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Popularization of off-season Coriander (*Coriandrum Sativum L.*) Cultivation in Eastern Ghat High Land Zone of Odisha

P. Sial* • B. B. Sahoo • S. K. Behera • N. Senapati

High Altitude Research Station (OUAT), Koraput, Pottangi 764039, Odisha

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ABSTRACT

Coriander grows best in dry climates however it can grow in any type of soil like light, well drained, moist, loamy soil, and light to heavy black soil. The Eastern Ghat High Land Zone of Odisha is highly favourable for off-season coriander cultivation. The field experiments were conducted under Central Sector Scheme of National Horticulture Mission programme operating at High Altitude Research Station (OUAT), Pottangi of Koraput district of Odisha during *Kharif*2013-14 as front line demonstration in a sizeable farmer's field of 20 advanced beneficiaries from different villages of Pottangi block in Koraput district. High yielding hybrid coriander seeds were supplied to the farmers along with different organic inputs like FYM, vermicompost and neem cake to popularize the technology. Results of the front line demonstration (FLD) revealed that the gross return (Rs.20,675) as well as the net return (Rs.6,855/-) obtained by the coriander growers under different FLDs are comparatively higher than that of farmers practice. Here it can be suggested that with optimum input cost and optimum changes in technology, it can be easily acceptable and validate for the long term benefit by the coriander growers.

1. Introduction

Coriander (*Coriandrum sativum* L.) is a tender herbaceous annual plant belongs to the family *Umbelliferae*. All parts if this herb are in use as flavouring agent and/or as traditional remedies for the treatment of different disorders in the folk medicine systems of different civilization (Sahib *et al.,* 2012). Its seeds are almost ovate, globular and have a mild, sweet, slight pungent like citrus flavour with a hint of sage. The most important constituents of its seeds are the essential oil and fatty oil. It contains an essential oil (0.03 to 2.6%) (Nadeem *et al.,* 2013). It occupies an important place in the diet of common man and popularly known as "Dhania" in Odiya. It is mainly cultivated from the seeds round the year (Mhemdi *et al.,* 2011). According to Fortune group (2014), global production of coriander is around 2.9 lakh metric tonnes to 3.35 lakh metric tonnes per year. India is the largest producer, consumer and exporter of coriander with greater share in world export market. It contributes almost 80% of world coriander production and produces. around 2.5-3.0 lakh metric tonnes annually Annually 5-10% of total production from India is exported. During April 2011– March 2012, estimated export of spices is around 5, 75,270 MT with value of 2037.76 million US $. Estimated export of coriander is 28,100 MT with total value of Rs. 16401.85 lakh.Coriander production in the past few years has varied drastically between 3-5 lakh tonnes, with average output of 4.01 lakh tonnes during 2005-2013. In the year 2009, production was around 5 lakh tonnes. The major production of coriander is consumed by domestic buyers in India accounting around 50% of the production. The demand from this sector peaks during April to June, which also coincides with the peak arrival period. At the same time strong export demand from other countries boosted exports from India. Hence it is an urgent need to make available the increasing demand of coriander in local domestic market as well as the importing countries like Middle East, South East Asia, USA, UK, Germany etc. But the supply of coriander is reduced during kharif season. Supply chain of coriander is not possible round

*Correspondence author: niranjanpbg@gmail.com

the year due to reduction in acreage, unavailability of farm resources, lack of technical knowhow for the commercial cultivation and negligible adaption of the crop among the farmers. Further, Odisha has been divided into 10 agro climatic zones based on the basis of soil structure, humidity, elevation, topography, vegetation, rainfall and other agro climatic factors. The state can be broadly divided into two Agro-Climatic zones *i.e.*Coastal Region and Highland Region. Eastern Ghat High Land Zone of Odisha is an excellent avenue with exclusive climatic situation which is situated at 18° 42'N, 82° 30'E elevation and 884m above mean sea level. It is around 8% of total geographical area of the state accounting an area of 12,456 sq km. The climate was hot and humid, with an annual average rainfall of 1567mm, most of which (90%) was received during monsoon months (June to September), mean summer and winter temperature were 34°C and 12°C respectively. The soil type was red and laterite with sandy to clay loam in texture. The pH of the soil was 5.8 with low in organic carbon (0.03-0.05%), available N (150-170 kg/ha), P (16-18 kg/ha) and K (152-160 kg/ha) as reported by Dalei *et al*., (2014). Coriander grows best in dry climates however it can grow in any type of soil like light, well drained, moist, loamy soil, and light to heavy black soil (Verma *et al*., 2011). However Eastern Ghat High Land Zone is highly favourable for off-season vegetable cultivation. Traditionally farmers are growing off-season tomato, cauliflower, cabbage and radish and able to get good economic return. Hence front line demonstration for off season production of coriander under Eastern Ghat High Land Zone will prove exemplary especially for green leaf production. With such an anticipation of higher economic benefit the present experiment was formulated to evaluate, validate and popularize the improved off season coriander cultivation under Eastern Ghat High Land Zone of Odisha.

2. Material and Methods

The field experiments were conducted under Central Sector Scheme of National Horticulture Mission programme operating at High Altitude Research Station (OUAT), Pottangi of Koraput district of Odisha during *Kharif* 2013-14 as front line demonstration in a sizeable farmer's field of 20 advanced beneficiaries from different villages of Pottangi block in Koraput district. The details of the farmers under taken for the evaluation are enlisted as follows in Table 1.Initially a complete list of all the major coriander growing villages of the selected localities was prepared in consultation with the grassroots 'workers of line departments such as Assistant Agriculture Officer of Pottangi and Semiliguda as well as scientists from KrishiVigyan Kendra (OUAT), Koraput, Semiliguda. High yielding hybrid coriander seeds Kailsh was supplied to the farmers along with different organic inputs like FYM, vermicompost, *Azotobacter*, PSB, *Trichoderma viridae*,

Table 1. Details of Farmers included in FLD on coriander cultivation during *Kharif* 2013-14

Sl No.	Name of the Farmer	Village	Area (ha)	Seed Variety
1	BanduSura	Badapadu, Pottangi, Koraput	0.1	Kalash
2	SundruGemel	Badapadu, Pottangi, Koraput	0.1	Kalash
3	TilsuGemel	Badapadu , Pottangi, Koraput	0.1	Kalash
4	Gemel Damo	Badapadu, Pottangi, Koraput	0.1	Kalash
5	Jani Pati	Badapadu, Pottangi, Koraput	0.1	Kalash
6	Boi Arjun	Tala Badapadu, Pottangi, Koraput	0.1	Kalash
7	DumariBandhu	Tala Badapadu, Pottangi, Koraput	0.1	Kalash
8	Boi Hari	Tala Badapadu, Pottangi, Koraput	0.1	Kalash
9	BoiAdia	Tala Badapadu, Pottangi, Koraput	0.1	Kalash
10	Boi Madan	Tala Badapadu, Pottangi, Koraput	0.1	Kalash
11	Murja Bata	Badaliguda, Pottangi, Koraput	0.1	Kalash
12	IndamSukra	Badaliguda, Pottangi, Koraput	0.1	Kalash
13	Murja Danu	Badaliguda, Pottangi, Koraput	0.1	Kalash
14	TamalBabu Rao	Dodumaguda, Pottangi, Koraput	0.1	Kalash
15	Gemel Nanda	Dodumaguda, Pottangi, Koraput	0.1	Kalash
16	TamalSubas	Dodumaguda, Pottangi, Koraput	0.1	Kalash
17	TamalNagesh	Dodumaguda, Pottangi, Koraput	0.1	Kalash
18	TamalBhimana	Dodumaguda, Pottangi, Koraput	0.1	Kalash
19	Murja Sadhu	Badaliguda, Pottangi, Koraput	0.1	Kalash
20	BoiManglu	Nilampadu, Pottangi, Koraput	0.1	Kalash

Pseudomonas fluorescence and neem cake to popularize the technology. Here the existing knowledge of farmers about coriander production technology was evaluated and subsequently modified to obtain a better economic return. From pre monsoon period the field preparation was initiated by the own arrangement of the beneficiaries with indigenous (Desi) plough or tractor plough. FYM@20t ha^{-1}, Vermicompost @ 5 t ha^{-1} and neem cake @ 3 tha^{-1} along with fertiliser @ 20:40:20 Kg ha^{-1} of N: P: K was applied at the time of field preparation followed by spraying of chloropyriphous@2ml l^{-1} to protect the crop from termites. Then lines showing of coriander seeds were done with an average spacing of 5-10cm from plant to plant and 30 cm from line to line, prior to that the seeds were treated with Bavistin @ 1gm per 100gm of seeds. Green leaf mulching was applied soon after showing to protect the seeds from ants and birds as well as to obtain a better germination of seeds. The seeds were sprouted within 4-5 days after showing. Soon after the sprouting started the mulching were removed from the beds with utmost care to ensure a high-quality development of plumule. Simultaneously the technical knowhow was supported to the coriander growers to obtain a better crop growth. Neem oil was used as need based Plant protection measures to protect the crop from insect and diseases severity. With all the possible resources, the extent of knowledge of farmers about coriander production technology was assessed. The results are presented in subsequent tables.

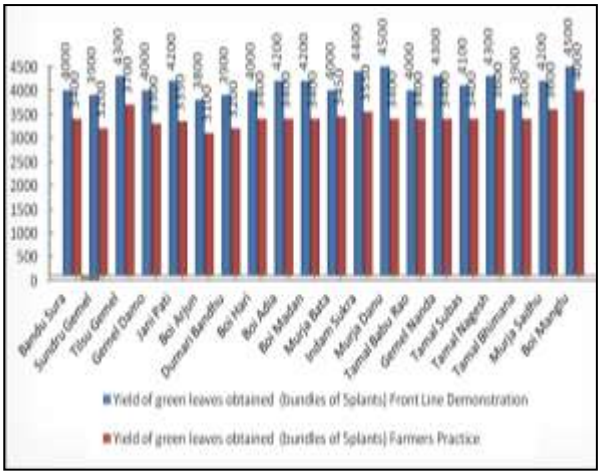

Figure 1. Yield of coriander green leaves obtained under Front Line Demonstration and Farmers Practice

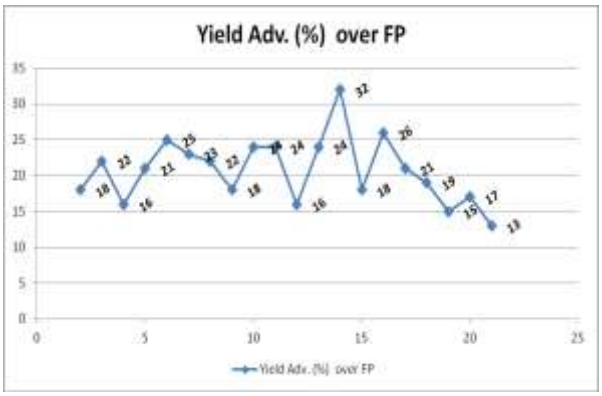

Figure 2. Percentage of yield advancement of coriander green leaves obtained over Farmers Practice

3. Results and Discussions

The results from the above experiment revealed that the green leaf yield from off-season coriander in *Kharif* season varies from 3800 - 4500 bundles consisting 5 plants in each bundles from 0.1 ha of land under different front line demonstration, whereas green leaf yield was varies from 3100- 4000 bundles with same no of plants per bundles and same area of cultivation under Farmers Practices. The average yield in Front Line Demonstration was 4135 bundles in comparison with average yield of 3433 bundles in farmers practice during *Kharif* 2013 under Eastern Ghat High Land Zone of Odisha in Koraput district. Nearly about 50% *i.e.* 10 farmers are benefited by fallowing the front line demonstration and getting more than the average bundles of green leaves under Front Line Demonstration, whereas only 6 farmers are getting more than the average bundles of green leaves under farmer practices.The data accorded in Table 2 and Fig 2 shows that, the percentage yield advantage over farmer's practices was varied from 13-32 % with an average percentage of 21%. Around 11 farmers, which were more than 50% of total farmers, were recorded for obtaining more than the average percentage of increase in yield over farmers practices.

Result revealed from the above experiment shows that the difference between the average costs of production was Rs.1,220, which was negligible and can easily be affordable for the coriander growers to get a better yield cum economic return. Simultaneously the gross return (Rs.20,675) as well as the net return (Rs.6,855/-) obtained by the coriander growers under different Front Line Demonstration are comparatively higher than that of farmers practice. Here it can be suggested that with optimum input cost and optimum changes in technology can be easily acceptable and validate for the long term benefit by the coriander growers. Regarding the cost benefit ratio, it was 1:1.5 under Front Line Demonstration where as it is 1:1.40 under farmer practices.

4.Conclusion

The net return obtained by the coriander growers under different Front Line Demonstration is comparatively higher than that of farmers practice. Hence, it can be concluded that the adaption of off-season coriander cultivation under Eastern Ghat High Land Zone of Odisha like Koraput district not only provides the higher green leaf yield but also gives highest economic benefit to the growers.

Table 2. Performance of coriander variety Kalash in FLD under CSS-NHM programme at Koraput during 2013-14.

Sl No.	Name and address of the farmer	Area (ha)		Yield of green leaves obtained (bundles of 5plants)		Yield Adv. (%) over FP	Total cost of production (Rs.)		Gross return (Rs.)		Net return (Rs.)		B:C ratio	
		FLD	**FP**	**FLD**	**FP**		**FLD**	**FP**	**FLD**	**FP**	**FLD**	**FP**	**FLD**	**FP**
1	BanduSura	0.1	0.1	4000	3400	18	13000	12000	20000	17000	7000	5000	1.5	1.4
2	SundruGemel	0.1	0.1	3900	3200	22	13500	12000	19500	16000	6000	4000	1.4	1.3
3	TilsuGemel	0.1	0.1	4300	3700	16	14000	12500	21500	18500	7500	6000	1.5	1.5
4	Gemel Damo	0.1	0.1	4000	3300	21	14500	13000	20000	16500	5500	3500	1.4	1.3
5	Jani Pati	0.1	0.1	4200	3350	25	12500	11500	21000	16750	8500	5250	1.7	1.5
6	Boi Arjun	0.1	0.1	3800	3100	23	13000	12500	19000	15500	6000	3000	1.5	1.2
7	DumariBandhu	0.1	0.1	3900	3200	22	14000	13000	19500	16000	5500	3000	1.4	1.2
8	Boi Hari	0.1	0.1	4000	3400	18	13900	12200	20000	17000	6100	4800	1.4	1.4
9	BoiAdia	0.1	0.1	4200	3400	24	12900	11800	21000	17000	8100	5200	1.6	1.4
10	Boi Madan	0.1	0.1	4200	3400	24	14500	13000	21000	17000	6500	4000	1.4	1.3
11	Murja Bata	0.1	0.1	4000	3450	16	14200	12200	20000	17250	5800	5050	1.4	1.4
12	IndamSukra	0.1	0.1	4400	3550	24	14500	13000	22000	17750	7500	4750	1.5	1.4
13	Murja Danu	0.1	0.1	4500	3400	32	14200	13000	22500	17000	8300	4000	1.6	1.3
14	TamalBabu Rao	0.1	0.1	4000	3400	18	13900	12000	20000	17000	6100	5000	1.4	1.4
15	Gemel Nanda	0.1	0.1	4300	3400	26	15000	13800	21500	17000	6500	3200	1.4	1.2
16	TamalSubas	0.1	0.1	4100	3400	21	14000	13000	20500	17000	6500	4000	1.5	1.3
17	TamalNagesh	0.1	0.1	4300	3600	19	13900	12800	21500	18000	7600	5200	1.5	1.4
18	TamalBhimana	0.1	0.1	3900	3400	15	13000	12500	19500	17000	6500	4500	1.5	1.4
19	Murja Sadhu	0.1	0.1	4200	3600	17	14000	13000	21000	18000	7000	5000	1.5	1.4
20	BoiManglu	0.1	0.1	4500	4000	13	13900	13200	22500	20000	8600	6800	1.6	1.5
	Average			4135	3433	21	13820	12600	20675	17162.5	6855	4562.5	1.5	1.4

*Selling Price of Coriander green leaf Rs 1500/-/300 bundles of 5 plants

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