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Economic comparison of paddy production using certified seed and commercial grain in north Bihar

Sima Sinha and Paras Nath[1]

Krishi Vigyan Kendra (Banka), BAU, Sabour-813 210
[1]BPS Agricultural College, Purnia, BAU, Sabour
**Email: simasinha11@gmail.com*

ABSTRACT

Rice is one of the most important crops of North Bihar, but its yield is quite less. A major constraint of paddy production is non-availability of quality seed in Bihar. Certified seed can be produced, to make farmers self-sufficient in seed and achieve high productivity. An experiment was conducted in Supaul district of N. Bihar in the year 2009 and 2010 at farmers' field, under the supervision of Krishi Vigyan Kendra, Supaul. The objective of the study was to calculate and compare the economics of production of paddy seed variety Rajendra Mahsuri -1 (certified) in farmers' field to commercial paddy grain. The identified village was Jahlipatti under Raghopur block which is located 6 km South to KVK, Supaul. On the basis of the data generated from the experiment of paddy seed production it was found that the benefit cost ratio of commercial grain produced was only 1.7: 1, whereas paddy seed had higher cost benefit ratio of 2.5:1. This implies that the profit which is obtained is more than twice the cost involved in this enterprise. The paddy seed production is a rewarding enterprise for Supaul Farmers giving high monetary returns.

Key words: *paddy seed production, commercial paddy grain, benefit cost ratio, certified seed*

Rice is an important staple crop providing 66-70 % of calorie intake to the consumers. The United Nations General Assembly, in a resolution declared the year of 2004 as the "International Year of Rice", which has tremendous effect on food security. It very eloquently upheld the need to heighten awareness for the role of rice in alleviating poverty and malnutrition (Barah and Pandey, 2005). Paddy is one of the important crops of N. Bihar however yield was very low. A major pillar of enhancing productivity is input management. Amongst inputs, seed is an important factor that contributes to productivity. Seeds are the fundamental input for sustained growth in crop production. It is cheaper than other critical inputs such as irrigation, fertilizer and plant protection measures. Efficacy of other agricultural inputs viz. irrigation, fertilizer, pesticide etc. depends upon the genetic potential of seed. The use of quality seed with desirable replacement rate is essential for growth in productivity. The use of high yielding varieties (HYV) of paddy played an important role in green revolution. Quality seed of any crop alone enhances the crop productivity by 15-25 % (Punnthurai *et al*., 1984). Productivity in the Bihar State is very low due to low seed replacement rate (SRR) as well as unavailability of certified seed in the market. In order to work out the gross return, net return and cost-benefit ratio of paddy seed production in comparison of paddy grain production, experiments were conducted in the Farmers' Fields. A Self Help Group (SHG) of nineteen members namely Bajrang Kisan Club was formed for seed production. The objectives of this study were to achieve self sufficiency in seed production and improve their socio-economic conditions.

MATERIALS AND METHODS

The study was conducted in Jahlipatti village under Raghopur block of Supaul district of North Bihar. This village was selected for transforming it into an ideal Seed village, where the production of crops for the purpose of quality seed was under direct guidance and

supervision of Krishi Vigyan Kendra (KVK), Supaul under Rajendra Agricultural University. A Self Help Group (SHG) was formed which had nineteen members. All of the nineteen farmers of this village are registered under the umbrella of Bajrang Kisan Club as seed growers. KVK, Supaul arranged the foundation seed of paddy variety Rajendra Manshuri - 1 as well as regular training and interaction was provided by the scientists as per farmers' need. Field experiments of paddy seed production and paddy grain production were conducted in farmer's field to compare the cost benefit ratio.

Farmers used 50Kg of seed per hectare for grain production whereas for certified seed production only 30Kg of foundation seed per hectare was sufficient. In seed production program three week seedlings were used but in case of grain production, seedlings used were as old as a month. In order to maintain the genetic purity, farmers maintained isolation distance. Paddy is highly self pollinated crop so chances of cross pollination were few thus, only three meters of isolation distance were required between different species. All the members of Bajrang club performed rouging in three stages during crop production namely before flowering, after flowering and prior to harvesting. It was moderately difficult to carry this task out but farmers were aware enough to know the genetic importance of seed thus, rouging became easy. It is essential to maintain the varietal purity. Firstly, rouging was done on the basis of phenotype of plant, secondly, on the basis of flower synchronization, colour, shape and size and thirdly on maturity duration, length of panicle diseased plant etc.

During seed production, post harvest operation was also important to maintain the physical purity of seed. A number of trainings were provided by KVK scientists to make seeds free from physical mixture during threshing, drying, bagging etc. There was yet another important factor to maintain *i.e.* the seed viability during storage. Precautions taken by farmers were proper drying on their own experience, storage in jute bags lined with plastic and stacked in air tight room. The storage room was free from moisture and fumigated before storage of seed. Paddy seeds were stored for an average of six months. In North Bihar, paddy seedling is grown in the month of May, so farmers prior to that took seed sample to check the germination percentage, physical purity and others. Seeds were also sent to Seed Testing Laboratory, Patna for germination and purity test which confirmed their purity and minimum germination standards. Seed certification was done at Seed Certification Agency, Patna and tags were issued as white tag for foundation seeds and blue tag for certified seeds. It is valid for only nine months from date of seed testing which was another step after the harvest of the crop to get it certified as seeds. Each bag is labeled with an appropriate tag which carried the following information-

Kind of seeds, name of variety, purity, per cent germination, date of germination test, per cent weed, per cent inert matter, name and address of seller and period of viability of the certificate. Accurate labeling is important to the purchaser as it provides necessary details about the seeds. This was mandatory for seed producers.

Observations on cost of cultivation were recorded as per the schedule at all the locations. Farmers can now reap the benefit of high quality seed yield results and make more profits from their investment and labour given in paddy production. The data recorded for cost involved of different inputs such as seed, fertilizer, irrigation, weedicide, insecticide, labour, seed registration, processing etc. Other data were recorded for quantity of seed produced as commercial grain. Income from sold paddy seeds as well as paddy grain was recorded. From above data gross return, net return as well as benefit cost ratio was computed.

RESULTS AND DISSCUSSION

The details of expenditure for different operations and returns is presented in Table:1. The total cost of cultivation was ₹ 17137 and ₹ 36117 hectare^{-1} for paddy grain and seed production respectively. Gross returns were ₹ 28250 from commercial grain and ₹ 90750 from paddy seeds, it was compartively three times more than the return from commercial grain. Fig.1 (a and b) represents the comparative involvement of input percentage for production of commercial grain as well as paddy seeds. The registration and processing of paddy seed production charges amounted to ₹ 14250 that is 39% of the total cost, while it was nil for

Table 1. Comparative study for cost of cultivation, gross income, net return of Paddy seed and commercial grain for one hectare land (10000sqm)

Operation		Commercial crop		Seed crop	
	Rate	Quantity	Amount (₹)	Quantity	Amount (₹)
Nursery Preparation	400sq.m				
Land preparation	@ 40 litre^{-1}	7.5 lt	300	7.5 lt	300
Seed and sowing	Cost of commercial grain@ ₹10 Kg^{-1} and				
	Foundation seed @25 Kg^{-1}	50 Kg	500	30 Kg	750
Fertilizer					
Urea	@ 5.52 Kg^{-1}	25 Kg	138	25 Kg	138
DAP	@ 9.72 Kg^{-1}	20 Kg	194	18 Kg	175
MOP	@ 5.25 Kg^{-1}	2.5 Kg	13	2.5 Kg	13
Irrigation	@ 180 number^{-1}	2	360	2	360
Vermicompost	@ 500 q^{-1}			5q	2500
Sub Total			1505		4236
Crop Cultivation	4000 sq.m	4-5 seedling hill^{-1}		1-2 seedling hill^{-1}	
Land preparation	@ 40 litre^{-1}	50 lt	2000	50 lt	2000
Fertilizer					
Urea (three doses)	@ 5.52 Kg^{-1}	200 Kg	1104	190 Kg	1049
DAP	@ 9.72 Kg^{-1}	95 Kg	923	85 Kg	826
MOP	@ 5.25 Kg^{-1}	37.5 Kg	197	32 Kg	168
Plant protection					
Butachlor +Follidol	700		700		700
Irrigation	@ 180 number^{-1}	15	2700	15	2700
Sub total			7624		7443
Seed Certification					
Seed Registration	@ 250 ha^{-1}	-	-		250
Seed processing charges	@ 400 q^{-1}	-	-	35 q	14000
Sub Total		00	00		14250
Labour	@ 114 labour^{-1}				
Nursery		5 irrigation	570	5 irrigation	570
Land preparation		5 irrigation	570	5 irrigation	570
Transplantation	@ 2750 ha^{-1}		2750		2750
Fertilizer application		5	570	5	570
Plant protection		2	228	2	228
Harvesting	@ 2750 ha^{-1}		2750		2750
Threshing		5	570	10	1140
Rouging (weeding)		-	-	15	1710
Sub Total			8008		10288
Total Cost of cultivation	A+B+C+D		17137		36117
Income					
Yield	q ha^{-1}	25	-	35	-
Rate of sale	@1000 q^{-1} as grain & 2500 q^{-1} as certified seed		25000		87500
By product @ 300 q^{-1}	@ 3250 ha^{-1}		3250		3250
Gross income			28250		90750
Benefit Cost ratio			1.7:1		2.5:1

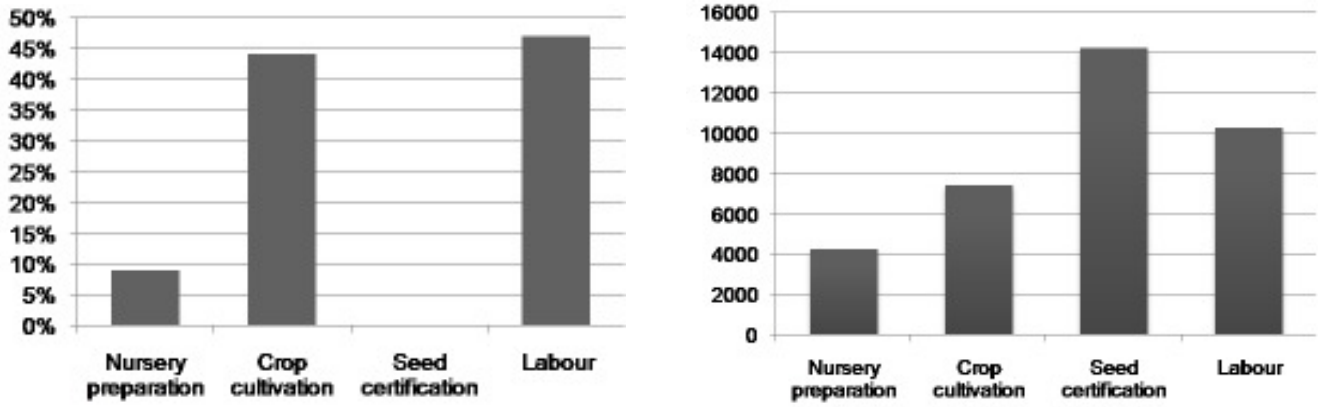

Fig. 1. Comparitive expenditure ratio of different factors of production in a) Commercial grain and b) Paddy seed

commercial grain. On the other hand, in the case of commercial grain, the major contribution in investment was labour which alone comprised of 47% of total cost of commercial grain production. The second most important cost involving factor was labour in paddy seed production which was only 28% of total cost while, in case of commercial grain 47% of the total cost involved. In certified seed production, cost for crop cultivation was 21% of total cost. Labour involvement for seed production was more as compared to commercial grain production due to rouging and care during threshing operation but, percentage share was only 28% of the total cost. In case of nursery prepration, amount was approximately half of the paddy seed production due to use of vermicompost but, their percentage share was quite near.

The comparative cost of cultivation, gross return and net return are presented for commercial grain and paddy seed (Fig 2). It depicts that the cost of cultivation for paddy seed production was almost double to cost of commercial grain while gross income of paddy seed was more than three times with respect to commercial grain. Net Return in seed production was more than five times in comparison to commercial grain production for very high seed sale rate The benefit versus cost was computed in the form of benefit to cost ratio (B:C ratio). It was calculated that it is 1.7:1 and 2.5:1 for commercial grain and certified seed production respectively. This was done due to use of high yielding variety of Rajendra Mahsuri-1 as well as foundation seed was used for production of certified seed.

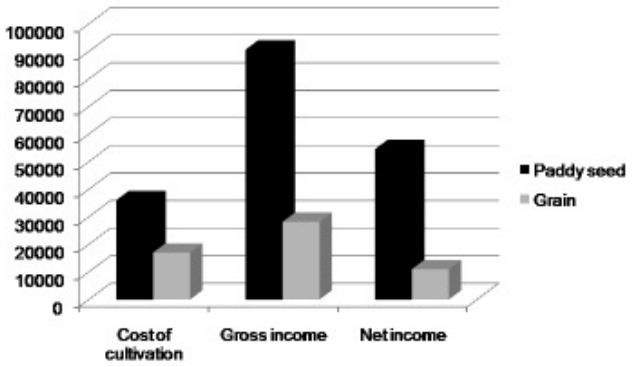

Fig. 2. Comparative study of cost of cultivation, gross income and net income

Paddy seed production in Supaul district of North Bihar found significant increase in income of members of Bajrang Kishan club. Seed growers were able to supply the certified seed and improved Seed Replacement Rate (SRR) for their locality and nearby districts. It is an epitome of profit for seed growers.

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