

Production aspects of contract farming in hybrid bitter gourd seed production

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ABSTRACT

The study on a case of contract hybrid bitter gourd seed production was conducted in Ranebennur taluk of Haveri district, which is considered to be hub of vegetable seed production not only in the State but also in the country. Primary data were collected from 90 farmers who were into contract with three company's viz., Mahyco, Indo-American Hybrid Seeds and Namdhari Seeds. Necessary data were also collected from the contracting companies. The study reveals that hybrid bitter gourd seed production is a highly labour intensive activity. Women labour contribution is more as compared to the men. The women labour accounted for 78 per cent in case of both Mahyco and Indo-American Hybrid Seeds and 79 per cent in Namdhari Seeds Company for hybrid bitter gourd seed production. The cost incurred for hybrid bitter gourd seed production per acre was found to be Rs. 55,906, Rs. 58,006 and Rs. 54,947 in case of Mahyco, IAHS and Namdhari Seeds Company, respectively. The average net returns realized by the farmers per acre were Rs. 27,769, Rs. 5,144 and Rs. 31,340 in case of Mahyco, IAHS companies, respectively. The reason for low net returns by farmers under IAHS Company was due to low quality seeds followed by heavy rains during production season and powdery mildew disease, resulting in drastic yield reduction. However, the farmers under Mahyco and Namdhari Seeds Company realized better returns because of high quality disease resistant seeds.

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Contract farming is the contractual arrangements between farmers and the company, whether oral or written, specifying one or more conditions of production and or marketing. The essence of such arrangements is being a commitment to provide agricultural and horticultural produce of a type, at a specified price and in a specified quantity to a known buyer. The contract farming offered the advantage of reduced capital investment, reduced risk of price fluctuations, guaranteed income, provision of technical assistance to the farmers and reduced capital investment, improved efficiency, efficient marketing with timely and assured supply to the contracting company. In India, seed production is outsourced to the farmers through contract farming by the seed companies. The seed companies provide foundation seed, technical guidance, monitor the seed production activities and procure seed material from the farmers. About more than 150 seed companies are functioning in India concentrating on field crops and vegetables.

India is one of the leading vegetable seed producing countries in Asia, others being China and Thailand. Karnataka produces nearly 90 per cent of the total hybrid vegetable seed in India. The major production centers

are located around Ranebennur in the northern part of the state.

In India, vegetable seed production started by the two private companies way back in 1982 viz., Indo American Hybrid Seeds (IAHS) and Mahyco. A number of medium and small sized companies have began to operate in the seed production in solanaceous and cucurbitaceous vegetables for domestic and international market. They include Namdhari, Mahyco, IAHS, Nunhems, Syngenta, Seminis, Bejoshethal, Sungrow, Exim, Unicorn, Emergent-Genetics, Nath seeds, Century, Oriental, Golden seeds, CK seeds, Ankur, Nijaveedu so on.

The seed production contributed to regional development in a big way. It has provided ample employment opportunities especially for women in villages. It is estimated that the total employment generation is over 7,00,000 in the sector.

Seed material is the primary input in agriculture and the quality of seed is one of the determinants of output growth, given other complementary inputs. In spite of intensive use of inputs, agriculture has witnessed stagnant/falling productivity levels in most of the crops and the cost of production has been increasing. As a result, the

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return to private investment on agriculture is falling. In this scenario, use of quality seed in enhancing the productivity is crucial.

Bitter gourd (*Momordica charantia* L.) belonging to the Cucurbitaceae family, is grown for its bitter tender fruits. The fruits turn to an orange-yellow when ripe. The fruits are rich in iron, Vitamin A, B, C and are an important source of proteins and minerals. It is considered good for curing blood diseases, rheumatism, diabetes and asthma.

Hence, the study was undertaken to understand the pattern of employment generation, cost incurred and the returns realized by the contract farmers in the hybrid bitter gourd seed production.

The study was conducted in Ranebennur taluk of Haveri district of Karnataka, as it is recognized as the seed production zone in Karnataka State. The study was mainly based on the primary data collected from farmers and secondary data from District Statistical Office, Haveri and from the companies involved in contract farming.

In order to assess the economics of contract farming, primary data were collected from a sample of 90 farmers who were into contract with three company's viz., Mahyco, Indo-American Hybrid Seeds and Namdhari Seeds Company. The data were also collected from the respondent farmers using a structured schedule developed for the purpose, for the crop year 2008-09.

Simple statistical tools like averages and percentages were used to analyse the cost and returns from hybrid bitter gourd seed production.

The results obtained from the present investigation

have been discussed below:

Pattern of employment generation in hybrid bitter gourd seed production:

The pattern of employment of the labour of Mahyco, Indo-American Hybrid Seeds Company and Namdhari Seeds Company farmers are presented in Table 1.

It is evident from the results that the total labour employed by farmers, in hybrid bitter gourd seed production for Mahyco, Indo-American Hybrid Seeds Company and Namdhari Seeds Company are 398, 414 and 381 mandays of human labour, respectively, out which the proportion of women labour used was more (310, 323 and 300 mandays in case of Mahyco, Indo-American Hybrid Seeds Company and Namdhari Seeds Company farmers, respectively) as compared to men labour (87, 92 and 81 mandays in case of Mahyco, Indo-American Hybrid Seeds Company and Namdhari Seeds Company farmers, respectively).

The highest number of mandays of labour was used for pollen collection and crossing (257, 269 and 247 mandays in case of Mahyco, Indo-American Hybrid Seeds Company and Namdhari Seeds Company farmers, respectively), followed by irrigation (30, 31 and 30 mandays in case of Mahyco, Indo-American Hybrid Seeds Company and Namdhari Seeds Company farmers, respectively) and weeding (23, 25 and 25 mandays in case of Mahyco, Indo-American Hybrid Seeds Company and Namdhari Seeds Company farmers, respectively).

Table 1 : Pattern of employment generation in hybrid bitter gourd seed production

Sr. No.	Type of operation	Mahyco			Indo-American hybrid seeds			Namdhari seeds		
		Men days	Women days	Total	Men days	Women days	Total	Men days	Women days	Total
1.	Land preparation	6.2	4.27	10.47	6.26	3.4	9.66	5.6	3.54	9.14
2.	Transplanting	-	8.27	8.27	-	9.34	9.34	-	9.6	9.6
3.	FYM (transportation and application)	12.07	-	12.07	12.34	-	12.34	11.66	-	11.66
4.	Fertilizers and micronutrients application	5.14	1.06	6.2	5	0.74	5.74	5.14	1.6	6.74
5.	Pesticides spray	11.67	-	11.67	14.8	-	14.8	8.26	-	8.26
6.	Weeding	-	23	23	-	24.86	24.86	-	24.8	24.8
7.	Intercultural operations	4	-	4	4	-	4	4	-	4
8.	Irrigation	30.27	-	30.27	31.46	-	31.46	29.8	-	29.8
9.	Staking sticks and wire	12	-	12	12.2	-	12.2	11.6	-	11.6
10.	Pollination	-	257.34	257.34	-	269.34	269.34	-	246.66	246.66
11.	Harvesting	3.93	8.2	12.13	3.54	7	10.54	3.2	6.94	10.14
12.	Cleaning and drying	-	8.13	8.13	-	7.94	7.94	-	6.94	6.94
13.	Transportation	2	-	2	2	-	2	2	-	2
	Total	87.27	310.27	397.54	91.6	322.62	414.22	81.26	300.08	381.34

Hence, it is clear that hybrid bitter gourd seed production is a highly labour intensive activity. The pollen collection and crossing requires highly skilled as well as trained labour, in order to achieve higher efficiency in labour utilization.

Cost structure in hybrid bitter gourd seed production:

Hybrid bitter gourd seed production is an activity involving specialized, skillful and delicate operations from sowing to harvesting. As bitter gourd is a cross pollinated crop, isolation distance of five hundred meters has to be maintained. For maintenance of genetic and physical purity of cultivars, roughing is done at vegetative, flowering and fruiting stages. Emasculation and hand pollination are crucial, which jointly influence seed yield. The right time of harvesting is also a crucial determinant of seed quality and yield.

Results of cost structure in hybrid bitter gourd seed production of Mahyco, Indo-American Hybrid Seeds and Namdhari Seeds company farmers are presented in Table 2. It is clear from the Table 2 that the total cost of hybrid bitter gourd seed production per acre incurred by farmers was Rs. 55906 in case of Mahyco, Rs. 58006 in case of Indo-American Hybrid Seeds Company and Rs. 54947 in case of Namdhari Seeds company. Hybrid bitter gourd seed production is highly labour intensive activity where labour cost forms significant proportion of the total cost of production. It is also clear from the table that labour cost alone was 50 per cent in case of both Mahyco and Indo-American Hybrid Seeds and 48 per cent in case of Namdhari Seeds Company. It was also evident that role of women labour as in any hybrid seed production is higher (75 per cent) compared to the role of men labour (25 per cent), due to specialized operations of emasculation and pollination. These operations require care, skill and patience, which are endowed with women labour.

The second important cost was the cost on staking sticks (Rs. 4003, Rs. 4000 and Rs. 4020 in case of Mahyco, Indo-American Hybrid Seeds and Namdhari Seeds company farmers, respectively), which accounted for 7 per cent of the total cost in all the three company farmers. Cost on plant protection chemicals accounted (Rs. 3267, Rs. 3900 and 3513 in case of Mahyco, Indo-American Hybrid Seeds and Namdhari Seeds company farmers, respectively) 6 per cent, 7 per cent and 6 per cent of the total cost in case of Mahyco, Indo-American Hybrid Seeds and Namdhari Seeds company farmers, respectively. The Indo-American Hybrid Seeds Company farmers invested more on pesticides because there was an attack of powdery mildew disease.

The cost on irrigation (Rs. 3000 in all three company farmers) accounted about 5 per cent of the total cost. Cost on FYM was (Rs. 2922, Rs. 3236 and Rs. 3166 in case of Mahyco, Indo-American Hybrid Seeds and Namdhari Seeds company farmers, respectively) 5.2 per cent, 5.6 per cent and 5.8 per cent of the total cost in case of Mahyco, Indo-American Hybrid Seeds and Namdhari Seeds company farmers, respectively and cost on fertilizer and micronutrients was (Rs. 3449, Rs. 3450 and Rs. 3270 in case of Mahyco, Indo-American Hybrid Seeds and Namdhari Seeds company farmers, respectively) 6.2 per cent, 5.6 per cent and 5.6 per cent of the total cost. Cost on crossing materials was (Rs. 1547, Rs. 1474 and Rs. 1504 in case of Mahyco, Indo-American Hybrid Seeds and Namdhari Seeds company farmers, respectively) 2.8 per cent, 2.5 per cent and 2.7 per cent of the total cost in case of Mahyco, Indo-American Hybrid Seeds and Namdhari Seeds company farmers, respectively. The average total fixed cost incurred in hybrid bitter gourd seed production was (Rs. 4034, Rs. 3960 and Rs. 4023 in case of Mahyco, Indo-American Hybrid Seeds and Namdhari Seeds company farmers, respectively) 7.2 per cent, 6.8 per cent and 7.3 per cent of the total cost in case of Mahyco, Indo-American Hybrid Seeds and Namdhari Seeds company farmers, respectively. Among the various cost items, seed registration and inspection charge was one which the company's charge on farmers, which was worked out to be Rs. 250 by Mahyco, Rs. 300 by Indo-American Hybrid Seeds Company and Rs. 400 by Namdhari Seeds Company. This is the charge that the company charges to all the contract farmers not as the seed cost but as seed registration and inspection charge. The rental value of land was high (Rs. 3793, Rs. 3713 and Rs. 3773 in case of Mahyco, Indo-American Hybrid Seeds and Namdhari Seeds company farmers, respectively) mainly due to the crop and also due to availability of irrigation facility.

Hybrid bitter gourd is an important commercial crop because of its high profitability. This crop is occupying a significant proportion in irrigated areas resulting in remarkable changes in the cropping pattern of the farmers. This crop has contributed for economic security of the farmers appreciably.

Returns structure in hybrid bitter gourd seed production:

The returns structure in hybrid bitter gourd seed production of Mahyco, Indo-American Hybrid Seeds and Namdhari Seeds Company's farmers are presented in Table 3.

Sr. No.	Particulars	Unit	Cost of sowing in 1 acre of 1000 ground seed production (per acre)			Total Amount of 1 year's seeds			Normal seeds		
			Quantity	Value (Rs.)	Percentage	Quantity	Value (Rs.)	Percentage	Quantity	Value (Rs.)	Percentage
1.	Variable cost			250	0.5		300	0.52		1.00	0.13
2.	Seed (upliftation and impudation charges)	1000000	10/5	297.8	5.23		3235.66	5.58		3166.1	5.16
3.	Deer cost	300	366.66	2699.6	1.83	363.3	267.6	1.56	3/3.3	2/90.1	1.53
4.	Water charges	300	18.26	1/9.9	1.3	80	80	1.39	1.9	1/19.3	1.2
5.	Plant production charges			3766.66	5.8		3900	6.12		3573.3	6.39
6.	Labour										
a) Man		Man days	8/28	5859.66	10.8	97.6	6711.2	10.6	87.6	5392.6	9.8
b) Women		Women days	3/0.26	2197.68	39.26	322.62	22867.5	39.2	300.08	2170.5	38.53
7.	Salaries										
a) 3 months		Man days	2	600	1.07	2	600	1.03	2	600	1.05
b) 3 months		Women days	3	1200	2.15	3	1200	2.07	3	1200	2.18
8.	Country road	No.	10733	1000.1	1.6	1000	1000	6.9	1000	1000	1.92
9.	Cr. wire	300	13.5	199.9	0.82	11.5	392.36	0.68	12.1	12.6	0.71
10.	Crossing materials	300	10.56	153.2	1.35	10.36	171.68	1.29	10.66	165.92	1.28
11.	Plastic	300	18.1	1379.1	2.11	11.6	1333.8	2.3	15.8	1360.26	2.18
12.	Colour coat	300	2.1	1.68	0.3	2	1.0	0.2	2.06	1.12	0.26
13.	Impudation cost			3000	5.37		3000	5.17		3000	5.16
14.	Transportation			111.3	0.26		133.3	0.23		137.66	0.25
15.	Interest on working capital (5%)			2170.1	1.12		2573.58	1.1		2121.96	1.1
16.	Sub total			51872.08	92.78		51075.2	93.17		50927.22	92.88
17.	Total Cost			207.6	0.1		237.1	0.1		237.6	0.13
18.	Depreciation			3793.3	6.79		3773.3	6.7		3773.3	6.87
19.	Real value			16.26	0.03		1.5	0.03		1.506	0.03
20.	Land revenue			103/2	1.22		3960.78	6.83		1023.0	1.32
21.	Sub total			55906.28	100		58005.6	100		57972.6	100

On an average the Mahyco, Indo-American Hybrid Seeds and Namdhari Seeds Company's farmers harvested 139, 126 and 107 kg of seeds with a gross return of Rs. 83676, Rs. 63150 and Rs. 86288, respectively. The returns structure was found to be profitable and beneficial in relation to the total cost incurred by them in case of Mahyco and Namdhari Seeds Company's farmers. But the returns structure was not much profitable and beneficial in relation to the total cost incurred by them in case of Indo-American Hybrid Seeds Company farmers. The gross returns was found to be much higher than their cost structure in case of Mahyco and Namdhari Seeds Company's farmers, but it was not so in case of Indo-American Hybrid Seeds Company farmers.

In all, the farmers realized net returns of Rs. 27770, Rs. 5144 and Rs. 31341 in case of case of Mahyco, Indo-American Hybrid Seeds and Namdhari Seeds company farmers, respectively over total cost. Further, the net returns over variable cost was worked out to be Rs. 31804, Rs. 9105 and Rs. 35364 in case of case of Mahyco, Indo-American Hybrid Seeds and Namdhari Seeds company farmers, respectively. The returns were worked out on per kg basis also and farmers realized a net returns of Rs. 199.1, Rs. 40.7 and Rs. 290.6 per kg of seeds in case of Mahyco, Indo-American Hybrid Seeds and Namdhari Seeds Company's, respectively. Mahyco, Indo-American Hybrid Seeds and Namdhari Seeds Company's farmers obtained Rs. 1.50, Rs. 1.09 and Rs. 1.57 per rupee of total cost and Rs. 1.61, Rs. 1.17 and Rs. 1.69 per rupee of variable cost, respectively. Hence according to the hypothesis, the farmers are getting better returns through contract hybrid bitter gourd seed production. Mahyco and Namdhari Seeds Company's farmers realized reasonable returns from hybrid bitter gourd seed production activity. But Indo-American Hybrid Seeds Company

farmers were not much happy with the returns from the hybrid bitter gourd seed production activity because of severe attack of powdery mildew disease. Farmers lost a reasonable portion of yield because of the disease. The productivity of seed mainly depends on the emasculation and pollination work. The yield drastically reduces if the crossing is not proper. Pollination work has to be completed between 7 AM in to 11 AM. Further, if there is rainfall within 5 to 6 hours of pollination the yield declines. Ultimately the core issue in seed production is pollination work, upon which the benefit depends and also the pest and disease attack on the crop.

Practical utility:

- At present, provision of credit by financial institutions exclusively for seed production is absent. Hence, the financial institutions operating in the area need to come forward to provide credit facilities for undertaking seed production activities to the farmers
- The crop insurance scheme may be introduced to cover the seed production activity in the area to protect the farmers from the vagaries of climate
- Seed farmers association may be promoted to strengthen the bargaining power of the farmers' *vis-à-vis* seed contract companies.

Conclusions:

Contract farming in bitter gourd seed production has enabled seed farmers to have gainful employment and income and hence contract seed production has the potential for replication to other areas. The results indicated that existing contract farming in seed production generated employment opportunity and thus farm labour are being richly benefited especially women. Bitter gourd seed production is capital intensive. But the seed companies

Table 3 : Returns structure in hybrid bitter gourd seed production

Sr. No.	Particulars	Unit	Mahyco	Indo-American hybrid seeds	Namdhari seeds
1.	Production	kg	139.46	126.3	107.86
2.	Price per kg of Bitter gourd seeds	Rs.	600	500	800
3.	Gross returns	Rs.	83676	63150	86288
4.	Total variable cost	Rs.	51872.08	54045.12	50924.22
5.	Total fixed cost	Rs.	4034.2	3960.48	4023.04
6.	Total cost of cultivation	Rs.	55906.28	58005.6	54947.26
7.	Net returns over variable cost	Rs.	31803.92	9104.88	35363.78
8.	Net returns over total cost	Rs.	27769.72	5144.4	31340.74
9.	Cost of production per kg	Rs.	400.88	459.27	509.43
10.	Net returns per kg	Rs.	199.12	40.73	290.57
11.	Returns per rupee of variable cost	Rs.	1.61	1.17	1.69
12.	Returns per rupee of total cost	Rs.	1.5	1.09	1.57

are providing only the foundation seed insulating themselves of seed quality, not bothering about judicious use of other inputs including the expensive agrochemicals, and human labour. It is essential that the seed companies gradually remove such anomalies and supply of other capital intensive inputs according to their evolved package of practices. This enables widening the seed production base by involving other marginal and small farmers to enter into contract seed production and provides financial relief to the existing seed farmers.

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