Profitability of Contractual Bread Wheat Seed Production in Mecha District of Amhara Region, Ethiopia

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ABSTRACT

The study was undertaken to examine the profitability of contractual bread wheat seed production in Kudmi village of Mecha district in Amhara region, Ethiopia. Primary data were collected from fourteen seed growers using structured questionnaire. The analytical tools employed include descriptive statistics and average net farm income. Results revealed that the average total cost of production per hectare is Br 8,478.82 ($ 493.82); the average gross revenue per hectare is Br 17,783.72 ($ 1,035.74); and hence the average net profit per hectare is Br 9,304.90 ($ 541.93). The findings also showed that an index of 1.10 economic efficiency of certified bread wheat seed production indicating that contractual bread what seed production is a profitable venture in the study area. The study identified non-application or improper application of inputs (fertilizers and seed) and not exercising the recommended management practices were the major problems in seed production. It is necessary to provide adequate extension service for farmers to promote better seed management technologies and efficient use of agricultural inputs.

Key words: economic efficiency, gross margin, net income

INTRODUCTION

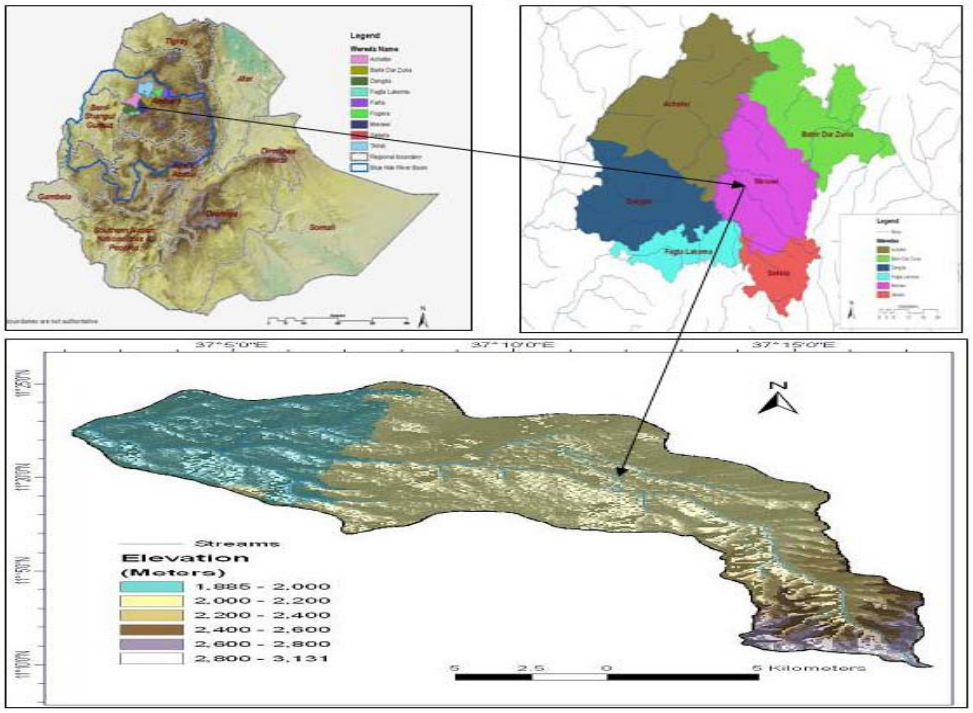
Bread wheat (*Triticum aestivum* L.) is one of the major cereal crops grown in Ethiopia. Ethiopia is the largest wheat producer country in Sub-Saharan Africa with a potential expansion area of more than 1.4 million ha. Wheat is the 4th and 3rd most important food crop in terms of production (25,376,398 q) and productivity (17.46 q*ha^{-1}), respectively (Central Statistics Authority, 2009).

Seed is a critical input in crop production and one of the most precious resources in farming. It is the basic unit for distribution and maintenance of plant population. The importance of improved seeds in boosting agricultural production is well recognized by agricultural scientists, farmers and development workers. Seed has to be available for every crop production cycle. It has to be there at the right time, in the right quantities, with the right qualities and at the right price so farmers can access the seed they need (Gregg and van Gastel, 1997). The seed availability and quality are the two key issues that farmers are concerned for the success of the crop (Almekinders and Louwarrs, 1999). Farmers have had their own traditional ways of getting 'improved' seeds. Zewede (2004) reported that the majority of Ethiopian farmers grew modern bread wheat varieties (76% recommended and 10% obsolete varieties). However, certified seeds mostly supplied from public institutions. In Ethiopia, the role of private sectors in commercial production of certified seed is

mainly concentrated only few crops particularly on hybrid maize seed production. Public institutions are producing certified seeds for major crops to satisfy the seed demand of the growers.

Kudmi is one of the villages found in Mecha district of Amhara region, Ethiopia. The district is located between 11^0 10' and $11^0$25' North latitude and $37^0$2' and $37^0$17' East longitude in Blue Nile basin, within the Highland of Ethiopia (Figure 1). The mean annual rainfall recorded in the area is 1480 mm with mean monthly temperature of 25.8 ^{0}C. The elevation ranges between 1885-3131 meters above sea level, and the slope ranges from nearly flat to very steep (Fikur, 2009). It is one of the food secure areas with no history of relief assistance. Surplus crop production ensures food self sufficiency and generates relatively higher cash income specifically for the better-off and middle households. Crop-live stock mixed farming is the dominant production system in the district. The main crops cultivated are maize, finger millet, tef, barley, pulses and oil crops.

Figure 1: Topography maps of Ethiopia, Mecha district and Koga irrigation site



Source: Aster and Seleshi, 2009

The district has great potential for irrigation. Koga irrigation dam is constructed in the district which has a total capacity of holding 83 million cubic meter water in 1,800 ha of land and expected to irrigate about 7,200 ha of land. Kudmi is one of the seven villages found in the command area of Koga irrigation site that accounts about 14 % of the total irrigable land area and 14.5 % of the total population expected to be benefited from the irrigation project (Desta Horecha Water Supply Engineering Service, 2007). In 2010/11 cropping season farmers produced improved bread wheat seeds, Pecaflor, through irrigation as contractual seed growers with Ethiopia Seed Enterprise. It was the first seed production experience of farmers in the area

However, there is no tangible economic analysis of contractual bread wheat seed production was done in the area. The present study was conducted with the objectives to determine the profitability and economic efficiency of contractual bread wheat seed production and problems associated with bread wheat seed production in the study area.

METHODOLOGY

The present study was conducted in Kudmi village of Mecha district of Amhara region, Ethiopia. Fourteen contract seed producers were randomly selected from a list of 78 out growers whom produced bread wheat seed in the area for the first time through irrigation. Primary data were collected on 2011 season using structured questionnaire that was administered to the farmers. Data collected includes size of land cultivated, quantity of seed used, quantity of fertilizer applied, cost of input, quantity of output, labour used for land preparation, planting, fertilizer application, weeding, harvesting, threshing and transport and the management practices of the out growers during the seed production. Existing market prices of all inputs and outputs were collected for profitability analysis. For estimation purpose the cost of inputs and price of the output was converted in to hectare basis. Family labour computed by multiplying total man-days by the wage rate at the time of seed production. During data collection an interview schedule was employed keeping the objectives of the study in mind.

Data collected were analyzed using budgetary techniques and descriptive statistics. The budgetary technique employed in the study was the average net farm income (ANFI). The ANFI is expressed as:

ANFI = AGM – ATFC

AGM = ATR – ATVC

ATC = ATFC + ATVC

Where, ANFI= Average net farm income

AGM= Average gross margin

ATR= Average total revenue

ATFC= Average total fixed cost

ATVC= Average total variable cost

ATC = Average total cost

Economic efficiency (e_i) for the ith seed is mathematically expressed as:

e_i= ANFI/ATC; When $e_i>0$, the production of the ith seed is economically efficient. When $e_i<0$, the production of the ith seed is economically inefficient and when $e_i=0$, the production of the ith seed is said to be at the breakeven point.

RESULTS AND DISCUSSION

Seed production management practices

The minimum and maximum area of land allocated for bread wheat seed production were 0.13 ha and 0.38 ha, respectively with average size of 0.21 ha (Table 1). The small area of land allocation may be due to the fact that the first seed production

experience of farmers in the area. On the average, 152.8 kg bread wheat seed per ha was used in the area. This is below the blanket recommendation rate of 175 kg*ha^{-1} for broadcasting (Adet Agricultural Research Center, 2009). The average quantity of Diamonium phosphate (DAP) applied on a hectare of land was 187.6 kg which is above the national blanket recommendation of 100 kg*ha^{-1}. The maximum kg of DAP per ha was used 400 while the minimum was 100 kg. The average amount of Urea was applied 101.4 kg*ha^{-1} which is almost equivalent to the blanket recommended rate for most areas of the region (100 kg*ha^{-1}). This may be due to the lack of information about the recommended agronomic practices for bread wheat seed production. Inadequate and non-application of fertilizers may result in low yield. The average yield per hectare was found to be 21 q*ha^{-1} which is about 20.3 % of yield advantage over the average national bread wheat productivity (17.46 q*ha^{-1}) in Ethiopia (Central Statistics Authority, 2009). The minimum productivity in quintal per hectare was 13.3 while the maximum was 51.2 quintal.

Table 1: Average land (ha), inputs used and yield obtained per hectare

Description	Minimum	Maximum	Mean
Average farm size (ha)	0.13	0.38	0.21
Average seed rate used (kg*ha^{-1})	100	288	152.8
Average DAP applied (kg*ha^{-1})	100	400	187.6
Average Urea applied (kg*ha^{-1})	0	400	101.4
Average yield (q*ha^{-1})	13.3	51.2	21.0

Source: Derived from field survey data, 2011

Out of the sampled farmers 85.7 % applied both DAP and Urea fertilizers, while the remaining (14.3 %) applied only DAP (Table 2). All sample respondents applied DAP at planting. Zewede (2004) also reported that the overwhelming majority of Ethiopian farmers (97 %) applied fertilizers to their wheat crop. Of the total of farmers who applied Urea fertilizer, 14.3 % didn't split at tillering stage. It is recommended to apply the all DAP at sowing, while Urea in splits with the first half at sowing and the second top-dressed at full tillering stage (Adet Agricultural Research Center, 2009). The overwhelming majority of the respondents (92.7 %) were properly practice weeding at critical stage of the crop.

Table 2: Seed production practices by out growers

Seed production practice	Number of respondents	Percentage
Application of both Urea and DAP	12	85.7
Application of only DAP	2	14.3
Split application of Urea	12	85.7
Weeding	13	92.9

Source: Derived from field survey data, 2011

Estimate of seed profitability

Average total cost per hectare for certified contractual bread wheat seed production is presented in Table 3. The total average variable cost includes seed cost, fertilizers cost, cost of oxen rent during land preparation and plating, labour cost and cost of transportation. Land rent is the only fixed cost included in the present study and estimated as Br 2000.00 ($ 116.48) per ha. Br is the symbol of Birr of the Ethiopian currency. Cost of materials accounted 39.09 % of the average total cost of production per ha (Br 8,478.82 ≈ $ 493.82) where as the fixed cost of production constitutes 23.59 % of the total average cost of production. The average cost of operations per ha (Br 3,164.17≈ $ 184.29) is lower than that of the average materials cost per ha (Br 3,314.65≈ $ 193.05). The average cost of hired labour was Br 25.00 ($ 1.46) per man day. The average cost of fertilizers per ha accounted 36.64 % of the average variable cost. No cost incurred for chemical pesticides as the occurrence of pests is below the threshold level.

Table 3: Estimated cost and return for certified bread wheat seed production in Kudmi village of Mecha district, Amhara region

Items of Cost and Revenue		
Items of Cost	Cost per Hectare (Br)	Percentage
Cost of Materials		
Seed	940.62 (54.78)	11.09
Fertilizers	2,374.03 (138.27)	28.00
Sub total	3,314.65 (193.05)	39.09
Operational Costs		
Land preparation	1,200.00 (69.89)	14.15
Planting	537.82 (31.32)	6.34
labour for split application of fertilizers	49.29 (2.87)	0.58
Weeding	489.45 (28.51)	5.77
Harvesting	405.56 (23.62)	4.78
Threshing	387.94 (22.59)	4.58
Transport/labour	94.13 (5.48)	1.11
Sub total	3,164.17 (184.29)	37.32
Total variable cost	6,478.82 (377.34)	
Fixed cost		
Land rent	2,000.00 (116.48)	23.59
Total cost	8,478.82 (493.82)	100.00
Items of Revenue	Revenue per Hectare (Br)	
Gross Revenue	17,783.72 (1,035.74)	

Figure in parenthesis are in USD
Source: Derived from field survey data, 2011

Net income analysis in Table 4 reveals that the average total cost of production per ha is Br 8,478.82 ($ 493.82) and the average gross revenue per ha is Br 17,783.72 ($ 1,035.74). Hence, amount of net profit per ha is Br 9,304.90 ($ 541.93) indicating contractual certified bread wheat seed production in the area is profitable. The value of economic efficiency shows that certified bread wheat seed production has an

index of 1.10. This means that for every Br 1.00 ($ 0.058) spent in the production of certified seeds of bread wheat, Br 1.10 ($ 0.064) is realized as a profit.

Table 4: Gross margin analysis of certified bread wheat out growers (Br*ha^{-1})

Item	Bread wheat
Gross Revenue	17,783.72 (1,035.74)
Cost of Materials	3,314.65 (193.05)
Operational Cost	3,164.17 (184.29)
Total Variable Cost	6,478.82 (377.34)
Gross Margin	11,304.90 (658.41)
Fixed Cost	2,000.00 (116.48)
Net Revenue/Profit	9,304.90 (541.93)
Total Cost	8,478.82 (493.82)
Economic Efficiency	1.10

Figure in parenthesis are in USD
Source: Derived from field survey data, 2011

CONCLUSION AND RECOMMENDATIONS

In this study, the economic profitability of contractual bread wheat seed production and management practices associated with bread wheat seed production were determined. The average total cost of production per ha in the area is Br 8,478.82 ($ 493.82) while the average gross margin per ha is Br 17,783.00 ($ 1,035.74); hence the average net profit per ha is Br 9,304.00 ($ 541.93). The findings also revealed that an index of 1.10 economic efficiency of certified bread wheat seed production indicating that contractual bread what seed production is a profitable venture in the study area. The results further indicate that farmers used inputs (seeds and fertilizers) below and above the recommended rate indicating the inadequate experience of farmers with better bread wheat seed production management.

In light of this reality, the following recommendations, among others, can be suggested to improve the wheat seed production business in the study area.

- It is a profitable venture to engage into contractual bread wheat seed production in the study area
- There is a need of adequate extension service for farmers in promoting better seed management technologies and efficient use of production inputs.

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Abbreviations: AGM= Average gross margin, ANFI= Average net farm income, ATC= Average total cost, ATFC= Average total fixed cost, ATR= Average total revenue, ATVC= Average total variable cost, DAP= Diamonium phosphate, e_i= economic efficiency

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