping sequence. In the present investigation capsicum-chilli sequence was to be proved superior as more than once harvest were possible which resulted higher income.

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