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Shriram

Department of Agricultural Economics, University of Agricultural Sciences, Raichur, Karnataka, India

Prabhuling Tevari

Department of Agricultural Economics, University of Agricultural Sciences, Raichur, Karnataka, India

Vaishnavi

Department of Agricultural Economics, University of Agricultural Sciences, Raichur, Karnataka, India

GB Lokesh

Department of Agricultural Economics, University of Agricultural Sciences, Raichur, Karnataka, India

Jagrati

Department of Agricultural Economics, University of Agricultural Sciences, Raichur, Karnataka, India

B Deshmanya

Department of Agricultural Economics, University of Agricultural Sciences, Raichur, Karnataka, India

Vijaya Kumar K

Department of Seed Science and Technology, University of Agricultural Sciences, Raichur, Karnataka, India

Corresponding Author:

Shriram

Department of Agricultural Economics, University of Agricultural Sciences, Raichur, Karnataka, India

An economic analysis of rabi sorghum and chick pea seed production in Nek region

Shriram, Prabhuling Tevari, Vaishnavi, GB Lokesh, Jagrati. B Deshmanya and Vijaya Kumar K

Abstract

The study on economic analysis of rabi sorghum and chickpea seed production was conducted in North-Eastern Karnataka, wherein the primary data was collected from Bellary district. The study was conducted with two categories of seed producers namely private company seed producer as private seed producing farmers and KSSC, NSC and UASR seed producer as public seed producing farmers during Rabi season of 2018-19. A total of 80 sorghum seed growers and 80 chickpea growers were selected randomly for the study. The cost of production of Rabi sorghum was found higher in private seed producing farmers (Rs. 15862.76/acre) than public seed producing farmers (Rs. 15785.28/acre). The yield of sorghum was highest in public seed production (916 kg/acre) than the private seed producers (894 kg/acre). B:C ratio for public sorghum seed producers was found higher (2.43) than private seed producing farmers (2.23). whereas in case of chickpea cost of production was found higher in public seed producing farmers (Rs. 13072.40/acre) than private seed producing farmers (Rs. 12966.48/acre). The yield of chickpea was higher in public seed production (502 kg/acre) than private seed producers (493 kg/acre). B:C ratio for public chickpea seed producers was found higher (1.84) than private seed producing farmers (1.75).

Keywords: Cost of production, yield, and benefit cost ratio

Introduction

Seed is a basic and vital input among all inputs for sustainable agricultural production. It is found that quality of seed accounts for 20-25 percent to productivity. The importance of quality seed has been realized by mankind long ago. The need for a good viable seed for prosperity of human race is mentioned in Rigveda of ancient India. It is mentioned in the primitive manusmriti as "Subeejam Sukhetre Jayate Sampadyate" which literally means "A good seed on a good field produces abundantly" (Poonia, 2013) [6].

Next to China, India has the highest population of 1.25 billion and likely to reach 1.7 billion by 2050. In order to meet the growing demands for our increasing population, production need to be increased. This can only be possible by bridging the existing yield gaps through improved technologies and by integrated natural resource management. Hence, the second Green Revolution would demand much faster growth of seed sector especially to meet the demand of quality hybrid seeds and to replace old with new high yielding varieties.

Sorghum is one of the main staple food for the world's poorest and most food insecure people across the semi-arid tropics. Globally, sorghum is cultivated on 41 million hectares to produce 64.20 million tonnes, with productivity hovering around 1.60 tonnes per hectare. With exceptions in some regions, it is mainly produced and consumed by poor farmers. India contributes about 16 percent of the world's sorghum production. It is the fifth most important cereal crop in the country. In India, this crop was one of the major staple cereals during 1950's and occupied an area of more than 18 million hectares but has come down to 7.69 million hectares.

There are two distinct sorghum growing seasons in India, *kharif* (rainy season; June–October) and rabi (post rainy season; October–January). Post-rainy sorghum is primarily used as a food owing to its good grain quality and also serves as a main source of fodder, especially during dry seasons. The area under post-rainy sorghum has remained stable and is grown predominantly in six districts of Maharashtra (Solapur, Ahmednagar, Pune, Beed, Osmanabad and Aurangabad) and three districts of Karnataka (Vijayapur, Kalaburgi and Raichur), apart from parts of Andhra Pradesh and Tamil Nadu. Characteristics like resistance to shoot fly, lodging (mechanical) and rust are exemplified best in Maldandi (M 35-1), a variety selected

from a local landrace in Maharashtra producing high stable yields of grain and Stover across different sowing dates which still dominates in post-rainy season sorghum area in India (Reddy *et al.* 2012)^[8].

Due to less use of improved varieties of post-rainy sorghum, the seed replacement rate is also falling. Hence, the outcome of the study would help to identify the entry points for post rainy season sorghum improvement and related seed system interventions.

Chickpea is the third most important pulse crop after the beans and peas produced in the world. It accounts for 20 percent of the world pulses production. Major producers of chickpea include India, Pakistan and Mexico. Global production, as per Food and Agricultural Organization (FAO), is about 12 million metric tons in 2016. India is the largest producer, with about 8 million tons, accounting for about 70 percent of total world production. Six countries including India, Australia, Turkey, Myanmar, Pakistan and Ethiopia accounts for about 90 percent of world chickpea production (Kumar, 2017)^[3].

India is also the largest producer of chickpea in the world. As a result the country occupied second place in world trade despite contributing for about 70 percent of world's total production. Production of gram is concentrated in central and southern parts of India. Production trends in past 15 years indicated that except for a few years in the early 2000s the output of gram fluctuated at around 6 million tons for over a decade till 2007-08. However production has steadily increased thereafter and largely in tune with the trends in yield levels and reached a record 9.5 million tons in 2013-14. However with a fall in acreage on account of lower prices, output is declined to 8.28 million tons in 2014-15 (Kumar, 2017)^[3].

Methodology

Study area

Bellary district is spread from southwest to northeast and is situated on the eastern side of Karnataka state. The district lies in 15° 30' and 15° 50' North latitude and 75° 40' and 77° 11' East longitude. This district is bounded by Raichur district on North, Koppal district on the west, Chitradurga and Davanagere districts on the south, and Anantapur and Kurnool districts of Andhra Pradesh on the east.

As per 2011 census, the population of the district was 24,52,595 (Male: 12,36,954 and Female: 12,15,641). The geographical area is 8450 sq. km. It has two revenue sub divisions, Bellary subdivision and Hospet subdivision, which in all have seven taluks. The Bellary subdivision has three taluks, while four taluks in Hospet subdivision. There are 27 hoblies, two CMC's, six municipality, seven town panchayats, 552 revenue villages and 436 thands/habitations. The rural population constituted 62 percent of the total population. The density of population is 290 per sq. km. The sex-ratio was 983 females per 1000 males. The normal rainfall is 636 mm. The major occupation of this district is agriculture and 75 percent of total labour force is dependent on agriculture.

Sampling and data collection

The study was conducted in Bellary district in North Eastern Karnataka region, which is purposively selected in consonance with the objectives of the study. Bellary is one of the important and major seed growing districts in North Eastern Karnataka region. Out of seven talukas in the district,

only one taluka was selected for the study because seed producing companies and more number of seed producing farmers were concentrated only in this taluka of the district.

Analytical tools and techniques employed

To fulfil the specific objective of the study, collected data was analyzed with help budgeting technique. This technique was used to estimate the costs and returns in seed production. Various cost concepts are used like variable cost, fixed cost and marginal cost to reach the specified objective.

Results

Economics of seed production

There may be variations in the cost of cultivation even between two different sample areas. This will have an impact on returns also. Hence an attempt was made to study the variation in the cost and to identify the causes for such variation. Though, rabi was the most preferred season for seed multiplication in the case of rabi sorghum, it was possible for the farmer producers to take up two crops (both *kharif* and rabi) in a year with the help of irrigation facility. For the study purpose only rabi seed production for the year 2018-19 was considered and results were drawn upon.

Cost incurred in rabi sorghum seed production

The various cost components like variable cost and fixed cost under rabi sorghum seed production for both public and private seed production system are presented below.

In order to assess the input and output levels of rabi sorghum cultivation and cost and returns structure of commercial seed production the data borrowed from Table 1 revealed that, the investment pattern in commercial rabi sorghum seed production was similar to one found in any other cereal seed crops. Little high investment was needed for seed production compared to grain production. Among the material inputs, the proportion of expenditure incurred on FYM, seed, fertilizer and plant protection chemicals under public seed production were 3.09, 8.10, 11.97 and 7.00 percent of the total cost of cultivation, respectively. In case of private seed producing farmers FYM, seed, chemical fertilizers and plant protection chemicals were used to the extent of 3.33, 7.60, 12.78 and 7.36 percent of the total cost of cultivation, respectively.

Rabi sorghum seed production is a labour intensive operation, hybridization; rouging, thinning, weeding, application of fertilizers and plant protection chemicals are the important operations which require more labour. Weeding has to be done four times, which eats always much labour. It can be seen from the Table 1 that, major portion of the total cost of cultivation was incurred on the human labour. The expenditure incurred towards the human labour and machine and bullock labour used in public seed production was 27.46 and 11.02 percent of the total cost of cultivation, respectively. In case of private seed producing farmers, the proportion of labour used accounts for 28.03 and 10.83 percent of the total cost of cultivation, respectively for human labour and machine and bullock labour.

Normally, the public or private seed companies enter into a written/oral contract with farmers individually for the production and supply of seed at a prefixed rate. The supply of inputs besides the seeds (breeders or foundation seeds) is optional in the contract. Technical guidance for crop cultivation, special operations such as emasculation, pollination and hybridization, harvesting and processing are

provided to the farmers through regular field visits by the trained supervisors. Generally, the seed agencies allot a specific area for seed production, such as one acre in case of both rabi sorghum and chickpea (which is called a 'plot') and provide the requisite number of seed of both the parents for maintaining the plant population for hybridization and seed production.

The seeds are charged along with a service charge for supervision, seed testing, etc. One plot per person per crop is a norm, keeping in view the additional labour and capital needs as the entire process of cultivation, processing and seed testing takes around eight months for the grower to receive the total emoluments, which is one of the main constraints for the seed producers.

In this regard, special care was taken to document the charges involved in seed certification and inspection by various agencies in seed production system. The results revealed that, 0.22 and 1.58 percentage share of the total cost of cultivation was incurred by the farmers on the seed certification and field inspection charges under the public seed production system. While similar proportion of cost structure was also noticed under private seed production in the study area.

The marketing charges incurred by the seed producers were also accounted for the total cost of cultivation. The marketing charges included were cost of gunny bags, cleaning the seeds, drying and bagging. It is interesting to note that, nearly two percent of total cost of cultivation was noticed only under public seed producer. Marketing cost was not noticed in case of private seed producers in the study area. This may be due to; the private agencies procured the produce as it is after harvest at the door step of farmers filed.

The variable cost was calculated by adding eight percent interest to the total working capital. The interest on working capital worked out to be Rs. 913.68 per acre for public seed production which was 5.79 percent of total cost of cultivation and for private seed producers the amount was Rs. 910.24 per acre and it accounted for 5.74 percent of total cost of cultivation.

The performance of public and private rabi sorghum seed producers was compared to assess the added and reduced costs and benefits in the study areas. The total variable cost of public and private rabi sorghum in total cost of cultivation has been depicted in Table 1. The total variable cost was Rs. 12334.68 and Rs. 12288.24 per acre in public and private seed production, respectively. The variable cost accounted for 78.14 percent and 77.47 percent to the total cost of cultivation for public and private seed growers of the study area, respectively.

The addition of depreciation, land revenue, rental value of land and interest on fixed capital gives the total fixed cost. The rental value of the land was considered as that prevailing in the locality for one crop. The results are presented in Table 1 and the results depicted that under public seed production, expenditure incurred on depreciation of farm implements, land revenue, rental value of land and interest on fixed capital accounts for 2.98, 2.38, 14.89 and 1.62 percent of the total cost of cultivation, respectively. Whereas, among private seed producing farmers these fixed cost components had the share of 3.31, 2.36, 15.04 and 1.82 percent to the total cost of cultivation, respectively. Land revenue was almost similar for all the farmers but there was a variation in case of rental value of land for public and private rabi sorghum seed producers. The depreciation charge was slightly high in private seed

grower farms and low on public seed farms because private seed farmer's asset position was high.

The total fixed cost for public seed producers amounts to Rs. 3450.60 per acre which is 21.86 percent of the total cost of cultivation. The total fixed cost in private seed production accounted for Rs. 3574.52 per acre, which translated to 22.53 percentage of the total cost of cultivation. The total cost of cultivation in public seed production system was Rs. 15785.28 per acre in the study area. In the surveyed area the total cost of cultivation for private seed producers accounted for Rs. 15862.76 per acre which was slightly higher compared to public seed growers.

It is clear from the table that among various costs incurred in seed production, human labour component accounts for 27.46 and 28.03 percent of total cost of cultivation in public and private seed production system, respectively. As it is a seed production activity, high labour force required for operations like rouging, thinning, weeding, application of fertilizers and plant protection chemicals. These results are in line with the Kumar *et al.* (2017) [3], who reported that human labour cost share is more in seed production activity. Similarly, same results were reported by Pal *et al.* (2016a) [5] in groundnut crop and Reddy (2015) [7] in *Bt* cotton seed production.

Table 1: Cost incurred in Rabi sorghum seed production (per acre)

Sl. No.	Particulars	Public		Private	
		Cost (Rs.)	Percentage	Cost (Rs.)	Percentage
I. Variable costs					
A. Material cost					
1	FYM	488.00	3.09	528.00	3.33
2	Seed	1,279.00	8.10	1,205.00	7.60
3	Fertilizers	1,889.00	11.97	2,027.00	12.78
4	PPC	1,105.00	7.00	1,168.00	7.36
B. Labour cost					
1	Human labour	4,335.00	27.46	4,447.00	28.03
2	Bullock and machine labour	1,740.00	11.02	1,718.00	10.83
C. Inspection and Marketing cost					
1	Seed certification charges	35.00	0.22	35.00	0.22
2	Field inspection charges	250.00	1.58	250.00	1.58
3	Marketing cost	300.00	1.90	-	-
D	Interest on working capital	913.68	5.79	910.24	5.74
	Total variable cost (A+B+C+D)	12,334.68	78.14	12,288.24	77.47
II. Fixed costs					
1	Depreciation	470.00	2.98	525.00	3.31
2	Land revenue	375.00	2.38	375.00	2.36
3	Rental value of land	2,350.00	14.89	2,385.00	15.04
4	Interest on fixed capital	255.60	1.62	289.52	1.82
	Total fixed cost	3,450.60	21.86	3,574.52	22.53
	Total cost (I+II)	15,785.28	100.00	15,862.76	100.00

Cost incurred in chickpea seed production

The economics of chickpea seed cultivation among the sample respondents in the study area is presented here under. This includes the variable cost and fixed cost of chickpea cultivation and the same is presented below under different sub-heads. The total cost incurred in chickpea seed production is presented in Table 2.

Among the material inputs, the proportion of expenditure incurred on FYM, seed, fertilizers and plant protection chemicals (PPC) under public seed production were 3.76, 12.85, 8.80 and 5.61 percent of the total cost of cultivation, respectively. Whereas, in case of private seed producers, the inputs used were in the order of 4.05, 11.18, 9.33 and 6.13 percent of the total cost of cultivation, respectively in the study area.

The detailed labour use pattern in cultivation of ginger production is depicted in Table 2. It could be observed from the table that, the total labour use in cultivation of public chickpea production was 24.23 and 9.56 percent of the total cost of cultivation for human labour and bullock and machine labour, respectively. In case of private chickpea seed producing farmers, the proportion of human labour and bullock and machine labour accounts for 25.23 and 9.86 percent of the total cost of cultivation, respectively. Likewise, in rabi sorghum cultivation, chickpea cultivation also requires large number of men and women labour in operations such as land preparation, application of plant protection chemicals, application of manures and fertilizers, thinning, earthing up and harvesting and cleaning.

From the Table 2 it is evident that, 0.27 and 1.11 percent share of the total cost of cultivation was incurred by the farmers on the seed certification and field inspection charges, respectively under the public chickpea seed distribution system. While similar proportion of expenditure was also noticed under private seed production in the study area.

The producers of chickpea seeds had to incur a considerable amount of expenditure towards the cost of cleaning, packing material, weighing and packing, loading and unloading charges, transportation charges and other miscellaneous items. All these expenses were accounted to arrive at total marketing costs of chickpea seeds. The marketing charges of Rs. 250 per acre were incurred by the public seed producers which accounted for 1.91 percent of the total cost of cultivation. Marketing charges were not noticed in case of private seed producers in the study area. The reason being the seed companies procured the seed material from growers without any scientific validation, like moisture content, dry matter content *etc.* Seed companies procured seed material without any cleaning and drying in the farmers' field. Packing material and transportation facility was provided by the companies itself at farmers' door step.

From the table it could be observed that, an amount of Rs. 671.20 per acre was incurred on interest on working capital for public seed producers and it accounted for 5.13 percent of total cost of cultivation. In case of private seed production, Rs. 696.80 per acre was spent on interest on working capital which accounted for 5.37 percent of total cost of cultivation.

The total variable cost stood at Rs. 9573.20 for public and Rs. 9406.80 for private seed producers in the study area.

As observed from the Table 2, the expenditure incurred on fixed cost components such as depreciation of farm implements, land revenue, rental value of land and interest on fixed capital accounts for 3.98, 2.87, 17.94 and 1.98 percent of the total cost of cultivation, respectively in public seed production system. Whereas among private seed producing farmers, above fixed cost components accounted for 4.36, 2.89, 18.17 and 2.03 percentages share in the total cost of cultivation, respectively.

The data from Table 2 revealed that, the total fixed cost of public seed production was Rs. 3499.20 per acre for the

respondent farmers. The total fixed cost in private seed production system accounted for Rs. 3559.68 per acre in the study area. The total cost of cultivation under public seed production system was Rs. 13,072.40 per acre. Whereas, the total cost of cultivation in private seed production system stood at Rs. 12,966.48 per acre.

It is evident from Table 2 that, the share of human labour cost is more in total cost in both public and private seed production systems and they accounted for 24.23 and 25.23 percent of total cost of cultivation, respectively. This is due to fact that high labour requirement for weeding, thinning and harvesting operations which are important in seed production activity. Kumar *et al.* (2017) [4] had also drawn similar conclusion from both existing literature and own analysis to argue that human labour accounts for larger share in the total cost of cultivation.

Table 2: Cost incurred in chickpea seed production (per acre)

Sl. No.	Particulars	Public		Private	
		Cost (Rs.)	Percentage	Cost (Rs.)	Percentage
I. Variable costs					
A. Material cost					
1	FYM	491.00	3.76	525.00	4.05
2	Seed	1,680.00	12.85	1,450.00	11.18
3	Fertilizers	1,150.00	8.80	1,210.00	9.33
4	PPC	733.00	5.61	795.00	6.13
B. Labour cost					
1	Human labour	3,168.00	24.23	3,272.00	25.23
2	Bullock and machine labour	1,250.00	9.56	1,278.00	9.86
C. Inspection and Marketing cost					
1	Seed certification charges	35.00	0.27	35.00	0.27
2	Field inspection charges	145.00	1.11	145.00	1.12
3	Marketing cost	250.00	1.91	-	-
D. Interest on working capital					
	Interest on working capital	671.20	5.13	696.80	5.37
	Total variable cost (A+B+C+D)	9,573.20	73.23	9,406.80	72.55
II. Fixed costs					
1	Depreciation	520.00	3.98	565.00	4.36
2	Land revenue	375.00	2.87	375.00	2.89
3	Rental value of land	2,345.00	17.94	2,356.00	18.17
4	Interest on fixed capital	259.20	1.98	263.70	2.03
	Total fixed cost	3,499.20	26.77	3,559.68	27.45
	Total cost (I+II)	13,072.40	100.00	12,966.48	100.00

Returns realized in rabi sorghum seed production

The yield obtained and returns realised from rabi sorghum cultivation per acre are presented in Table 3. The various utilization components such as quantity retained for home consumption, quantity retained for seed production and quantity sold to agency and in local market are presented below.

The average yield observed in study area under public seed production system was 916.00 kg per acre. Out of these 916 kg of produce, public agencies procured on an average of 874 kg per acre as graded good seeds and 42 kg per acre were rejected because of quality parameters. In case of private seed production system, the average productivity observed was 894 kg per acre and all the produce was procured by company only.

Sample public seed growers realized gross returns of Rs. 38,418.00 per acre and net returns of Rs. 22,632.72 per acre in the study area. The cost of production per kg of rabi sorghum seed observed to be Rs. 17.23 with the benefit cost ratio of 2.43 which is represented in Table 3. Similarly, private seed producers realized gross returns of Rs. 36,150.00 per acre and net returns of Rs. 20,287.24 per acre. Cost of production per kg was observed to be Rs. 17.74 with the benefit cost ratio of 2.28 for private seed producers in the study area. The private seed growers realised slightly higher cost of production (Rs. 17.74 per kg) compared to public seed producers (Rs. 17.23 per kg).

It was observed from the table that, net returns were more in public seed production compared to private seed production, which is due to public agencies like KSSC, NSC and UASR will procure the farmer producer's seed by providing extra money in the form of incentives over the price prevailing in the market, due to which the farmers incurred less cost of cultivation. The cost of cultivation was reduced by the repeated visits of field officials to seed plots and technical guidance imparted to seed growers at regular intervals. At the same time there was meagre amount of rejected seeds by the public agencies due to quality parameters. It works out to be on an average around 4-5 kgs per quintal of the graded good seeds. Returns per rupee invested for public rabi sorghum seed producing farmers were quite higher compared to private seed producers. The results are in line with Haque *et al.* (2012) and they reported that net returns and B:C ratios were more in public seed growers compared to NGO and private company.

It is worth noting that public seed producing farmers get more returns than private seed producers because public procurement agency will procure the seeds from the farmer by paying more than prevailing market prices so that the public seed production is more beneficial to the farmers.

Table 3: Returns realized in rabi sorghum seed production (per acre)

Sl. No.	Particulars	Unit	Public agencies	Private companies
I. Production and utilization				
1	Main product	kg	916.00	894.00
2	By product	kg	1,950.00	1,750.00
3	Graded good seeds	kg	874.00	894.00
4	Rejected seeds	kg	42.00	-
5	Quantity retained for home consumption	kg	-	-
6	Quantity retained for seed production	kg	-	-
7	Quantity sold to the agency	kg	874.00	894.00
8	Quantity sold in the market	kg	42.00	-
II. Costs				
a.	Variable cost	Rs.	12,334.68	12,288.24
b.	Fixed cost	Rs.	3,450.60	3,574.52
	Total cost (a + b)	Rs.	15,785.28	15,862.76
III. Returns				
1	Sale of good seeds to the company	Rs.	34,368.00	33,400.00
2	Sale of good seeds in the market	Rs.	-	-
3	Sale of rejected seeds in the market	Rs.	1,050.00	-
4	By product	Rs.	3,000.00	2,750.00
5	Gross returns	Rs.	38,418.00	36,150.00
6	Net returns over variable cost	Rs.	26,083.32	23,861.76
7	Net returns over total cost	Rs.	22,632.72	20,287.24
8	Cost of production per Kg	Rs.	17.23	17.74
9	Returns per rupee	Rs.	2.43	2.28

Returns realized in chickpea seed production

It is evident from the Table 4 that on an average yield observed in public seed production system was 502 kg per acre, out of which 478 kg per acre were procured by public agency as good seeds and 24 kg per acre were rejected due to quality parameters. In case of private seed production system, the yield observed was 493 kg per acre and all the seed which is produced were procured by companies.

Total gross returns realized by the public seed farmers were Rs. 24,099.00 per acre with cost of production of Rs 26.04 per kg of seed. Gross returns accrued by the private seed producers were Rs. 22,678.00 per acre with cost of production of Rs. 26.30 per kg of seed. The net returns obtained by the public seed respondents was Rs. 11,026.60 per acre whereas, private seed farmers realized Rs. 9,711.52 per acre. The benefit cost ratio for public farmers stood at 1.84 and it was 1.75 for private chickpea seed producer respondents in the study area. It's clear from the table that net returns obtained was more in public seed production compared to private seed production, the reason for this was public agencies will procure the seeds at the price more than price prevailing in seed markets. The results are in line with Haque *et al.* (2012), reported that net returns and B:C ratios were more in public seed growers compared to NGO and private company.

Table 4: Returns realized in chickpea seed production (per acre)

Sl. No.	Particulars	Unit	Public agencies	Private companies
I. Production and utilization				
1	Main product	kg	502.00	493.00
2	By product	kg	-	-
3	Graded good seeds	kg	478.00	493.00
4	Rejected seeds	kg	24.00	-
5	Quantity retained for home consumption	kg	-	-
6	Quantity retained for seed production	kg	-	-
7	Quantity sold to the agency	kg	478.00	493.00
8	Quantity sold in the market	kg	24.00	-
II. Costs				
a.	Variable cost	Rs.	9573.20	9406.80
b.	Fixed cost	Rs.	3499.20	3559.68
	Total cost (a+b)	Rs.	13072.40	12966.48
III. Returns				
1	Sale of good seeds to the company	Rs.	22944.00	22678.00
2	Sale of good seeds in the market	Rs.	-	-
3	Sale of rejected seeds in the market	Rs.	1155.00	-
4	By product	Rs.	-	-
5	Gross returns	Rs.	24099.00	22678.00
6	Net returns over variable cost	Rs.	14525.80	13271.20
7	Net returns over total cost	Rs.	11026.60	9711.52
8	Cost of production per kg	Rs.	26.04	26.30
9	Returns per rupee	Rs.	1.84	1.75

Conclusions and Policy implications

- Total cost of cultivation of Rabi sorghum seed production was more in private (Rs. 15862.76 per acre) compared to public seed production (Rs. 15785.28 per acre).
- Among the Rabi sorghum total cost of cultivation, human labour occupied the major share (27.46% and 28.03%) of total cost in public and private seed production. The higher human labour requirement in seed production was mainly due to activities like rouging, weeding, fertilizer and Plant protection chemicals application, etc
- Total cost of chickpea seed production was observed to

be Rs. 13072.40 per acre in public and Rs. 12966.48 per acre and private seed producing farmers.

2012;102(6):904-908.

- Human labour cost accounts for 24.23 percent and 25.32 percent of chickpea total cost of cultivation in public and private seed production, respectively.
- Marketing cost was not borne by the private seed producers in the study area. Nearly two percent of total cost of cultivation was noticed under public seed producers.
- Out of 916 kg of Rabi sorghum produce, public agencies procured on an average of 874 kg per acre as graded seeds and 42 kg per acre were rejected to meet quality standards. But in case of private companies they will procure all the seeds produced by farmers.
- Gross returns were more in public sorghum seed producers (Rs. 38418 per acre) compared to private seed producers (Rs. 36150 per acre) and it was due to the fact that public agency procured seed material by providing incentives over the market prevailing price.
- For chickpea seed production, gross returns were more in public seed producers (Rs. 24099 per acre) compared to private seed growers (Rs. 22678 per acre).
- The private Rabi sorghum seed growers realized slightly higher cost of production (Rs. 17.74 per kg) compared to public seed producers (Rs. 17.23 per kg).
- The benefit cost ratio for public farmers stood at 1.84 and it was 1.75 for private chickpea seed producer respondents in the study area.
- Establishment of processing plants and storage facilities for both the crops are needed for fetching higher prices to the farmer.
- Policy guidelines that enforce a commitment for the seed companies to undertake infrastructure development and quality assurance in the seed production must be undertaken strictly.

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