Journal of Agricultural Development and Policy, 2021
Volume 31, No. 1, 33-38

Entrepreneurship Development of Farmers through Berseem Seed Production: An Economic Analysis

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Abstract

There are tremendous opportunities in the agriculture and allied sector for promotion of agri-start-up. Among various agri-business startups, berseem (Trifolium alexandrinum L.) seed production is also highly beneficial business to farmers as it has high demand in rural areas. Keeping in mind the business opportunity, demand and profitability in production of quality seed of berseem, 105 farmers were guided in Jhansi, UP. Out of that 11 farmers have successfully produced and sold the quality seed of berseem in year 2013-14. The average total cost of cultivation at farm was found as Rs 62.33 thousand per ha in production of crop and with processing charge of Rs2529.09, the Total cost per ha was found as Rs 64.86 thousand. Ungraded berseem seed was produced is 417.27 kg and 294.78 kg (70.64 per cent of total ungraded seed) of processed seed was produced. The average rate of graded seed was sold at Rs 120 per kg. In production process,491 qtls of green fodder and 23.53 qtls of dry fodder was also produced. The total return from sale of main products and by products was found as Rs 78.17 thousand per ha and net return per ha was found as Rs 13.31 thousand per ha and B:C ratio (on total cost basis) was found 1.21 and B:C ratio with variable cost only was found as 1.80. The cost of quality seed production when both main and by products (green and dry fodder and waste seed etc) are sold/estimated is found as Rs 75.63 per kg of berseem seed. The price of quality berseem seed in area is high in relation to its cost of production. For sustainability of benefits of farmers depends on higher incentives to be provided to farmers in form of availability of seed of improved varieties, support for Berseem purchase outlets, custom hiring centres for machines, prevention of stray animals.

Keywords: Entrepreneurship development, Berseem seed production, Economics, Cost of cultivation

JEL Classification: C8, O13, Q12

Introduction

People involved in agricultural employment are realizing that they cannot afford to look at others for employment and sustainable income. Besides, with the changing global agricultural scenario, over-dependence on traditional format of farming and on traditional crops will not be enough. Agri-business startups or entrepreneurship in agriculture sector or agripreneurship is the order of the day.

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There are tremendous opportunities in the agriculture and allied sector also for promotion of agri-start-ups. Such entrepreneurial ventures can increase the disposable income of the farmers largely and can make them more financially independent. Among various agri-business startups, fodder seed production can also been lucrative enterprise for farmers as most of the fodder crops are harvested for fodder only and little area is left for seed production. Thus, farmers have to purchase the seed for fodder crops every year. Among the different fodder crops, berseem seed production is proved as highly beneficial business to farmers due

to high demand for berseem seed in berseem fodder producing regions of India.

Berseem *(Trifolium alexandrinum L.)* is an important fodder crop of winter season in north Indian states. Its fodder is highly nutritive and palatable to the animals. Because of its higher growth and fodder yield, the seed of Berseem gets huge demand in the market (Mukherjee and Maiti, 2009). Its seed is generally sold at Rs 150 - Rs 180 per kg in the market at the time of sowing in Bundelkhand and some regions it is sold even at higher rate depending upon the nearness of sowing time. However, its cost of production is comparatively less in relation to the prevailing price. Thus, there is good scope for farmers to get a good margin over the cost in berseem seed production. Due to its importance by livestock based farmers, the produced seed can be sold locally in same village or nearby villages. Because of these reasons, the farmers were encouraged to grow the seed of Berseem in Jhansi area of Bundelkhand to harness the benefit of higher income and employment (Thomas, 2008).

Data Sources and Methodology

Keeping in mind, the business opportunity, demand and profitability in production of quality seed of berseem, 105 farmers were guided in Jhansi through training, personal interaction and field visits. Out of those about 10 per cent farmers (11 numbers) have successfully produced and sold the quality seed of berseem in year 2013-14. The average area under berseem seed was 0.4ha. The technical knowhow was provided to the farmers in growing the quality seed. The berseem varieties that were used for production were Wardan and Bundel Berseem 3. The cost of production analysis of Berseem was done at ICAR-IGFRI Jhansi. The seed rate used was 20 kg per ha and 100 kg DAP was suggested to apply as basal dose. Irrigation was provided through canal and electric motors as and when required. Three cuttings of green fodder were taken by manual labour till the first week of March. Opportunity cost of different inputs, machines and labourers was used for calculation of cost of production (Kumar, 2009). The prevailing wage rate of labour was taken as Rs 160 per manday of eight hours for year 2013-14. The estimated rate of green fodder was taken as Rs 71 per qtl.

Results and Discussion

Operation wise economics in berseem seed production expenditure has been presented in Table 1. The important operations in berseem seed production were field preparation, sowing, manures and fertilizers,

Table 1. Operation wise cost of cultivation (Rs/ha)

Operation	Per hectare	Percent to total cost
Field preparation	3889.56	6.24
Sowing	2604.32	4.18
Manures and fertilisers	6308.61	10.12
Irrigation after sowing	8975.41	14.40
Weeding	3272.47	5.25
Fodder Cutting	9642.84	15.47
Rouging	2807.82	4.50
Harvesting and pooling	3606.43	5.79
Threshing	1530.00	2.45
Total Working capital	42637.45	68.41
Interest on WC	1279.12	2.05
Total variable cost	43916.57	70.46
Rental value of land	12500.00	20.05
Total fixed cost	12746.16	20.45
TVC+TFC	56662.73	90.91
Management & Risk	5666.27	9.09
Total Cost	62329.01	100.00

Table 2. Input wise cost of cultivation **(Rs/ha)**

Input wise cost of cultivation	Per hectare	Percent to total cost
Draft power		
Draft power (hours)	7.15	
Draft power cost	3218.80	5.16
Labour power		
Total mandays	147.75	
Total Labour cost	23640.24	37.93
Seed cost	2436.36	3.91
Manures and Fertilizers	6148.05	9.86
Irrigation		
Tubewell (hrs.)	144.65	
Tubewell cost	7167.62	11.50
Chemical cost	26.36	0.04
Total working capital	42637.45	68.41
Total variable cost	43916.57	70.46
Total fixed cost	12746.16	20.45
Total cost	**62329.01**	**100.00**

irrigation, weeding, rouging, harvesting and threshing.

Among different operations, the highest expenditure incurred was on fodder cutting as 15.47 percent (Rs 9642.84) followed by the expenditure on irrigation which was found as 14.40 percent (Rs 8975.41) and manures and fertilizers as 10.12 per cent (Rs 6308.61). Average total cost of cultivation was found as Rs 62329 per ha in production of crop. In that, the share of total variable cost was found as 70.46 per cent and fixed cost as 20.45per cent (Table 1).

Employment generation and economics for different inputs used in production is presented in Table 2. A total of 147.75 mandays of labourers were employed in different operations which was found as 37.93 per cent of the total cost. The expenditure on inputs of irrigation and manures and fertilizers was 11.50 per cent and9.86 per cent respectively (Table 2) .

The data given in Table 3 presents the different outputs received at the farm. On per ha basis, the average ungraded seed production was 417.27 kg. The average price of ungraded seed was found as Rs 49.43 per kg. It was calculated by deducting the estimated value of by products as green fodder (Rs 34861.00) and dry fodder (Rs 7057.96) from the total cost (Rs 62329.01) and divided by quantity of ungraded seed produced. The value of ungraded seed was found as Rs 20624.16. The total green fodder produced from crop cutting was 491 qtls/ha and dry fodder produced from threshing of seed was 23.53 qtls (Sardana and Narwal, 2000).

Table 3. Cost and Return analysis at farm for ungraded seed

Particulars	Average
Ungraded seed (kg/ha)	417.27
Rate of ungraded seed (Rs/kg)	49.43
Value of ungraded seed (Rs/ha)	20624.16
Green fodder at farm (kg/ha)	49100
Estimated rate of green fodder (Rs/kg)	0.71
Value of green fodder (Rs/ha)	34861.00
Dry fodder (kg/ha)	2352.66
Value of dry fodder (Rs/kg)	7057.96
Gross return at farm (Rs/ha)	62543.13

The value of unchopped green fodder is estimated at Rs 71/qtls which was cost of production of berseem green fodder in locality. The price of leguminous dry fodder was estimated at Rs 300/qtl it was the rate at which the dry fodder was sold by farmers in season (Table-3).

The information shown in table 4 presents the total returns from Berseem seed production from field and after processing. With the manual processing of 417.27 kg of ungraded seed, 294.78 kg of processed seed was produced. It was 70.64 per cent of total ungraded seed (Martiniello, 1999, Din et al, 2014 and Tufail et al, 2018).

Table 4. Total cost and return in seed production (Per hectare)

Particulars	Values
Cost of cultivation	62329.01
Processing	2529.09
Total cost	64858.10
Return from crop field	
Quantity of Green fodder	49100.00
Rate of green fodder	0.71
Value of green fodder	34861.00
Quantity of Dry fodder	2352.65
Rate of dry fodder	3.00
Value of dry fodder	7057.96
Returns from processing of ungraded seed	
Quantity of TFL seed	294.78 (70.64% of ungraded seed)
Rate	120.00
Value of seed	35373.82
Quantity of waste/undersized seed	108.11 (25.91%of ungraded seed)
Rate	8.00
Value of waste seed	864.87
Straw from seed processing	14.38
Rate	1.00
Value	14.38
Total return from production and value	78172.04

Note: Cost has been expressed as Rs/ha; Quanity in kilogram per hectare; Rate in Rs/kg respectively

During processing 108.11 kg (25.91 per cent of ungraded seed) of undersized and waste seed and 14.38 kg of straw and nodes are also produced. The quality seed was sold at Rs 120 per kg to village farmers. The estimated value of waste seed and nodes and straw was taken as Rs 8/kg and Re one per kg respectively (Tiwari et al, 2016).

Table 5 presents the net returns and Benefit Cost ratio analysis. The total return from sale/estimation of different products and by products as Green fodder, Dry fodder, quality seed, waste seed, nodes and other straw was found as Rs 78.17 thousand per ha and the total cost of cultivation and processing was Rs 64.86 thousand per ha. The net return was found as Rs 13.31 thousand per ha and I:O ratio (on total cost basis) was found 1.21 and I:O ratio with variable cost only is found as 1.80.

Table 5. Net return, Benefit cost ratio analysis and cost of production per kg of seed

Particulars	Per hectare
Total return from seed production (Rs/ha)	78172.04
Total cost of seed production (Rs/ha)	64858.10
Net return (Rs/ha)	13313.94
I:O ratio on total cost basis	1.21
I:O ratio on variable cost basis	1.80
Cost of quality seed production	Rs/kg
A. when both main product and by-product are sold	75.63
B. When only main product is sold	221.30

Cost of production of quality seed was calculated in two ways 1- when the farmer was able to sell/utilised both main product as seed and by products (green fodder, dry fodder and others) and 2- when the farmer was able to sell/utilized only main product as quality seed and by product gives no return.

Case 1: Cost of quality seed production when both main and by products (green and dry fodder and waste seed etc) were sold/estimated was found to be Rs 75.63 per kg of berseem seed. The price of quality berseem seed with 10 per cent margin will be Rs 83.19 per kg. It was the situation, when the seed was sold instantly in village. When the seed had to be stored for about five to six months till Sept.- Oct, margin may be kept as 15 per cent (10 per cent profit and 5 per cent for store charges) the price of berseem seed would be then Rs 86.97 per kg. When the farmer had to borne the transportation and packing, the margin over the cost was kept as 20 per cent. In that situation, the price of berseem seed would be kept as Rs 90.76 per kg of pure seed (Table 5).

Case 2: Cost of quality seed production was found as Rs 221.30 per kg when only main product when seed was sold and by products were not utilized. In this case, the price of quality berseem seed with 10 per cent

margin would be Rs 243.43 per kg. When the seed had to be stored for about five to six months till Sept.- Oct., margin was taken as 15 per cent (10 per cent profit and 5 per cent for store charges) the price of berseem seed would be Rs 254.50 per kg. When the farmer had to borne the transportation and packing, the margin over the cost might be kept as 20 per cent. In that situation, the price of berseem seed would be kept as Rs 265.56 per kg of pure seed (Table 5).

The by-products as green fodder/dry fodder or waste seeds could be utilized for domestic livestock or could be sold in market. The price of quality Berseem seed varied in the market from Rs 150 per kg to Rs180 per kg and even more during the sowing season. Thus, the farmers could take the advantage of high price during the sowing season and so they were advised to sell the seed during the sowing season.

Conclusion and Policy Implications

It was observed that with per hectare total cost of Rs 64.86 thousand, the total returns of Rs 78.17 thousand was received. The net returns per ha was Rs 13.31 thousand and B:C ratio is found as 1.21. The production cost of graded seed was found as Rs 75.63 per kg and had easily marketed at Rs 120 per kg as prevailing retail prices were Rs 150-180 per kg in Bundelkhand. It was clear that even by comparing the prevailing cost of production of Berseem seed (Rs 75.63 per kg) by the farmers and prevailing retail selling price of berseem seed (Rs 150 - Rs 180) in the sowing season in Bundelkhand region, farmers can reap good profit margin. Thus, there a scope for increase in profit margin from sale of Berseem seed by the farmers based on demand for berseem and seed storage capacity by farmers.

Sustainability of this margin in berseem seed production depended on good weather during March to May, timely availability of agricultural machines, prevention of stray animals, good quality seed and availability of more purchase units for berseem seed in vicinity. It was found that the farmers' cost of berseem production had increased due to higher intensity of sun from March to May that led to more irrigations and big cost was also incurred in management of fields from the stray animals and less availability and costly labour during harvesting of Berseem in mid May. Thus, for sustainability of profits of farmers depended on higher incentives to be provided for Berseem purchase and processing outlets in about 5 km radius, opening up the effective custom hiring centres for improving the availability of agricultural machines in villages, incentives to be provided to agencies dealing with wires, chain link fences, other tools to prevent the stray animals from entering the farms and incentives also required to be provided to farmers to install these prevention mechanism in fields as during April-May, no or less agricultural crops are in visible in nearby fields. So, all stray animals tried to approach the Berseem fields. The emphasis should also be provided to increase the quality seed of Berseem (that providing high fodder crop) from both private and Public sectors organization. Otherwise, the farmers had to use the previous season seed or other easily available seed which was sometimes had lots of impurities including harmful cuscuta seed.

Acknowledgements

Authors are grateful to Director, ICAR-IGFRI, Jhansi, for providing necessary facilities, support and guidance for research study during data collection, analysis and development of research paper.

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Received: December 12, 2020 Accepted: February 17, 2021