

Economics Analysis of Mango Orchard Production under Contract Farming in Taluka Tando Adam District Sanghar Sindh, Pakistan

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Abstract

The present study has been designed to investigate cost of production, and returns per acre of mango fruit. A sample of 60 mango farmers was taken purposively from various villages in taluka Tando Adam district Sanghar Sindh Pakistan. The objective was to work out benefit cost ratio and net present worth of growing mango orchard. The mango growers in study area on average per farm spent a sum of Rs. 38000.00. This included Rs. 6000.00 for loading, Rs. 16000.00 for transportation and Rs. 6000.00 of unloading respectively in the study area. The mango grower in the study area on average per acre spent a total cost of production of Rs. 203762.00 this included Rs.80000.00, Rs.28847.00, Rs.56915.00 and Rs.38000.00 on fixed cost, labour costs, Capital Inputs and marketing costs respectively in the study area. It is clear from the result each mango grower in the study area obtained per acre 233 Mds on an average. On revenue an average per acre earned of Rs. 291250.00 that obtained by the grower of mango in the study area. Thus the mango growers on an average per acre earned during study, Rs. 87488.00 on net income, Rs. 291250.00 on gross income and Rs. 203762.00 on total expenditure in the study area. the selected mango growers on an average per acre gross income Rs. 291250.00 and total expenditure is Rs. 203762.00 in the study area therefore they availed input output ratio of 1:1.42 from mango growing in the study area. Mango growers on a net income per acre earned Rs. 87488.00 and total expenditure Rs. 203762.00 in the study area therefore they availed input output ratio of 1:0.42 from mango growing in the study area.

Keywords: Mango, Orchard, Capital Inputs, output ratio, Pakistan

1. Introduction

Mango (*Mangifera indica L.*) is one of the two most delicious and admired tropical fruits in the world along with pineapple. The mango is “King of Fruits” native to South Asia and Southeast Asia. This fruit is national fruit of Pakistan, India, and the Philippines countries. Mango is a highly nutritious and healthful fruit containing rich quantities of pre biotic fiber, vitamins A and C along with smaller quantity of vitamin B, protein, and minerals. Mango is a tropical fruit and thrives in sandy loam soil with hot and dry weather in well-drained land. Water-logging or frost are harmful for the mango tree and fruit. Worldwide there are hundreds of varieties of mangoes with different colors, sizes, shapes, and weights. In general, it has an inedible skin covering juicy pulp underneath with which stone or seed is attached through fiber. India is the world’s largest producer of mangoes while Pakistan is the 6th largest producer. In Pakistan, Sindh and the Punjab are the main producers of mangoes. In Sindh, the main districts where mango is cultivated are Mirpur Khas, Tando Allah Yar, Khairpur, Sanghar, Naushero Feroz, and Matiari (SBI, 2014).

Mango is the second major fruit in Pakistan, grown on area of 93.42 thousand hectares with production 915.7 thousand tones. The area under mango production has increased but the rise in production is comparatively slow. The main mango growing districts in the province of Sindh it is mainly grown in Sanghar, Mirpur Khas, Hyderabad and Thatta. In the Punjab province are Multan, Bahawalpur, Muzaffar Garh and Rahim yar Khan in the province of KPK it is grown in Peshawar and Mardan. The climate of Sindh gets warmer and about one month earlier than the Punjab which has given the province the privilege to grow early varieties of mango. Subsequently, a new trend of growing late varieties in Punjab has received a wide popularity which has extended the market period and added to the exportable surplus (GOP, 2014).

Mango season in Pakistan starts with harvest from Sindh province in late May and finishes in Punjab in late August. Major mango varieties grown in Pakistan are Sindhri and Chounsa whereas other varieties (Dosehri, Malda, Swarnarika, Langra, Siroli, Alphonso, Gulab Khas, Fajri, Golden, Anwar Ratol and Began Phali) are also grown in some parts of the Sindh and Punjab provinces. Sindhri is mainly grown in Sindh as against Chounsa which dominates in Punjab. Chounsa and Sindhri are considered by industry as good varieties in terms of taste and demanded both in the domestic and international markets (PHDEB, 2005).

Mango trees are amongst the most cold sensitive fruit plants and grow best in subtropical and tropical climates. The leaves and twigs of the plant suffer serious damages at temperature below 30 degree Fahrenheit. Low temperatures cause far more damage to the plant than high temperature. This delicious fruit is nutritionally superior, source of several vitamins and minerals. Pakistan produces 5.86 percent world's mangoes being the third largest producer. Its export is progressing resulting into substantial foreign exchange earnings. Mango export including Middle East has also found its way to the UK and other European markets. It is believed that the demand would rise to as high as 50 percent given the right impetus and expanding the export to Germany, Japan China and Hong Kong. Agriculture occupies pivotal position in the economy of Pakistan. Despite structural shift towards industrialization, agriculture still contributes 21.8 percent to the Gross Domestic Product (GDP). It is a source of livelihood of about 45 percent of total employed labour force and contributes significantly in the export earnings. Besides major crops the share of horticultural crops (fruits, vegetables & condiments) stands around 76 percent in the category of minor crops. Major fruits dominate in the horticultural crops, sharing about 59 percent to the total value (GOP, 2013).

Marketing plays an important role not only in stimulating production but also in accelerating the pace of economic development. Efficient marketing system usually ensures higher level of producer's share, reducing the number of middlemen and restricting the marketing charges, mal-practices during marketing of farm products. It is, therefore, essential to explore the efficient marketing channels and to suggest the producers the channels for obtaining optimum prices of their farm produce. So far, very few mango researches have been done, especially on marketing aspects of mango in this country (Mahmood, 2005).

Keeping this in view, the present study was undertaken to analyze the marketing of mango in selected areas of Sanghar Sindh. Hence, the present study has been conducted with the following specific.

2. Objectives

1. To review the status of mango production in Pakistan.
2. To find out the economics of mango production and marketing in the study area.
3. To suggest policy measures for increasing mango contract farmers.

3. Review of literature

Ghafoor (2007) observed that there were no proper arrangements for generating and handling exportable surplus of mangoes from Pakistan. Efforts were generally made at individual level with very little utilization of centrally organized platforms. He remarked that amongst others, poor farm production practices, inappropriate post harvest management, inefficient marketing practices and lack of infrastructure affected exports of mango from Pakistan. Short life span of varieties and over dependence on few mango varieties for export purpose determined limits in export. He argued that extra burden on Karachi terminal market affected efficiency in the export business. He recommended that new terminal points should be established and vapour heat treatment facilities made available to exporters at affordable price to increase export of quality product.

Mustafa *et al.* (2006) explored barriers against export of mango from Pakistan in the context of sanitary and phytosanitary agreement of World Trade Organization. They collected information from 20 mango producers, 15 pre-harvest contractors and 40 exporters and identified number of hurdles in the export of mango from Pakistan. They concluded that mango producers and exporters were not capable enough to comply with SPS requirements of the global market. Majority of the exporters showed their dissatisfaction about policies of the government. As such, government was not promoting mango industry. They suggested that existing concentration and overdependence of mango in few export markets should be avoided by identifying new markets and introducing value added products and also by complying with emerging international standards like HACCP and Europe GAP.

Khushk *et al.* (2004) studied structure, conduct and performance of marketing system, margins and seasonal price variation of selected fruits and vegetables in Pakistan. Wholesale prices of fruits and vegetables and regressed base market prices against other market prices in their first difference form were used in the analysis to check level of integration between the markets. Hyderabad and Multan were taken as base markets in Sindh and Punjab province respectively. The analysis revealed that fruit and vegetable prices did not move uniformly across spatially separated markets. Distance between markets was not found as an important constraint to affect the process of price transmission right from production point to the markets rather higher transportation cost and risks associated with transportation along with constraints in the availability of price information were found as the major factors revealing weak integration between these markets. They concluded that there was weak evidence that price changes in one market were fully and immediately transmitted to another market. They suggested that government should invest in infrastructural developments to improve access in different markets by reducing transportation cost.

Khan *et al.* (2008) studied that production of Mango in Pakistan has increased due to use of improved farm inputs and better management practices. Despite an increased production and rising demand in the export

market, the potential of Mango export has, however, not been fully achieved. Pakistan has comparative advantage in the production of Mango and enormous potential exists for its export in the vast Middle East market. The study was undertaken to forecast production of Mango for the years 2005 through 2024. The Log linear and ARIMA models were used to forecast production of Mango. The predicted value of production of Mango for the year 2024 worked out as 1431010 metric tons, which means that an increased output of Mango would be available for consumption as well as for export. The paper underlines the need for taking measure to increase export of Mango by improving its quality, packaging and complying with international standards required under the WTO regime.

Pirzada (2006) revealed that enormous potential and opportunities existed in the production and trade of mangoes from Pakistan. He mentioned potential mango varieties which according to him were quite suitable for export purpose from Pakistan. These varieties included Sindhri, Chounsa, Fajri, Golden and Began Phali and were in great demand in the Middle Eastern and Far Eastern countries. Despite an increase in mango exports, Pakistan continued to encounter many technical barriers to trade. He suggested that a proactive approach should be adopted to deal with the situation and an all-out effort made to comply with emerging requirements of the international market.

Matin *et al.* (2008) carried out to identify the most efficient and suitable marketing channels of mango in some selected areas of Bangladesh by using primary data collected randomly from 90 farmers and 55 traders. Out of 55 traders, 15 were Bairals, 15 were Beparis, 9 Aratdar (local), 6 Aratdar (urban), 10 Retailers (both local and urban). According to the volume of mango handled and longevity or participation of the intermediaries in the channel, five major channels were identified as dominant in the study areas. The results showed that channel V, Farmer-Retailer Consumer, possesses the highest marketing efficiency followed by channel IV, III, and II. The performance indicators revealed that the channel I and channel II were not relatively efficient in the mango producing regions. Unstable price of mango was the first rank problem in the study area. Establishment of mango processing plant in the intensive growing areas may be the remedy of the problem, which will ensure fair prices for the farmer.

4. Materials and methods

The Sanghar district of Sindh province is also famous for its mango orchards and the especially in Sindhri mango variety. Simple mango, mango as fruit, sweets made of mango, ice cream, drinks and even mango pickles; they are available in various varieties in the district. The district Sanghar is situated in the center part of Sindh.

4.1. Data Collection

The primary data were used, which was collected from sample of 60 respondents. The data was collected from taluka Tando Adam district Sanghar Sindh, Villages and respondents from this area were randomly selected.

4.2. Secondary Data

Secondary data also collected for this study, which was gathered from various agricultural departments used to determine the overall growth rate of mango fruit production in the country. The Secondary data was also collected from literature and other publications including reports, research papers etc.

4.3. Final Survey

Final survey was conducted in study area to obtain the required information from respondents.

4.4. Data Editing and Coding

After the data collection, the questionnaires were properly checked to make sure that all the responses had been recorded accurately. Sequentially all questionnaires were numbered in a serial order.

4.5. Socio economic Characteristics

Socio economic characteristics determine the status of provide. For the purpose of present study following indicator of socio economic characteristics have been used: such as age, educational level, size of land holding, annual income and etc.

4.6. Data Analysis

For data analysis statistical package of social sciences (SPSS) were used. Following statistical techniques were used to analyze and interpret data.

4.7. Descriptive Statistics

To analyze the results of present study the descriptive statistics was used to find out the percentage and frequencies of different characteristics of mango farmers.

4.7.1. (A) Average

Average was calculated by using following formula

$$AM = \sum X / N$$

Where;

AM = Arithmetic Mean

$\sum X$ = Total sum of variables

N = Total number of observations

4.7.1.(B) Percentage

Percentage was calculated by using following formula

$$P = F / N * 100$$

Percentages were calculated in the simple table for the purpose of comparison.

Where;

F = Frequency of a class

N = Total number of observations

4.8. Estimation Methods

Data were analyzed by developing equations for estimating fixed costs, variable costs, total cost of production, total revenue, net revenue Input-Output ratio and benefit cost ratio. A brief description of each term is given as follows:

4.8.1. Estimation of Land Inputs

The land inputs were measured on the basis of area planted under various crops/fruits at the selected diversified farm in areas. The main component of land inputs included rent of land, irrigation charges and other taxes.

For estimation of land inputs for mango on the sample farms, the following formula was used.

$$Lit = (As \times Cr) + (As \times Rie) / As.$$

Where

Lit = Land input per acre of mango

As = Area sown under mango

Cr = Contract rent per acre.

Rie = Rate of irrigation expenditures.

As = Area sown

4.8.2. Estimation of Labour Cost

The extent of labour inputs for various cultural operations involved in mango production was estimated by applying the following formula:

$$Lib = (Mn \times Hc) + (Mwd \times Wr) + (Bwd \times Hc) / As$$

Where

Lib = Labour input per acre of mango

Hc = Hiring charges

Mn = Machine work hour

Mwd = Man work day

Wr = Wage rate

As = Area sown.

4.8.3. Estimation of Capital Inputs

The following formula was used to compute per (acre) cost of the capital inputs.

$$Cipu = (Qs \times Pr) + (Qf \times Pr) + Qi \times Pr / As.$$

Where

Cipu = Capital inputs per acre of mango

Qs = Quantity of plant.

Pr = Price per acre of input.

Qf = Quantity of fertilizer.

Qi = Quantity of insecticides / pesticides.

As = Area sown.

4.9. Marketing Cost

The marketing cost was estimated by using the following formula:

$$Mc = Qm (Rl + Tr + Ru) / As$$

Where

Mc = Marketing cost.

Qm = Quantity of produce marketed.

Rl = Rate of loading.

Tr = Transportation rate.
Ru = Rate of unloading of mango
As = Area sown

4.10. Estimation of Returns

The estimation of returns was developed by using the following formula:

$$VP = (Qs \times Pr) / As$$

Where

Vp = Value of product.

Qs = Quantity sold.

Pr = Price per acre mango

As = Area

4.11. Total Cost of Production

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

$$TC = TFC + TVC$$

Where TC = Total Costs of Production

4.12. Net Returns

Net returns were estimated by using the following formula:

$$NR = TI - TC$$

Where

NR = Net Returns

TI = Total Income

TC = Total Cost

4.13. Terms of the mango contract and Methods

Terms of contract: The conditions that people offer demand or accept when they make an agreement.

4.13.1. Methods: A particular method of working.

Purchase value – junk value

Useful life of the asset (years)

4.14. Problems of the mango contract farmers and the contract firm

Opinions expressed by the farmers and the contract firms regarding the problems of contract farming.

5. Results

This study is based on primary data, which was collected from mango orchard growers in taluka Tando Adam district Sanghar Sindh Pakistan. The study is described into three subsections:

1. Current Status of mango in Pakistan
2. Socio-economic characteristics
3. Physical productivities and net returns on mango orchard growers

5.1. Current Status of Mango Sub-Sector

The area, production and average yield of mango in Pakistan is given in Table-1. Since 2000-01 to 2012-13, the area under mango fruit has increased from 97.00 to 206.93 thousand hectares and production has increased from 989.80 to 1784.30 thousand tons. To obtain a potential yield, high yielding varieties and improved production technology have to be adopted.

Table 1: Area production and average yield of mango in Pakistan (2000 to 2013)

Year	Area(000, ha)	Production(000, tones)	Yield(tones/ha)
2000-01	97.00	989.80	10.2
2001-02	99.00	1037.20	10.4
2002-03	102.00	1034.60	10.06
2003-04	103.10	1056.00	10.24
2004-05	151.50	1674.00	11.05
2005-06	156.60	1753.90	11.20
2006-07	164.50	1719.20	10.44
2007-08	166.30	1753.70	10.54
2008-09	170.10	1727.90	10.15
2009-10	173.80	1845.60	10.61
2010-11	191.33	1804.44	10.58
2011-12	198.97	1715.02	11.43

Source: Agricultural Statistics of Pakistan, Government of Pakistan, (2014).

5.2.Socio-Economic Characteristics

5.2.1.Age

Age is very important demographic factor which influences the efficient allocation of resources' it shows the ability to do work, efficiency, willingness to make progress and attitude towards various social and economic aspects of life.

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

Age group	No. of farmers	Percentage
Below 30	18	30.00
31-45	22	36.66
Above 45	20	33.34
Total	60	100

Table-2 shows that 33.34 percent of the mango respondent belonged to the age group of above 45 years; followed by 36.66 percent respondents belonged to the age group of 31-45 years and while 30.00 percent belonged to the age group of below 30 years in the study area.

5.2.2.Education

Education in its general sense is a form of learning in which the knowledge, skills, and habits. The education system in Pakistan is generally divided into five levels: primary, middle, high, intermediate and university programs leading to undergraduate and graduate degrees.

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 mango farmers were illiterate, 50.00 percent farmers were Primary level of education, 26.66 percent of matriculation and while 10.00 percent farmers of the graduate education level in the study area.

5.2.3.Farming experience

Farming is growing crops or keeping animals by people for food and raw Materials farming are a part of agriculture. Experience comprises knowledge of or skill of something or some event gained through involvement.

Table 4: Distributions of mango farmers farming experience in the study area

Farming Experience	No. of farmers	Percentage
Below 10 years	12	20.00
11-20 years	20	33.34
Above 20 years	28	46.66
Total	60	100.00

Table-4 shows that 20.00 percent respondents belonged to the mango farming experience group of below 10 years and above followed by 33.34 percent respondents belonged to the experience group of 11-20 years, while 46.66 percent respondents belonged to the above 20 years.

5.2.4.Farm Size

A farm is an area of land. It is the basic production facility in food production. Farms may be owned and operated by a single individual, family and community.

Table 5: Distributions of mango farmers farm size in the study area

Farm size	No. of farmers	Percentage
Up to10 acres(small)	15	25.00
11-30 acres(medium)	32	53.34
Above 30 acres(large)	13	21.66
Total	60	100.00

Table-5 shows about the number of small mango farm were 25.00 percent, 53.34 percent and 21.66 percent were medium and large mango farm in the study area.

5.2.5.Farmer Status

The status of the farmers has significant role in mango production. Two Tenures classes i.e. landowner and lessee/rent were found in mango farming.

Table 6: Distributions of mango farmer status in the study area

Farmer status	No. of farmers	Percentage
Landowner	22	36.66
Lessee/rent	38	63.34
Total	60	100.00

Table-6 shows that there were 36.66 percent mango farmers who have owner ship and 63.34 percent were renters who have hired their mango farms on rent

5.3.Verities of Mango

The banana varieties are the most vital and important input for fruit production. Quality plant is one of the ways to increase the productivity.

Table 7: Distributions of mango farmers Verities of mango in the study area

Verities of mango	No. of farmers	Percentage
Sindhri Mango	32	53.34
Dusehri Mango	7	11.66
Chaunsa Mango	8	13.34
Langra Mango	5	8.33
Saroli Mango	5	8.33
Neelam Mango	2	3.34
Gulab Khas Mango	1	1.66
Total	60	100.00

Table-7 indicates that about 07 mango varieties were cultivated by sample farmers in the study area during the study. The majority of mango producers were 53.34 percent of Sindhri Mango verity cultivate, while 11.66 percent,13.34 percent,8.33 percent, 8.33 percent,3.34 percent,1.66 percent respondent were cultivate Dusehri Mango, Chaunsa Mango, Langra Mango, Saroli Mango, Neelam Mango and Gulab Khas Mango verity in the study area.

5.4.Production Variation

Table 8: Distributions of the mango farmers according to production variation in the study area

Reasons	No. of farmers	Percentage
Increase		
More and long term income	38	63.34
Good yield	18	30.00
Reduce tenants	4	6.66
Total	60	100.00
Decrease		
Disease problems	41	68.34
Shortage of irrigation water	14	23.33
Shortage of capitals	5	8.33
Total	60	100.00

Table-8 indicates that higher and long term income was the major reason to increase mango plantings, so 63.34 percent of mango growers, while 30.00 percent good yield and 6.66 percent fewer requirements of tenants were also the reason to increase mango production. The mango growers who responded to decrease

mango acreage perceived the disease problem 68.34 percent, shortage of irrigation water 23.33 percent and shortage of capitals 8.33 percent.

5.5.Planting Material

The main criteria used by the mango producers in selecting planting material for a new mango orchard. It was observed the growers were conscious of planting material, because of disease problem. So growers try to avoid the disease carrier plants for their orchards.

Table 9: Distributions of the mango 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	8.34
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 mango producers considered good looking and health of plants and 25.00 percent planted the suckers of their own plants. Finally 8.34 percent received help from Malhi, in identification and selection of best planting material.

5.6.Labour costs

A labour input refers to all outlays incurred to engage labour for production. Labour inputs were employed for all cultural operations during the period of mango cultivation. These operations are, leveling, sowing and inter-culturing, application of fertilizer harvesting, weeding and cutting/harvesting.

Table 10: Average per acre labour cost incurred by the mango 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 mango 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.

5.7.Capital Inputs

Capital input measures the services derived from the stock of physical assets used in production. The assets included are fixed business equipment, structures, inventories and land.

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

Particulars	Number	Rate/Unit	Amount
Suckers and plants	1543.00	4.00	7715.00
F.Y.M(Farm Yard Manure)	3	2250.00	6750.00
Urea	7	2900.00	20300.00
DAP (Diammonium phosphate)	3	5300.00	15900.00
SOP (Sulphate of potash)	5	1250.00	6250.00
Total			56915.00

Table-11 shows that each selected and plants grower of study area on an average per acre of plants 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.

5.8.Fixed Cost

Fixed costs are expenses that are not dependent on the level of goods or services produced. They tend to be time-related, such as tax, rents being paid per month/year, and are often referred to as overhead costs. This is in contrast to variable costs, which are volume-related.

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

Particulars	Rate of contract (per year)
Rent/Contract of mango orchard	80000.00
Total	80000.00

Table-12 showed that majority 80 percent of contractor obtained advance payment to mango producer. On an average per acre mango growers spent for rent of land Rs.80000.00 in the study area.

5.9.Marketing costs

The cost associated with delivering goods or services to customers. The marketing cost may include expenses associated with transferring title of goods to a customer, storing goods in warehouses pending delivery, promoting the goods or services.

Table 13: Average per acre marketing cost incurred by the mango producer in the study area

Particulars	Number	Rate/Unit	Amount
Loading	20	300.00	6000.00
Transporting	8	2000	16000.00
Unloading	20	300.00	6000.00
Commission charges	--	6.00%	10000.00
Total Rs.			38000.00

Table-13 the result indicated that each selected mango farmers in study area on average per farm spent a sum of Rs. 38000.00. This included Rs. 6000.00 for loading, Rs. 16000.00 for transportation and Rs. 6000.00 of unloading respectively in the study area.

5.10.Total Cost of Production

TCP defined as sum of fixed cost plus variable costs make the total cost of production.

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

Particulars	Mean
Fixed Cost	80000.00
Labour Cost	28847.00
Capital Inputs	56915.00
Marketing Cost	38000.00
Total	203762.00

Table-14 the results showed in this table that the selected mango grower in the study area on average per acre spent a total cost of production of Rs. 203762.00 this included Rs.80000.00, Rs.28847.00, Rs.56915.00 and Rs.38000.00 on fixed cost, labour costs, Capital Inputs and marketing costs respectively in the study area.

5.11.Physical Productivity

The yield when expressed in terms of physical weight is known as physical productivity. It is generally expressed in terms of unit weight of production obtained. In other words physical productivity of mango farm is the same as the total yield obtained of other crop by farmers.

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

Particulars	Mean
Mango	233 Mds
Total	233 Mds

Table-15 it is clear from the result each mango grower in the study area obtained per acre 233 Mds on an average.

5.12.Revenue productivity

The value of farm production of gross profit it refers to money income accruing to the farmers from the sale of their production. It is calculated by multiplying the physical productivity (yield) obtained with the price, it is sold.

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

Particulars	Mean
Mango fruit	291250.00
Total	291250.00

Table-16 depicted that each selected mango grower in the study area on revenue an average per acre earned of Rs. 291250.00 that obtained by the grower of mango in the study area.

5.13.Net Income

Net income is gross profit remains cash operating expenses and depreciation cost of machinery and equipments costs could be obtained by subtracting the gross revenue from cash operating expenses. Net income Averages output or gross income after subtracting all farm expenses.

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

Particulars	Mean
Gross Income (Rs) A	291250.00
Total Expenditure (Rs) B	203762.00
Net Income (Rs) A-B=C	87488.00

Table-17 the results showed in this table that the mango growers on an average per acre earned during study, Rs. 87488.00 on net income, Rs. 291250.00 on gross income and Rs. 203762.00 on total expenditure in the study area.

5.14.Input – Output ratio

The input-output ratio is calculated by dividing total income with the total cost of production.

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

Area sown	Gross Income(Rs.)	Total Expenditure(Rs.)	Input-output ratio
Acre	(A)	(B)	A/B=C
1	291250.00	203762.00	1:1.42

Table-18 showed that the selected mango growers on an average per acre gross income Rs. 291250.00 and total expenditure is Rs. 203762.00 in the study area therefore they availed input output ratio of 1:1.42 from mango growing in the study area.

5.15Cost Benefit ratio

The cost benefit ratio refers to net returns as compared to the cost of production. It is calculated by dividing net returns with cost of production.

Table 9: Per acre cost benefit ratio of mango orchard in the study area

Area sown	Net income(Rs.)	Total Expenditure(Rs.)	Input-output ratio
Acre	(A)	(B)	A/B=C
1	87488.00	203762.00	1:0.42

Table-19 showed that the selected mango growers on a net income per acre earned Rs. 87488.00 and total expenditure Rs. 203762.00 in the study area therefore they availed input output ratio of 1:0.42 from mango growing in the study area.

6.Discussion

In this study, identified a number of factors that believed would be influential in determining the mango growing area of in taluka Tando Adam district Sanghar Sindh sustainability. The results indicate that proposed model provides an acceptable fit on the data.

The results of present study conducted to determine the economic implications of mango production in taluka Tando Adam district Sanghar indicated that the farmers on 33.34 percent of the mango respondent belonged to the age group of above 45 years; followed by 36.66 percent respondents belonged to the age group of 31-45 years and while 30.00 percent belonged to the age group of below 30 years in the study area.education level 13.33 percent mango farmers were illiterate, 50.00 percent farmers were Primary level of education, 26.66 percent of matriculation and while 10.00 percent farmers of the graduate education level in the study area.

Pirzada (2006) revealed that enormous potential and opportunities existed in the production and trade of mangoes from Pakistan. He mentioned potential mango varieties which according to him were quite suitable for export purpose from Pakistan. These varieties included Sindhri, Chounsa, Fajri, Golden and Began Phali and were in great demand in the Middle Eastern and Far Eastern countries. Despite an increase in mango exports, Pakistan continued to encounter many technical barriers to trade. He suggested that a proactive approach should be adopted to deal with the situation and an all-out effort made to comply with emerging requirements of the international market.

Thus the mango growers in taluka Tando Adam district Sanghar are 20.00 percent respondents belonged to the mango farming experience group of below 10 years and above followed by 33.34 percent respondents belonged to the experience group of 11-20 years, while 46.66 percent respondents belonged to the above 20 years. About the number of small mango farm were 25.00 percent, 53.34 percent and 21.66 percent

were medium and large mango farm in the study area. There were 36.66 percent mango farmers who have ownership and 63.34 percent were renters who have hired their mango farms on rent.

The majority of mango growers were 53.34 percent of Sindhri Mango variety cultivate, while 11.66 percent, 13.34 percent, 8.33 percent, 8.33 percent, 3.34 percent, 1.66 percent respondent were cultivate Dusehri Mango, Chaunsa Mango, Langra Mango, Saroli Mango, Neelam Mango and Gulab Khas Mango variety in the study area. The higher and long term income was the major reason to increase mango plantings, so 63.34 percent of mango growers, while 30.00 percent good yield and 6.66 percent fewer requirements of tenants were also the reason to increase mango production. The mango growers who responded to decrease mango acreage perceived the disease problem 68.34 percent, shortage of irrigation water 23.33 percent and shortage of capitals 8.33 percent in the area.

Khushk *et al.* (2004) studied structure, conduct and performance of marketing system, margins and seasonal price variation of selected fruits and vegetables in Pakistan. Wholesale prices of fruits and vegetables and regressed base market prices against other market prices in their first difference form were used in the analysis to check level of integration between the markets. Hyderabad and Multan were taken as base markets in Sindh and Punjab province respectively. The analysis revealed that fruit and vegetable prices did not move uniformly across spatially separated markets. Distance between markets was not found as an important constraint to affect the process of price transmission right from production point to the markets rather higher transportation cost and risks associated with transportation along with constraints in the availability of price information were found as the major factors revealing weak integration between these markets. They concluded that there was weak evidence that price changes in one market were fully and immediately transmitted to another market. They suggested that government should invest in infrastructural developments to improve access in different markets by reducing transportation cost.

Thus the selected mango growers in district Sanghar incurred of Rs.28847.00 on an average per acre mango 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 Nitrophos (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. And per acre of plants 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. The majority 80 percent of contractor obtained advance payment to mango producer. On an average per acre mango growers spent for rent of land Rs.80000.00 in the study area.

The mango growers in district Sanghar incurred in study area on average per farm spent a sum of Rs. 38000.00. This included Rs. 6000.00 for loading, Rs. 16000.00 for transportation and Rs. 6000.00 of unloading respectively in the study area. The mango grower in the study area on average per acre spent a total cost of production of Rs. 203762.00 this included Rs.80000.00, Rs.28847.00, Rs.56915.00 and Rs.38000.00 on fixed cost, labour costs, Capital Inputs and marketing costs respectively in the study area. It is clear from the result each mango grower in the study area obtained per acre 233 mounds on an average. On revenue an average per acre earned of Rs. 291250.00 that obtained by the grower of mango in the study area.

Mustafa *et al.* (2006) explored barriers against export of mango from Pakistan in the context of sanitary and phytosanitary agreement of World Trade Organization. They collected information from 20 mango producers, 15 pre-harvest contractors and 40 exporters and identified number of hurdles in the export of mango from Pakistan. They concluded that mango producers and exporters were not capable enough to comply with SPS requirements of the global market. Majority of the exporters showed their dissatisfaction about policies of the government. As such, government was not promoting mango industry. They suggested that existing concentration and overdependence of mango in few export markets should be avoided by identifying new markets and introducing value added products and also by complying with emerging international standards like HACCP and Europe GAP.

Thus the mango growers on an average per acre earned during study, Rs. 87488.00 on net income, Rs. 291250.00 on gross income and Rs. 203762.00 on total expenditure in the study area. the selected mango growers on an average per acre gross income Rs. 291250.00 and total expenditure is Rs. 203762.00 in the study area therefore they availed input output ratio of 1:1.42 from mango growing in the study area. Mango growers on a net income per acre earned Rs. 87488.00 and total expenditure Rs. 203762.00 in the study area therefore they availed input output ratio of 1:0.42 from mango growing in the study area.

7. Conclusion and suggestions

The research study on Economic Analysis of mango orchards production in taluka Tando Adam district Sanghar Sindh was concluded for the findings during 2014 there were the most efficient to cultivate the mango. The agricultural infrastructure is the web of personal, economic, social and legal relationships that support the production of agricultural commodities. It includes, most visibly, agricultural input suppliers and output

processors. However, it also includes the formal and informal business relationships between individual farms. Infrastructure provides access to input and output markets, access to agricultural services ranging from continuing education to consulting, as well as including institutional arrangements, such as the legal and monetary systems.

In Sanghar district is fertile in agricultural production. Thus, the district can have a potential to produce more fruits for demand of growing population, there is also need for study the efficient mango fruits production practices and issues in the production process for policy making.

7.1. Suggestions

Based on the findings of the study the following policy implications were made. The information such as total holding, area under mango, physical and revenue productivity obtained from mango enterprises 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 mango 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;

- i. Awareness should be created among the farming through media and extension services regarding scientific farming of Mango.
- ii. Growers may be educated about soil status market conditions to get better profit of mango fruit.
- iii. Agricultural loans should be provided on soft and simple terms and conditions to small farmers.
- iv. The required inputs should be made available for, farmers in required amount and at the right time.
- v. The cold storage facility will also positively contribute to enhance mango productivity.
- vi. Processing and manufacturing plants should be installed for easy access of the farmers. Where the farmers could either sell their product at profitable rates or make juices, jams, squashes etc. This could result into more mango production and better socio-economic conditions of the farmers.

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