



## **Economics of Tea Production in Pakistan**

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## Economics of Tea Production in Pakistan

### Abstract

Tea is one of the most important non-alcoholic beverage drinks worldwide and has been gaining further popularity as an important ‘health drink’ in view of its purported medicinal value. Pakistan has the potential of producing quality tea. National Tea Research Institute NTRI plays a very important role in the production and promotion of tea cultivation in Pakistan. The study was conducted to identify the opportunities and constraints in Shinkiari Mansehra. Primary data was collected from NTRI and different farmers of Shinkiari and evaluate the farmer’s perceptions production processing and marketing of tea. Results revealed that NTRI processing unit was working at below its full capacity and 226.59 Rs/Kg extra costs bearing due to below capacity. Tea is a high value crop of gross margin of 21340 Rs/ Acre and annually earned gross margin from other Crops wheat and maize was 6675Rs/Acre and Tea Cultivation Advantage was 14665 Rs/Acre but farmers was not interested to cultivate due to its high initial investment. Internal Rate of Return (IRR) and Net Present Value (NPV) were calculated for investment appraisal of the tea. Hence, there is need to promote tea cultivation on grass land area which will increase their income and livelihood and create more employment opportunities for local people.

**Keywords:** Tea, Production, Economic Analysis, NTRI, Pakistan

### Introduction

Tea (*Camellia sinensis*, *Thea sinensis*, or *C. thea*) is the world’s most popular beverage after water due to its palatability, comparative cheapness and other beneficial effect. Tea plant originated from South East China, gradually expanded to India and further into tropical and sub-tropical countries (Schapiro, 1982). At present, China is the leading tea producer followed by Kenya, Sri Lanka, Turkey, and Indonesia, Sri Lanka

Tea is produced at a large scale in the world. Its cultivation is restricted to acidic soil (4.5-5.5 pH). Rain plays an important role in its cultivation as for good production its water requirement is 1000-1500 ml per annum.

Temperature requirement is 0-35 °C if temperature is from 16-20°C its producing potential will increase. For optimal production plant to plant distance is 2 feet and row to row distance is 4 feet. Initial water requirement of tea is high. Pruning is the one of important part of the development of the tea plant after plantation. Generally tea plants take 3-4 years to mature with a long production life of 70-100 years (NTRI, 2010).

Tea is a labor intensive perishable crops and creates employments and income generating opportunities and indirectly contribute in economic development. It requires a skilful labor in picking the leaves. The quality of tea also depends upon the picking of the leaves because the growth of the tea leaves depends

upon the picking technique. A skilled labor can pick 35-kg tea per day (Alam, 2010)

### **Background of Tea in Pakistan**

Before 1971, East Pakistan had established tea orchards and Pakistan was the major exporter of tea. Separation from East Pakistan (modern-day Bangladesh) in 1971 turned Pakistan overnight from a tea exporter to an importer, a situation that continues today.

However, a tepid relationship with India, concern about over-dependence on Kenya, and the availability of large amounts of suitable land for tea cultivation within Pakistan itself are motivating change in the subcontinent: Pakistan has set its sights on self-sufficiency in tea production.

The high import bill of tea for a developing country like Pakistan became a great problem, therefore, soon after the separation of East Pakistan in 1971 a cell of special crops was created in the Ministry of Food and Agriculture, Government of Pakistan and a project titled "Research and Introduction of Tea in Pakistan" was initiated in 1973-74. Later on, the project was handed over to Pakistan Agriculture Research Council (PARC), Islamabad. The National Tea Research Station (NTRS) was established in 1986 at Shinkiari, District Mansehra, which was later on promoted to National Tea Research Institute (NTRI). A tea garden on 30 acres of land was established with a sound infrastructure on 20 acres land for tea nursery. An adequately equipped soil laboratory and an orthodox miniature tea-processing unit were installed (Latif et al. 2008)

Looking at the issues following objectives was defined to achieve the aim of the research study.

- i. To empirically analyze the cost and production management practices of tea.
- ii. To evaluate the economic feasibility of tea with other seasonal crops like wheat and maize.
- iii. To see the effect of tea cultivation on farmers income.
- iv. To identify the problem faced by the tea industry in Pakistan regarding the

production, processing and marketing of local Shinkiari Tea.

- v. To identify policy intervention, institutional changes needed to increase the tea production and improve the livelihood of the farmers.

### **Materials and Methods**

The study was conducted in May, 2011 in District Mansehra, Shinkiari which had the potential of local tea production. A detailed data was collected on production, the post production issues, processing, marketing; brand choice issues related the tea. The cost of production was provided by the experts in NTRI. The required information regarding the black and green tea processing machinery and equipment cost, labor charges involved in the installation, level of production and input costs involved etc were collected from the NTRI processing plant. Investment appraisal analysis was carried out to determine the extent of incentives for future investment in tea enterprise (Shah et al. 2010). Cash flow sheet was developed up 80 years to identify the feasibility of tea field. For cash flow sheet 30(1980-2006) year data was taken from Agriculture Statistics and Economic Survey of Pakistan of various issues and then calculate the compound growth rate. This approach had been used by various authors such as Nandi and Bera (2011), Prajneshul and Chandran (2007) and Rehman et al (2010). After calculating the growth rate future years data sheet was manipulated by multiplying the previous year figure with the calculated growth rate. If the feasibility study or business plan shows that project will bring direct tangible benefits, the classical methods of project evaluation can be applied (Brzozowska, 2007). Having data of projected capital expenditures, projections of turnover, income and cost statement projections and effect on expected cash flows the further evaluation can be lead through different stages. The one is the calculating of the payback period ratio, accounting rate of return and break-even-point (Mishan, 1982). The second one, the most popular, is the assessment based on changes of value in time that is calculating of discounting ratios, like as NPV or IRR and others like sensitivity analysis, different scenarios or simulation game (Myers, 1984). This approach

had been used in many studies in different ways like Lumby, 1991, Shah et al, 2010. The Research team visited tea growers at different locations of the area to analyze the cost and benefits differential between the perennial crop and seasonal crops. At the end of field day concluding meeting was planned at NTRI where the research team shared the concerns and problems at farmers' fields.

## Results and Discussion

### Role of NTRI

NTRI planted tea on 607 acres of land, Uni-Lever (Pvt.) Ltd on 1340 acres and agricultural department of KP on 20 acres. But due to the natural disaster of earth quake and terrorism the tea planted area decreased and reached up to 300 acre. Now tea is planting at different area of Sawat, Battagram Balakot and AJK.

To fulfill the demand of country, now tea is being currently cultivated in Mansehra, Swat and Dir on about 87 acres of land under the National Tea Research Institute (NTRI) and expected to rise. Along with this tea-processing unit has already been established in Shinkiari in Mansehra district with a processing capacity of 5000 kilogram of black tea per day but it is working below its installed capacity as only 1200 kg/day tea is being processed mainly due to low production of fresh leaves.

However this production cannot sufficient for growing population Pakistan has a long tradition of tea consumption because its annual consumption is about 150 million kg, fluctuates at just less than 1 kg per person per year. This is the world's seventh highest consumption (Government of Pakistan, 2008).

To fulfill the demand of tea government import the tea from different countries, its resultant position as 3rd largest importer of tea after England and Russia and the consumption is increasing day by day with the increase in population. Pakistan is importing black tea from nineteen different tea-producing countries of the world. Consumption of green tea in Pakistan is very small: it is imported from four different countries (Hamid, 2002).

Presently, Annual expenditure on the import of black tea and green tea was Rs 227.58 and

114.29 respectively per Kg. Approximately, Annual imports of 95.91 M tones of Rs. 21724 million, which approximates to 95 thousand M tones of Rs.21.62 billion of black tea and 0.91 thousand M tone of Rs.104.0 Million of green during the 2009-10, which is showed in Table 1. Approximately more than 42% percent of yearly consumption is being received by smuggling, which is a major loss in government revenues (National Tea Research Institute, 2010)

Besides this, sizeable quantity of tea is also being smuggled to supplement the supply to satisfy the ever-growing demand. According to a moderate estimates about 50,000 to 65,000 tones of tea are making inroads into Pakistan each year (Hassan, 2003). To fulfill the national requirements, the country is spending valuable foreign exchange on tea import. Besides continuous efforts farm level adoption is nominal and the processing plants are running much below the breakeven point. Therefore there is need to develop integrated and coordinated approach for increasing area under tea cultivation and production, develop market linkages between producers and processors, resolving issues of plucking and post harvest management along with promotion of local tea consumption.

### Farmers Perceptions

Tea is high yielding crop, gives high return but still farmers are stick to traditional cropping pattern in the area. Most of the people of the area have very smallholdings of land, usually in kanals. The farmers, therefore, are reluctant to grow tea because it is a long duration and high cost crop in the first 4 years and takes 7 to 8 years to reach complete yielding stage. They prefer short duration crops like vegetables, maize, rice and wheat etc. that provide quick return to meet their daily life expenditures. Most of the farmers are very poor while tea requires some investment for its cultural practices such as weeding, fertilization and irrigation etc.

Tea is usually cultivated on marginal lands as farmers think that tea cultivation is profitable in comparison to crops normally grown at marginal lands in the area.

The Table 2 indicates the cost of production of tea at Shinkiari. In the 1<sup>st</sup> and 4<sup>th</sup> year the cost is higher. In the 1<sup>st</sup> year the larger portion of cost goes to land preparation, seedling and transplanting cost and irrigation etc. In 2<sup>nd</sup> and 3<sup>rd</sup> year there is only maintenance cost. In the 4<sup>th</sup> year the along with maintenance cost there is a transportation cost from field to processing plant which is 15000/plant. The total cost of tea production is Rs 53660/acre while the profit from tea cultivation is Rs 21340/acre. Tea is a perennial crop and it gives production after 4 years. Therefore for initial 3 years it can be intercropped with Soybean, musters/canola, strawberry and vegetables like garlic onion and turnip so that 60-70 percent cost will be recovers from intercropping.

The table 3 presents the comparison of the three crops i.e. wheat, maize and tea. Stream water is the main irrigation source so there is no irrigation cost. The gross margin from wheat and maize cultivation is Rs.6675/acre gross margin from tea cultivation is Rs 21340/acre. The net advantage from tea cultivation is Rs.14665/acre. It indicates that through tea cultivation farmers can earn higher profit as compared to wheat and maize cultivation.

Table 4 indicates a negative cash flow up to 4 years, because tea plant starts fruiting after four years and management expenses are added in care every year but gives return from intercropping. The cash flow turns positive at 5<sup>th</sup> year. The cash flow remains higher from 6<sup>th</sup> to 80 years. After that the cash flow decline or constant up to 80 years. Keeping in view the current interest rate that is 16% (SBP, 2012) NPV and IRR is premeditated., the NPV is positive and the IRR was also very 24%. This provide a good justification that tea can be promote on the marginal land where a farmer doesn't get a beneficial returns from his land. The summary of the results of NPV and IRR are elaborated in Table 3

### **Constraint**

Tea is a perishable and high cost crop. There are a number of constraints in tea cultivation like Climate, frequency of rainfall, type of land, degree of slope of land, availability of inputs, seed and fertilizers and the untrained labor are important factors. Tea cultivation is not possible in Punjab and Sindh to some extent

due to these constraints. Investment on tea and poverty of the farmers is one of the hurdles for tea cultivation in Pakistan.

The distance between the tea plants is too short that a farmer does not go for intercropping this factor also restricts the farmer. The little quantity of tea produced and processed in Pakistan, because of unavailability of the processing units. 3-5 hours tea leaves should reach to the processing units. But unfortunately Pakistan has only 1 processing units Black Tea Processing Plant at NTRI. Along with other private agencies i.e. Hazara Uni, FATA, Sungi Found, Tepal and AJK are also planting tea. Within 3-5 hours fresh tea leaves should reach to the processing plant. Unfortunately the roads are narrow and under-constructed a lot of leaves reduce their moisture level while travelling. At last farmer suffered and get low price at farm gate.

It cultivation requires proper training, new techniques and better management practices are required to improve the efficiency of the farmer and as well field. Unfortunately, Pakistan has a lack of research institutes and modern laboratories and equipment.

Some of the commercial bank like Zarai Taraqiati Bank Ltd. (ZTBL) provides loans to facilitate the in three instalments bases, free of interest for the first four years, which is not enough to meet the requirements of this crop. The interest rate is very high i.e. 9 percent, which has to pay within 7-8 years when crop give maximum yield. This loan is not insufficient but also further increases the burden on the growers. The procedure to access loan facility is too difficult for poor and illiterate farmers. Besides, that loan is provided to those farmers who has two acre of land. These requirements again creates problem for the small farmers.

The long-term viability of tea production in Pakistan will inevitably depend on its security situation; both Baluchistan and the North-West Frontier Province in which Mansehra falls have experienced ongoing instability as a side effect of the conflict in Afghanistan.

### Benefits

Tea is a labor intensive crop and creates employment and income generating opportunities and indirectly contribute in economic development. Day by day Increase in population as well as rise in inflation level house hold head is unable to fulfill the food requirement of a whole family. That's why the rate of migration level is high and people are forced to leave their homeland to earn livelihood. If better opportunities are provided to those migrants in rural areas who move in search of better jobs, poverty will be alleviated. It also has some other advantages like no disease infestation, erosion control, no effect of hail storm etc. Tea crop gives good prices compared to other crops, and the risk of crop failure is fairly low.

If its production will be increased by the utilization of waste land the processing unit of National Tea Research Institute (NTRI) will be work at economic level (full capacity). Along with this increased local production of tea will help to reduce import bill.

The processing expenditure regarding tea cultivation is presented in the table 5. The current/existing variable cost per kilogram of tea is rupees 118 while the variable cost can be considerably decreased to rupees 5 only when the plant operates at its full capacity. The total processed cost of the finished product is Rs.386/kg at the current/ existing level while the total cost processing at the plant full capacity is only Rs.160/kg only. Hence, the extra costs to be beard due to below capacity of the plant are Rs.226. In short the empirical results indicates that variable cost and processed cost are considerably low when the plant is at its full capacity.

### Conclusion and Recommendations

Pakistan has the potential of producing quality tea. Most of the farmers are interested to cultivate tea at marginal lands and not agree to replace the traditional cropping pattern. Land holdings in the area are small and resources are low. Along with there are no proper marketing linkages and effective procedures to market tea in Pakistan. Therefore those constraints should be channelized properly and make the

marketing procedure simpler and effective. As for as the expansion in area under tea cultivation is concerned, there is need to develop grass lands of the farming communities with special technological packages and proper persuasion. There is also need to popularize tea cultivation by the social mobilization and capacity building of the farmers through the training in other potential areas of Pakistan through proper advertisement. One of the main problem is there is no record of tea production in Pakistan. Data should be properly organized and documented. Government should introduce the home processing unit rather than the private or multinational companies so that our more employment opportunities are available.

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**Table 1: Import Situation of Tea during Last Five Years in Pakistan**

Year	Black Tea			Green Tea		
	Qty*	Value**	Rs/ Kg Cost	Qty*	Value***	Rs/ Kg Cost
2005-06	104	11.60	111.54	1.5	84.96	56.64
2006-07	105	11.73	111.71	1.1	79.23	72.03
2007-08	102	13.73	134.61	1.3	104.00	80.00
2008-09	98	14.98	152.86	1.05	98.46	93.77
2009-10	95	21.62	227.58	0.91	104.00	114.29

Note: \* showed quantity in “000”M tones, \*\* shows value of Black tea in Billion Rs, \*\*\* shows value of Green tea in Million Rs

Source: National Tea Research Institute, 2010

**Table 2: Cost of Production of Tea**

Initial Investment	Unit	1 <sup>st</sup> Year (2006)	2 <sup>nd</sup> Year (2007)	3 <sup>rd</sup> Year (2008)	4 <sup>th</sup> Year (2009)	5 <sup>th</sup> Year (2010)
<b>Land Preparation</b>						
Ploughing +Leveling	Rs/Acre	1200	–	–	–	–
Seedlings Cost	Rs/Acre	40000	–	–	–	–
Transplanting	Rs/Acre	8580	–	–	–	–
Irrigation	Rs/Acre	463	505	550	600	654
<b>Fertilizers</b>						
Urea(2 bags)	Rs/Acre	1054	1162	1502	1600	1712
DAP(1bag)	Rs/Acre	993	1931	2578	2267	2494
Cleaning and Pruning	20 days	3089	3367	3670	4000	4360
Plucking Cost	8 plucking	–	–	–	–	17440
Transportation Cost	Rs/Acre	–	–	–	–	15000*
<b>Total Cost</b>	Rs/Acre	55379	6965	8300	8467	41660
Land Rent	Rs/Acre	9774	10263	10830	11400	12000
Total Cost with land	Rs/Acre	65153	17228	19130	19867	53660

Rent					
<b>Yield</b>	Kg/Acre				2500
<b>Output</b>	Rs/Acre				75000
<b>Net Profit</b>	Rs/Acre				21340

Pervaiz, et al (2009)

**Table 3: Cost Comparison of Seasonal Crop with Tea 2010-11**

Items	Wheat	Maize
	Rs/Acre	Rs/Acre
Seed	1000	550
Fertilizer	3250	2000
Cultivation	1800	1800
Harvesting	2100	1550
Threshing	1800	1350
Total Cost	9950	7250
Price Rs/40kg	950	1000
Total Yield/Acre	23	17
Total income/Crop	21375	17500
Total cost without land rent/Year	17200	
Land Rent(Rs./Acre)	15000	
Total cost with land rent/Year	32200	
Total Gross Income/Year	38875	
Gross Margin/Year	6675	
<b>Tea Cultivation Advantage</b>	<b>21340-6675=14665</b>	

**Table 4: Estimated Annual Costs And Revenues Of Tea Cultivation Non-Intercropped**

Year	Cost(Rs/acre)	Revenues(Rs./acre)	Net benefits cash flow	Cumulative cash flow
1	65153	0	-65153	-65153
2	17228	0	-17228	-82380
3	19130	0	-19130	-36358
4	19867	0	-19867	-38997
5	53660	75000	21340	1473
6	68075	82620	14545	35886
7	59940	90979	31039	45584
8	63478	100147	36669	67708
9	67311	110200	42888	79557
10	71467	121220	49753	92641
11 to 20	103789	189654	85865	135618
21 to 30	212520	409449	196928	282793
31 to 40	465931	883969	418037	614966
41 to 50	1067073	1908422	841349	1259386
51 to 60	2514556	4120141	1605585	2446934
61 to 70	6045252	8895075	2849823	4455408
71 to 80	14757203	19203799	4446596	7296419



NPV@16			3896.25	
IRR			24%	

**Table 5: Processing Expenditure**

Items		Year 2010 / Existing	If Full Capacity
Maintenance cost	Rs/Month	16666.67	16666.67
Labor cost	Rs/Month	69171.43	69171.43
Electricity cost	Rs/Month	50000.00	50000.00
Coal cost	Rs/Month	7500.00	7500.00
Wood cost	Rs/Month	4166.67	4166.67
Diesel cost per season (April to October)			
Rs/Month		2812.50	2812.50
<b>Variable Cost</b>		<b>150317.26</b>	<b>150317.26</b>
Quantity processed finished year 2010	Kgs	<b>8885</b>	<b>210000</b>
If Processing Fresh	Kg/Month	<b>6347</b>	<b>150000</b>
Quantity processed finished per month	Kgs	1269.29	30000
<b>Variable cost per Kg</b>	Rs/Kg	<b>118.43</b>	<b>5.02</b>
<b>Fixed cost</b>	Rs/Month	150000.00	150000.00
<b>Total cost (variable +fixed)</b>	Rs/Month	300317.26	300317.26
Total processing cost finished	Rs/Kg	<b>236.60</b>	<b>10.01</b>
Total processed cost finished product including purchase price of fresh	Rs/Kg	<b>386.60</b>	<b>160.01</b>
<b>Extra cost bear due to below capacity</b>			<b>226.59</b>

\*For finished 1 kg of tea requires 5 kg fresh