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Economic Analysis of Banana Production under Contract Farming in Sindh Pakistan

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Abstract
The result indicated that each selected banana farmers in study area on average per farm spent a sum of Rs.21334.00. This included Rs.4500.00 for loading, Rs.12334.00 for transportation and Rs.4500.00 of unloading respectively in the study area. The total cost of production of Rs.158581.00 this included Rs.88300.00, Rs.20100.00, Rs.28847.00 and Rs.21334.00 on fixed cost, labour costs, Capital Inputs and marketing costs respectively in the study area. The banana grower obtained per acre143 mounds on an average and revenue Rs.1750.00 mounds on an average and per acre earned of Rs. 250250.00 that obtained by the grower of banana. Thus the banana growers on an average per acre earned during study, Rs.91669.00 on net income, Rs.250250.00 on gross income and Rs.158581.00 on total expenditure in the study area. An average per acre gross income Rs.250250.00 and total expenditure is Rs.158581.00 in the study area therefore they availed input output ratio of 1:1.57 from banana growing in the study area. The selected banana growers on a net income per acre earned Rs.91669.00 and total expenditure Rs.158581.00 in the study area therefore they availed input output ratio of 1:0.57 from banana growing in the study area.
Keywords: Banana, Capital Inputs, gross income, total expenditure, Capital Inputs, Sindh

1. Introduction

Banana *(Musa paradidica L.)* belongs to the banana family *Musaceae*. A banana is an edible fruit produced by several kinds of large herbaceous flowering plants in the genus Musa. The fruit is variable in size, color and firmness, but is usually elongated and curved, with soft flesh rich in starch covered with a rind which may be green, yellow, red, purple, or brown when ripe. The fruits grow in clusters hanging from the top of the plant. In Southeast Asia, many more kinds of banana are grown and eaten, so the simple two-fold distinction is not useful and is not made in local languages. Bananas are an excellent source of vitamin B_6, soluble fiber, and contain moderate amounts of vitamin C, manganese and potassium. Along with other fruits and vegetables, consumption of bananas may be associated with a reduced risk of cancer and in women, breast cancer and renal cell carcinoma. Banana ingestion may affect dopamine production in people deficient in the amino acid tyrosine, a dopamine precursor present in bananas. Individuals with a latex allergy may experience a reaction to bananas (FAOSTAT, 2011).

Banana is a major fruit crop of Pakistan. It is grown on 34,800 hectares with production of 154,800 tons. It is mainly grown in Sindh province where the soil and climatic conditions are favorable for its successful cultivation. The total share of Sindh province alone in its cultivation is 87 per cent. Major districts in Sindh where banana is grown are Thatta, Hyderabad, Badin, Mirpurkhas, Tando Allahyar, Matiari, Tando Muhammad Khan, Sangar, Naushero Feroz, and Nawabshah. However, its cultivation has extended to northern parts of Sindh particularly district Khairpur. Ninety five per cent of area is under Basrai variety (Cavendish dwarf), and the remaining under William Hybrid. Recent introductions include variety Grand Nine (G-9) while the work is underway to introduce high yielding Chinese varieties viz. B-10, W-11, and Pishang. Banana sector of Pakistan is facing serious problems from production to post harvest management and export marketing. In view of limited awareness and technical know how about this sector, our basic aim of this guide is to provide technical assistance to growers, post harvest managers and exporters in order to overcome pre- and post-harvest problems and enhance production and quality of banana for local and foreign markets while ensuring increased profitability for banana growers. It includes the information about banana varieties and their potential, banana disease management particularly banana bunchy top virus, nutrient management in banana, pre-harvest banana bunch care, banana cool chain requirements, and also to establish effective linkages among the key players in banana value chain management including production, post-harvest management and marketing of banana (SEDF, 2014).

Pakistan is a key player in the banana industry, with more than 349,000 hectares cultivation. 90% of this land lies in the Sindh province in the south-east of the country. Banana cultivation in the country started after independence, and after its success in Sindh, it emerged as an important fruit crop. The Sindh is a major banana producing area with about 85 to 92 per cent in banana acreage and about 90 per cent of production. The average

area under the fruit in Sindh was 32,200 hectares with a production of 1,26,000 tons during 2013. Banana is mainly cultivated in Khairpur, Hyderabad, Thatta, Nawabshah, Noshahro Feroz, Sanghar, Mirpurkhas and Badin districts in Sindh province. Khairpur, Thatta and Hyderabad districts are the leading banana producing districts with production of 35,324, 30,432 and 21,996 tons respectively (GOP, 2014).

The research aimed to performed socio-economic analysis of banana production and marketing in Sindh province of Pakistan. This study was therefore taken up keeping in view the following objectives:

2. Objectives

1. To review present status of banana production in Sindh province.
2. To study the socio-economic status of banana producing farmers under contract farming.
3. To examine the cost and returns structure in banana production.
4. To identify the problems faced by the contract farmers under the banana contract farming and suggest appropriate policy measures

3. Methodology

This study was carried out through a primary survey of banana producers and market intermediaries in order to assess the banana production positional and efficiency of the marketing system in Naushahro Feroze district Sindh. The emphasis has been given on qualitative and quantities analysis of production practices adopted by the banana growers and identification of technical and socio-economic factors in banana production. Therefore, it is essential to define variables included in the research to make it more scientific and objective.

Research Design

Study Area

The study was restricted generally to gather primary data from Naushahro Feroze district Sindh. The district is gifted naturally with fertile soil.

Sample Size

The sample was supposed to contain banana growers. A sample size of 60 respondents was selected through random sampling.

Data Collection

As described above, the data was collected from Naushahro Feroze district, Villages and respondents from this area were selected.

Questionnaire Development

Interview schedule was based on a well designed questionnaire. Comprehensive information was obtained face to face from the farmers involved in banana farming and the banana business and documented by the interviewer.

Data Analysis

Collected data had both quantitative and qualitative information. For data analysis Microsoft Office Excel software package and SPSS package were used.

Averages

Averages were calculated by applying following formula:

Average = $\sum Xi / n$

Where,

$\sum Xi$ = sum of independent variables

n = number of observation in data

Percentages

Percentage is the proportion of fraction articulated in hundredth. It was computed by

Percentage = F / N* 100

Where,

F =Respondents of desired class

N = Total number of respondents

Total Cost of Production

Total cost of production was estimated by using the following formula:

TC=TFC+TVC

Net Returns

Net returns were estimated by using the following formula:

NR= TI- TC

Input-Output Ratio

The input-output ratio was estimated by using the following formula:

$$IO_R = \frac{T1}{TC}$$

Where IOR = Input-Output Ratio

Cost-Benefit Ratio

The cost-benefit ratio was estimated by using the following formula:

$$CBR = \frac{NR}{TC}$$

Where *CBR* = Cost Benefit Ratio

4. Results

This study was initiated to conduct detail analysis of banana production and marketing in Naushahro Feroze district Sindh. It is based on primary data collection through a survey of banana growers and market.

4.1. Current Status of Banana Sub-Sector

Table 1: Area and production of banana in Pakistan and Sindh

Year	Area(000, ha)			Production(000, tons)		
	Pakistan	Sindh	% Share of Sindh	Pakistan	Sindh	% Share of Sindh
2003-04	31.6	27.5	87.02	154.0	125.7	81.62
2004-05	33.1	29.0	87.61	158.0	129.6	82.02
2005-06	32.5	29.7	91.38	163.5	134.8	82.69
2006-07	34.9	32.2	92.26	150.5	126.3	84.2
2007-08	35.5	32.9	92.67	158.0	127.0	80.37
2008-09	36.0	33.4	92.77	157.3	128.9	81.94
2009-10	34.8	32.2	92.52	154.8	127.4	82.29
2010-11	29.6	26.8	90.54	141.2	113.4	80.31
2011-12	32.1	28.5	88.78	160.2	133.1	83.08
2012-13	33.2	29.8	89.75	159.4	134.0	84.06

Source: Agricultural Statistics of Pakistan, Government of Pakistan, Islamabad (2012-13)

4.2.Age

Table 2: Distributions of age groups of selected growers in the study area

Age group	No. of farmers	Percentage
21-30	6	10.00
31-45	20	33.00
46 and above	34	57.00
Total	60	100

Table-2 shows that 57.00 percent of the banana respondent belonged to the age group of 46 and above years, followed by 33.00 percent respondents belonged to the age group of 31-45 years and while 10.00 percent belonged to the age group of 21-30.

4.3.Education

Table 3: Distributions of education level of selected growers in the study area

Education level	No. of farmers	Percentage
Illiterate	8	13.33
Primary	30	50.00
Matriculation	16	26.66
Graduate	6	10.00
Total	60	100.00

Table-3 shows education level 13.33 percent banana farmers were illiterate, 50.00% banana farmers were Primary level of education, 26.66% of matriculation and while 10.00% farmers of the graduate education level in the study area.

4.4.Farming experience

Table 4: Distributions of banana farmers according to farming experience in the study area

Farming Experience	No. of farmers	Percentage
1- 10 years	42	70.00
11-20 years	14	23.00
21 and above	4	7.00
Total	60	100.00

Table-4 shows that 70.00 percent respondents belonged to the experience group of 1- 10 years and above followed by 23.00 percent respondents belonged to the experience group of 11-20 years, while 7 percent respondents belonged to the 21 and above years.

4.5.Farm Size

Table 5: Distributions of banana farmers according to farm size in the study area

Farm size	No. of farmers	Percentage
Up to10 acres(small)	17	28.33
11-30 acres(medium)	29	48.33
Above 30 acres(large)	14	23.33
Total	60	100.00

Table-5 shows about the number of small banana farm were 28.33 percent, 48.33 percent and 23.33 percent were medium and large banana farm in the study area.

4.6.Farmer Status

Table 6: Distributions of banana farmers according to farmer status in the study area

Farmer status	No. of farmers	Percentage
Landowner	41	68.33
peasant proprietor	22	36.66
renter	07	11.66
Total	60	100.00

Table-6 shows that there were 68.33 percent banana farmers who have owner ship, 36.66 percent were peasant proprietor and 11.66 percent were renter who have hired their banana farms on rent.

4.7.Verities of Banana

Table 7: Distributions of banana farmers according to Verities of Banana in the study area

Verities of Banana	No. of farmers	Percentage
Basrai (Cavendish dwarf)	53	88.33
William (Hybrid)	4	6.66
Grand Nine (G-9)	1	1.66
B-10 (Hybrid)	1	1.66
W-11 (Hybrid)	1	1.66
Total	60	100.00

Table-7 indicates that about 05 banana varieties were cultivated by sample farmers in the study area during the study. The majority of banana producers were 88.33 percent of Basrai (Cavendish dwarf) verity cultivate, while 6.66 percent respondent were cultivate William (Hybrid) verity, 1.66 percent Grand Nine (G-9), 1.66 percent B-10 (Hybrid) and 2.58 percent W-11 (Hybrid) verity were cultivated.

4.8.Variation in Banana Cultivation

Table 8: Distributions of the banana farmers according to their reasons in the study area

Reasons	No. of farmers	Percentage
Increase		
More and long term income	21	50.00
Good yield	18	42.85
Reduce tenants	3	7.14
Total	42	100.00
Decrease		
Disease problems	9	50.00
Shortage of irrigation water	6	33.33
Shortage of capitals	3	16.66
Total	18	100.00

Table-8 indicates that 50.00 percent of banana growers, while good yield and fewer requirements of tenants were also the reason to increase banana. The banana growers who responded to decrease banana acreage perceived the disease problem 50.00 percent, shortage of irrigation water 33.33 percent and shortage of capitals 16.66 percent.

4.9.Banana Planting Material

Table 9: Distributions of the banana farmers according to their Planting Material in the study area

Planting Material	No. of farmers	Percentage
Progressive & Reliable grower	22	36.66
Help of Malhi	05	8.33
Health & looking of suckers and plants	18	30.00
Own plants	15	25.00
Total	60	100.00

Table-9 indicates that a majority 36.66 percent of farmers obtained planting material from progressive & reliable grower. Where 30.00 percent of banana producers considered good looking and health of plants and 25.00 percent planted the suckers of their own plants.

4.10.Labour costs

Table 10: Average per acre labour cost incurred by the banana producer/contractor in the study area

Particulars	Number	Rate/Unit	Amount
Layout (time)	2	300.00	600.00
Suckers (time)	5	300.00	1500.00
FYM(time)	2	300.00	600.00
Urea, DAP and Nitrophas (time)	7	300.00	2100.00
Irrigation (time)	25	300.00	7500.00
Harvesting (time)	26	300.00	7800.00
Ploughing	2	1800.00	3200.00
Clod crushing	1	2200.00	2200.00
Harrowing	1	2114.00	2114.00
Hoeing	1	1233.00	1233.00
Total			28847.00

Table-10 depicted that the Rs.28847.00 on an average per acre banana farmer spent labour cost of production. This included Rs.600.00 on Layout (time), Rs.1500.00 on Suckers (time), Rs.600.00 on FYM (time), Rs. 2100.00 on Urea, DAP and Nitrophas (time), Rs. 7500.00 on Irrigation (time) and Rs. 7800.00 on Harvesting (time). Results showed that Rs. 1800.00 on ploughing, Rs.2200.00 on cold crushing, Rs.2114.00 on harrowing, and 1233.00 on hoeing respectively in the study area.

4.11.Capital Inputs

Table 11: Per acre expenditure incurred on capital inputs in the study area

Particulars	Number	Rate/Unit	Amount
Sucker	1543.00	4.00	7715.00
F.Y.M	3	2250.00	6750.00
Urea	7	2900.00	20300.00
DAP	3	5300.00	15900.00
SOP	5	1250.00	6250.00
Total			56915.00

Table-11 shows that each selected banana grower of study area on an average per acre of banana spent a sum of Rs.56915.00 that included Rs.7715.00, Rs.6750.00, Rs.20300.00, Rs.15900.00 and Rs.6250.00 on Suckers, F.Y.M (Farm Yard Manure), Urea, DAP (Diammonium phosphate**),** SOP (Sulphate of potash) in the study area.

4.12.Fixed Cost

Table 12: Average per acre rate of contract (per year) banana orchard in the study area

Particulars	Rate of contract (per year)
Rent/Contract of banana orchard	88300.00
Total	88300.00

Table-12 showed that majority 95% of contractor obtained advance payment to banana producer. On an average per acre banana growers spent for rent of land Rs.88300.00 in the study area.

4.13.Marketing costs

Table 13: Average per acre marketing cost incurred by the banana producer

Particulars	Number	Rate/Unit	Amount
Loading	15	300.00	4500.00
Transporting	5	2450	12334.00
Unloading	15	300.00	4500.00
Commission charges	--	6.00%	12000.00
Total			21334.00

Table-13 the result indicated that each selected banana farmers in study area on average per farm spent a sum of Rs.21334.00. This included Rs.4500.00 for loading, Rs.12334.00 for transportation and Rs.4500.00 of unloading respectively in the study area.

4.14. Cost of Production

Table 14: Per acre total cost of banana orchard production in the study area

Particulars	Mean
Fixed Cost	88300.00
Labour Cost	20100.00
Capital Inputs	28847.00
Marketing Cost	21334.00
Total	158581.00

Table-14 the results showed in this table that the selected banana grower in the study area on average per acre spent a total cost of production of Rs.158581.00 this included Rs.88300.00, Rs.20100.00, Rs.28847.00 and Rs.21334.00 on fixed cost, labour costs, Capital Inputs and marketing costs respectively in the study area.

4.15.Physical Productivity

Table 15: Per acre physical productivity banana orchard in the study area

Particulars	Mean
Banana	143 Mds
Total	143 Mds

Table-15 it is clear form the result each banana grower in the study area obtained per acre143 Mds on an average.

4.16.Revenue productivity

Table 16: Per acre revenue productivity banana orchard in the study area

Particulars	Mean
Banana	250250.00
Total	250250.00

Table-16 depicted that each selected banana grower in the study area on revenue Rs.1750.00 mounds on an average and per acre earned of Rs. 250250.00 that obtained by the grower of banana.

4.17.Net Income

Table 17: Per acre net income of banana orchard in the study area

Particulars	Mean
Gross Income (Rs) A	250250.00
Total Expenditure (Rs) B	158581.00
Net Income (Rs) A-B=C	91669.00

Table-17 the results showed in this table that the banana growers on an average per acre earned during study, Rs.91669.00 on net income, Rs.250250.00 on gross income and Rs.158581.00 on total expenditure in the study area.

4.18.Input – Output ratio

Table 18: Per acre input-output ratio of banana orchard in the study area

Area sown	Gross Income(Rs.)	Total Expenditure(Rs.)	Input-output ratio
Acre	(A)	(B)	A/B=C
1	250250.00	15851.00	1:1.57

Table-18 showed that the selected banana growers on an average per acre gross income Rs.250250.00 and total expenditure is Rs.158581.00 in the study area therefore they availed input output ratio of 1:1.57 from banana growing in the study area.

4.19.Cost Benefit ratio

Table 19: Per acre cost benefit ratio of banana orchard in the study area

Area sown	Net income (Rs.)	Total Expenditure(Rs.)	Input-output ratio
Acre	(A)	(B)	A/B=C
1	91669.00	158581.00	1:0.57

Table-19 showed that the selected banana growers on a net income per acre earned Rs.91669.00 and total expenditure Rs.158581.00 in the study area therefore they availed input output ratio of 1:0.57 from banana growing in the study area.

5. Conclusion and suggestions

Based on the findings of the study the following policy implications were made. The information such as total holding, area under banana, physical and revenue productivity obtained from banana contractors were enquired from the respondents. Data so collected was processed, tabulated, analyzed and interpreted in the previous chapters. Investigate the quantitative and qualitative aspect of various inputs as incurred by the producer to cultivate per unit (acre) of banana in the area. The present study has been carried out the means to increase per acre yield and consequently the income of farm; therefore the following suggestions are put forwarded as under;

Strengths of banana sector:

- Availability of cheap labor in Naushahro Feroze district Sindh
- Availability of fertile land in Naushahro Feroze district Sindh
- Suitable environment for banana cultivation in Naushahro Feroze district Sindh
- Interest of banana the farmers and landowners in Naushahro Feroze district Sindh.

Weaknesses of banana sector:

- Lack of awareness of pre and post harvest management.
- Lack of information about new technologies.
- Water shortage (they can overcome this problem by using new techniques).
- Character of middlemen or contractors in this sector.
- Direct marketing problems.
- Bad infrastructure, Absence of cold storages.

Issues and problems of the banana sector of Sindh are:

There are different problems in the banana sector of Naushahro Feroze district Sindh, such as

- Uneducated farmers and labor in this sector.
- Untrained farmers and labor in this sector.
- Unawareness about new technologies in this sector.
- Lack of proper information about pre and post harvest management.
- Non availability of proper testing laboratories in sindh.
- Its perishable nature and unreliable prices because of pre and post harvest losses.
- This sector is dependent on middlemen and contractors because of lack of knowledge, commission agents' bias, and engagements of farmers or growers in other crops force banana producers to make contracts with middlemen or contractor.

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