USAID FIRMS PROJECT

Economic Benefits of Agriculture Policy Reforms

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Abstract

In light of the Provincial Agriculture Policy Reforms proposed by the FIRMS Project, a suitable model has been developed to calculate the probable economic benefits accruing out of these policy reforms. Policy reforms proposed specifically for Punjab have been made the basis of analyses. Projections have been made for certain impact indicators by finding appropriate variables for quantification of impact. The model provides quantitative information by linking the policy reforms and the impact indicators on the basis of certain assumptions.

Acronyms

FAO	Food and Agriculture Organization of the United Nations
FY	Fiscal Year
GDP	Gross Domestic Product
KPK	Khyber Pakhtunkhwa
MINFAL	Ministry of Food & Agriculture
PBIT	Punjab Board of Investment & Trade
SOW	Scope of Work
USAID	United Stated Agency for International Development
UNIDO	United Nations Industrial Development Organizations

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Executive Summary

Agriculture is the mainstay of Pakistan's economy. It contributes 25 per cent to the GDP and engages 44 per cent of the total labor force. Nearly 62 percent of the country's population resides in rural areas, and is directly or indirectly linked with agriculture for their livelihood. However, there is evidence that the agriculture industry potential is constrained by distortions and inefficiencies introduced on the part of current institutional, legal and regulatory policies. The agriculture marketing laws of Pakistan have had a crippling effect on market development. Legitimate marketing issues such as quality, cold chains, market segments, business opportunities, value, and hygiene, freedom from contamination, linkages, packaging, distribution, transport and labeling are ignored. Keeping these distortions in mind and after a thorough review of agriculture marketing policies, laws and regulations being currently followed, the FIRMS project prepared a policy draft carrying recommendations for this sector. The aim of the proposed policy reforms is to bring attention of the government towards this sector to adopt plausible ways through which the maximum potential gains can be tapped.

Stemming from the work already done, the aim of this consultancy is to develop a model to calculate economic benefits of the proposed policy/ regulatory reforms for agriculture sector. The proposed agriculture marketing framework focused on areas such as: market inefficiencies, state of infrastructure, value chain development and lack of private investment limiting the size of opportunities for market access. Addressing current distortions will assist in getting back millions of dollars that the economy is losing each year by improving a range of socioeconomic factors. This study will clearly calculate how the intervention (inputs) is expected to affect final outcomes i.e. the expected economic impact of reforms on socioeconomic factors. This involves calculating the impacts of reforms through quantification of socioeconomic and institutional factors influencing the agriculture sector. By identifying suitable variables corresponding to each area of policy reform, a quantifiable evaluation can be made. For this purpose, an "Input-Output Calculation Model" has been built which lays down how the proposed interventions (inputs) are expected to have effect on probable outcomes (output), by establishing a link between input and output on the basis of certain assumptions.

On the whole, the results of the economic model thus developed show that the growth rate of agriculture sector can increase to a minimum of 6.5% subject to the successful implementation of the proposed policy reforms. Annual wastage of 1533.78 thousand metric tones of major crops can be avoided with the adoption of better practices. The volume of production of citrus, mango, apple, banana, guava, potato, tomato, garlic, and onion is expected to increase by 191.2, 63.1, 0.34, 1.236, 41.1, 514.3,14.8, 2.86, 140.9 thousand tones respectively. The income of people associated with agriculture can increase by Rs 3007.7. The employment in agriculture sector can increase by 0.98 %. 1.6% more females will accommodated in the industry. The per capita monthly consumption expenditure on fruits and vegetables can increase by Rs 50.3 and Rs 62.3 respectively. Value of horticulture produce can go up by 530,218,700 US Dollars due to better grades.

1. Introduction

1.1 General

Agriculture is the mainstay of Pakistan's economy. It contributes 25 per cent to the GDP and engages 44 per cent of the total labor force[1]. Nearly 62 percent of the country's population resides in rural areas, and is directly or indirectly linked with agriculture for their livelihood. While on the one hand, the sector is a primary supplier of raw materials to downstream industry, on the other hand, it is a large market for industrial products such as fertilizer, pesticides, tractors and agricultural implements[2]. In fact, the welfare of a large population depends on a resourceful harnessing of the agricultural source of Pakistan. With a population growth rate of 2.6 percent there is a net addition of 3.4 million people each year. To fulfill the needs of the growing population, there is the need of a continuous increment through an enhancement in per hectare yields[3]. In the last 20 years, the average annual growth rate of agricultural output is estimated at about 4%, with a lower rate (3%) in the last 5 years[4].

1.2 Assets:

Within agriculture; horticulture i.e. fruits, vegetables and floriculture is an important sub- sector of the agricultural economy having an immense potential for local consumption. Horticulture plays a vital role not only in rejuvenation of rural economy but also in improving human nutrition which is often deficient in ingredients such as vitamins and minerals. Horticultural products, which include vegetables, fruit and cut flowers, have grown steadily and become the single largest category in agricultural trade. Pakistan is blessed with wide range of agro climatic conditions i.e. tropical, sub-tropical, warm temperate and temperate regions. This opportunity positions Pakistan in privileged countries, where variety of crops particularly horticultural crops can be produced[5].

More than 28 types of fruits and 30 types of vegetables are grown throughout the year. Approximate yearly production of fruits, vegetables and spices is 12 million tons with over 25 commodities being among the largest 20 harvests in the world. The important fruits include citrus 2 million tons, mangoes 1 million tons, dates 0.63 million tons and apples 0.4 million tons. In addition, there is a large variety of other fruits that are harvested around the year. Important vegetables and spices include potato, onion, tomato, chillies, garlic and a large variety of leafy, root and other crops[6].

Horticultural production creates employment opportunities for the rural poor, notably women, and has significant impacts on poverty reduction. Also, studies show that households that participate in horticultural production, in both rural and urban areas, earn higher incomes than households that do not.

1.3 Punjab Profile

Punjab, the most populous province of Pakistan, is progressively becoming a more significant player on Asia's economic map. Punjab not only is the economic and cultural hub of the country but also an increasingly important region from a global standpoint. With a history dating back over 9,000 years it is a cradle of civilization and bestows on Punjab a historically entrenched legacy in

[1] www.pakissan.com/english/agri.overview/agriculture.policy.overview.html
[2] Economic Survey 2010: Chapter 2 Agriculture
[3] www.economicreview.com.pk/food-and-agriculture-sector-in-pakistan
[4] UNIDO Report 2010: Report on enterprise based survey of horticulture sector
[5] www.sbp.org.pk/guidelines/horticulture/horticulture_Guideline.pdf
[6] www.phdeb.org/phs.php

agriculture, far more than any other agriculture power house the world over. To this day Punjab enjoys unique status among the agriculturally driven economies of the world.

Punjab serves as the granary and food basket of Pakistan. Punjab's Agricultural GDP is 66% of the national agricultural GDP. Punjab is largely a self-sustaining, agrarian province with an abundant produce of food crops. It has historically posted the highest production numbers for rice, wheat, dairy and meat in the world[7]. As with other crops, it is the Punjab that dominates the production of both fruits and vegetables, accounting for 63% of fruits and 60% of vegetables. Citrus, especially the small fruit known as "kinnow" is produced in the largest volume around Sarghoda and forms the basis for a commercial juice industry in that area. Punjab produces 95% of the total Pakistan's production of citrus[8]. Mango is also heavily produced in Punjab and comprises the second largest volume of fruit. Punjab holds 67% of the total area and produces 80% of Pakistan's mango yield, which averages 10.7 ton/ha placing Pakistan 13th in the world. It is consumed fresh and used for juice manufacture. Together these two fruits in Punjab alone account for 48% of all fruit produced in Pakistan. For vegetables, once again Punjab dominates with the production of potato. This vegetable represents 30% of all vegetables produced in Pakistan and is followed by onion. The following is a list of major agricultural commodities that are produced in Pakistan. Also indexed is the amount produced in Punjab and the share that Punjab holds in the production of that commodity[9].

Table 1 Major Agricultural Commodities Produced in Pakistan

Commodity	Pakistan	Punjab	% Share of Punjab
Citrus	2299	2060	89.6
Mango	1732	1325	76.5
Guava	490	239	48.8
Dates	566	45	8.0
Banana	158	8	5.1
Apple	442	4	0.9

[7] PBIT report: Punjab Sector Profile. Agriculture
[8] Competitiveness Support Fund: Horticulture Action Plan; background paper July 2007
[9] PBIT report: Punjab Sector Profile. Agriculture

2. The Study

2.1 Potential of Horticulture Industry

The horticulture sector contributes about 12% to national agricultural GDP of Pakistan. The sector also experience higher yields per acre and higher price per acre's produce. Of these higher returns per hectare, Pakistan has a local comparative advantage in the production of horticultural commodities compared to regional competitors as illustrated below10.

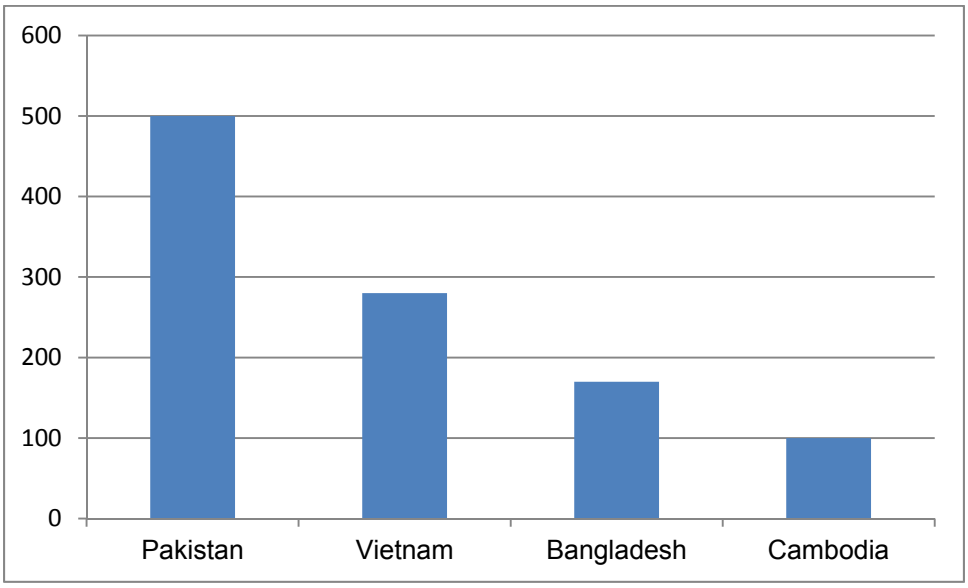

Figure 1: Net Returns on Agriculture (Source PBIT: Punjab Sector Profile, Agriculture)

In KPK and Northern Areas, there is great room and scope for promotion of citrus fruits, peaches, plums, apricot, persimmon, apple, strawberry, guava etc. In Punjab citrus, mango and guava, while in Sindh mango, banana, dates and papaya and in Baluchistan apple, grapes, dates, stone fruits (apricot, peach, plum, cherry etc.) and pistachio can be targeted for increased production and value by promoting processing industry for value addition. Citrus is the largest fruit crop group by volume. Pakistan is the fifth and fourth largest producer of citrus and dates respectively. There is considerable scope for introduction and development of new fruits like cherries, strawberry, litchi in different parts of the country. There is tremendous potential for production and processing of tomatoes, potatoes, onions etc11. Thus, horticulture in Pakistan has a great potential and scope for the domestic market. If Pakistan is able to improve the processing and marketing of horticultural produce, then the country will become competitive and there is no doubt that horticulture will contribute substantially to sustain the economy of the country.

2.2 Sluggish Growth:

Despite its critical importance to growth, incomes, and food security, the Agriculture sector has been suffering from secular decline and has not been able to meet its target.

[10] PBIT Report. Punjab Sector Profile. Agriculture
[11] www.phdeb.org/phs.php

Table 2 Agriculture GDP Growth Rates in Pakistan

Historical Growth Performance	
Agriculture Growth	
Years	Percent
1960's	5.1
1970's	2.4
1980's	5.4
1990's	4.4
2000's	3.2
Source: Federal Bureau Of Statistics	

It is evident from the statistics that the agricultural GDP growth rate in Pakistan has been slow in the past several years. Growth in the sector, particularly in the crop sub sector i.e. horticulture, has been falling for the past three decades. It declined from 65.1 per cent in the FY 91, to 57.3 per cent in the FY 01. Horticulture is a major economic opportunity with a fast growth rate of 12% per year. Pakistan has not captured this opportunity yet, growing slower than the world market (6% vs. 12% per year). This is primarily because of the fact that the country has not yet been able to achieve quality standards and marketing potential. There are issues relating to compliance, certification according to international standards, traceability, farm management, perish ability, cool chain, storage, wholesales markets and marketing etc. Out of 13.67 million tones of fruits and vegetables produced annually, about 12 percent goes to waste between farms to consumers while 4 percent is exported at a price 41 percent lower as compared to world average price, owing to poor produce quality12.

Vegetables produced in different zones during different seasons are traded across regional markets of the country to meet consumer demands. Over eighty per cent vegetable production is marketable surplus while it is reported that the surplus is 86 per cent of production of which 25-35 per cent is wasted. The decline in productivity of crops has contributed to a decline in the living standards of the rural population as it is the main source of their income. Moreover, 75 percent of Pakistan's agriculture potential remains untapped13. These productivity gaps can be addressed if reforms are introduced aiming at encouraging and facilitating the growers to develop/ implement marketing strategies that aims at establishment of value addition and efficient marketing system, attracting local private investment; facilitating in setting up of necessary material and quality infrastructure including inter alia cool chain system all over the country etc. This will help in transforming current post-harvest losses into economic gain.

2.3 Key Challenges

Much evidence exists as to the significant importance of the agriculture sector for the economy. However, little has changed in production technology, harvesting practices, packaging and post harvest care within the horticulture industry over the last decade. As a result the industry has been unable to significantly improve the volume of output. The lackluster performance of the horticulture industry in Pakistan is due to a multitude of factors. These include old marketing laws, poor pest management, inadequate harvesting and post-harvest procedures and a lack of infrastructure, especially cold storage14. In order to build a solid foundation for the development of commercial horticulture farming the government needs to adopt policy reforms that empower the private

[12] www.pakissan.com
[13] www.pakissan.com
[14] MINFAL Yearbook 2005-06

sector to drive the inefficiencies out of the current horticulture marketing regimes benefiting the grower, the consumer and the retailers. Increased farm productivity, achieved by sustainable use of natural resources and other inputs, and diversification of production from the low value to high value products in response to market demand have to be the key ingredients of future agriculture strategy to make agriculture both productive and profitable.

2.4 Addressing Inefficiencies through Policy Reforms:

With clear evidence as to the economic and social importance of agriculture sector in Pakistan, it goes without saying that agriculture will continue to play an important role in the economic development and poverty alleviation in Pakistan. However the traditional marketing laws that are being strictly followed have rendered the sector inefficient. Consequently, it becomes imperative for the provincial governments to develop the agriculture sector to meet the upcoming challenges, utilize its untapped potential and to put the sector on the right tract for increasing income of farmers supported by policy and regulatory environment and attracting private investment for expanding agribusiness. The Provincial Agriculture Policy Framework developed by the USAID Pakistan FIRMS Project is one milestone attempt which envisages countering the inefficient and distortive practices in the agriculture sector in order to support its growth.

Key features of the reforms are as under:

- Abolishing single market channel by doing away with notified areas, market committees and government control over marketing
- Meaningful participation of private sector
- Corporatization of public markets
- Set up of independent, representative marketing board to register markets and enforce standards
- Re-orient role of Government towards market information services, performance monitoring, feasibility studies, standards

FIRMS expect that the proposed market reform efforts led by the Provincial governments will:

1. Facilitate a conversion of the existing wholesale markets run by government market committees into corporatized entities managed by professional boards.
2. Enable private sector markets to be set up, leading to new wholesale markets, farmer markets, collection points and consumer/retail markets.
3. Establish an agriculture marketing board consisting of representatives from the private sector, academia, growers, retailers and Government to promote standards in the industry and provide public goods (information, training, linkages)
4. Initiate sustainable momentum towards commercial farming in horticulture through greater linkages between farmers and niche markets, special markets for specific products, contract growing, better sourcing for export houses, proper grading and packaging, and adherence to sanitary and phyto-sanitary regulation.

3. Study Methodology

3.1 Calculating Economic Benefits of Policy Reforms:

In order to calculate the economic benefits of provincial policy reforms, an "input-output calculation model" has been developed. The model based on input-output analysis provides quantitative information by linking inputs (policy reforms) and the corresponding probable outputs (impact indicators) on the basis of certain assumptions. The economic benefits of the proposed policy reforms have been calculated on the basis of following impact indicators:

1. Agriculture Income:

   This impact indicator covers the income related aspects of people engaged in agriculture activity.

2. Productivity:

   This impact indicator relates to the production and value of horticulture items i.e. fruits and vegetables (defined in economics term as the amount of output produced per unit of input utilized).

3. Profitability:

   This impact indicator gauges the benefits enjoyed by consumers and producers in the form of producer surplus.

4. Consumer Satisfaction:

   This impact indicator relates to the benefits received by the consumers in the form of increase in consumption.

5. Employment:

This impact indicator refers to percentage of people employed in agriculture sector both male and female.

Some quantifiable economic variables have been made use of in order to facilitate the calculations with regard to the aforementioned impact indicators.

3.1.1 Input – Output Calculation Model:

The following table gives probable economic benefits accruing out of the proposed policy reforms. For the purpose of calculations, some assumptions have been made and conservative estimates have been calculated.

Table 3 Proposed Economic Benefits

Serial no.	Input (Area of Policy Reform)	Primary Agent of Action	Output (Impact Indicator)	Theoretical Outcome (Variables for Analysis)	Projections & Economic Benefits[15]
1	• Alternative market channels	Public Sector & Private sector	Agriculture Productivity	Volume of production of: • Fruits: citrus, mango,	Production (000' tones) • Fruits Citrus: 2103.2 (191.2)

[15] The last column gives projected (forecasted) values of agriculture industry specific economic variables. The values in parenthesis give annual economic benefit.

Serial no.	Input (Area of Policy Reform)	Primary Agent of Action	Output (Impact Indicator)	Theoretical Outcome (Variables for Analysis)	Projections & Economic Benefits15
	• No. of concessions & grants • Retail markets & expansion of public markets			banana, apple, guava. • Vegetables: potato, tomato, garlic, onion	Mango: 1566.3 (63.1) Apple: 3.74 (0.34) Banana: 11.53 (1.236) Guava: 461.2 (41.1) • Vegetables: Potato: 3854.2 (514.3) Tomato:102.6 (14.8) Garlic: 27.16 (2.86) Onion: 508.8 (140.9)
2	• Encouraging Private participation • Distribution center • Value chain development • Facilities for grading, packaging, cooling, storage etc.	Public & Private Sector	Productivity & Consumer satisfaction	• Less wastage of production • Increased consumption of fruits & vegetables • Incremental Value of horticulture produce (Fruits & Vegetables)	• Annual Wastage avoided : 1533.78 000' tones • Increased per capita monthly consumption expenditure Fruits: 108.08 Rs (Rs 50.3) Vegetables: Rs 120 (Rs 62.3) • Incremental Value of Horticulture produce US Dollars: 530,218,700
3	• Business development institutions • Infrastructure development • Availability of credit & Training resources	Public Sector	Income & Productivity	• Average monthly income of a person employed in agriculture	• Rs 13905.2 (Rs 3007.7)
4	• Private investment • Expansion opportunities for female entrepreneurs	Private Sector	Employment in agriculture sector.	• Percentage of people employed in agriculture Punjab • Increase in % of females employed in Punjab	• 41.35 % (0.98%) • 16.9 % (1.6%)
5	• Lower margins	Public & Private Sector	Profitability	• Producer surplus	Surplus in Rs = Apple: 3, banana: 1, citrus: 4, mango: 6, guava: 2, potato: 1, Tomato: 1, garlic: 3, onion: 1 (5%)

3.2 Methodology:

The key steps undertaken in order to forecast annual economic benefits from policy reforms include:

1. To keep a realistic approach and in order to arrive at conservative estimates (as given in the above table), past trends of agriculture specific economic variables have been utilized. After calculating the percentage change in years 2009-2010/2010-2011, criteria for calculating minimum achievable gain has been applied. This criteria is as follows;

   Min Achievable Gain: value of output derived by assuming that there is an "incremental" (additional) contribution proportional to one-third of the percentage change calculated for each economic variable.

2. The minimum achievable gain criteria itself has been based on the premise that any policy reform is bound to have an impact over and above the past trend.
3. The minimum achievable gain captures a conservative estimate (least possible value) of impact of policy reforms in the economy.
4. Calculations have been made specifically using Punjab specific data.
5. 5 major fruits (citrus, mango, apple, banana, and guava) and 4 major vegetables (potato, tomato, onion, and garlic) are chosen from the list of fruits and vegetables to calculate volume of production and value of horticulture produce.
6. To calculate the value of horticulture produce i.e. fruits and vegetables, average annual whole sale prices are multiplied by the total production of fruits and vegetables. All prices are further converted to US Dollars using the current currency rate i.e. 1$ = 95 Rs.
7. Statistics for income, employment and consumption expenditure have been taken from household integrated survey that is compiled for alternate years. Years 2007-08 and 2010-11 was taken to calculate percentage change.
8. Provincial policy framework proposed specifically for Punjab by the FIRMS Project has been made the basis of the economic model thus developed.
9. All economic benefits are annual.
10. Calculations in this document are based on figures/information obtained from various sources including Agriculture statistics of Pakistan, Federal Bureau of statistics, FAO Stat, Ministry of Agriculture & Livestock and USAID: Agriculture Marketing Policy Framework by Preston Pattie.
11. Variables taken for calculation of benefits have been chosen on the basis of knowledge of important theoretical linkages between various elements of economic activity. Thus these variables account for "probable" economic outcomes of policy reforms.

It must be noted that this document gives a snapshot of probable potential future benefits from policy reforms. It is based on limited data availability due to dearth of compilation of economic data by government departments and concerned authorities. Also, the study does not take political or security factors into account.

4. Study Findings

4.1 Economic Benefits from Alternate Market Channels & Expansion of Public Markets:

The current market system emphasizes control of products and restricts market development. Because of restrictive policies, marketing of fruits and vegetables in the domestic market continues to be rudimentary. The product is delivered to the mandi for sale by auction with no prior management to prepare it for a particular market segment or niche. This requires initiative of private enterprise to introduce alternative market channels, expansion of public markets and incentives provided to private investors in the form of liberal and permissive regime. Liberalizing the overall policy in a way that allows greater market access to private sector will have far reaching implications for behavior and performance of the marketing system. Such policy reforms will facilitate commercial development through multiple channels thereby providing closer linkages of farmers to markets leading to increase in volume of production. Through more market channels, (better signaling and positive feedback loops) growers will respond by increasing the volume of production to cater to specific demands of market segments. 5 major fruits (citrus, mango, apple, banana, and guava) and 4 major vegetables (potato, tomato, onion, and garlic) are chosen from the list of fruits and vegetables to calculate increase in the volume of production of the horticulture produce. After calculating the percentage change in FY 10 & 11, criteria for calculating minimum achievable gain has been applied.

4.1.1 Fruits

4.1.1.1 Calculation of Benefit through increase in volume of production (Mango)

Total mango production (000' tones) in FY 11 1503.2

Total mango production (000' tones) in FY 10 1455.7

$$\%\Delta = \frac{1503.2 - 1455.7}{1455.7} \times 100$$

= 3.2 %

Min Achievable Benefit = incremental increase in production proportional to 1/3rd of the % Δ

Gross incremental percentage change (following the reform) = [3.2% + 1/3rd (3.2%)]

= 4.2%

Forecasted total mango production = 4.2% of 1503.2

=1566.3 (000' tones

Economic Benefit (in terms of incremental production) = 63.1 (000' tones)

4.1.1.2 Calculation of Benefit through increase in volume of production (Banana)

Total banana production (000' tones) in FY 11 10.3

Total banana production (000' tones) in FY 10 9.4

$$\%\Delta = \frac{10.3 - 9.4}{9.4} \times 100$$

= 9.5 %

Min Achievable Benefit = incremental increase in production proportional to 1/3rd of the % Δ

Gross incremental percentage change (following the reform) = [9.5% + 1/3rd (9.5%)]

= 12%

Forecasted total banana production = 12% of 10.3

=11.536 (000' tones)

Economic Benefit (in terms of incremental production) = 1.236 (000' tones)

4.1.1.3 Calculation of Benefit through increase in volume of production (Apple)

Total apple production (000' tones) in FY 11	3.4
Total apple production (000' tones) in FY 10	3.4

%Δ = $\frac{3.4 - 3.4}{3.4} \times 100$

= 0 %

Min Achievable Benefit = Assuming that as a consequence of the reform minimum of an incremental 10 % increase in total production will be witnessed.

Gross incremental percentage change (following the reform) = 10%

Forecasted total production = 10 % of 3.4

= 3.74

Economic Benefit (in terms of incremental production) = 0.34 (000' tones)

4.1.1.4 Calculation of Benefit through increase in volume of production (Guava)

Total guava production (000' tones) in FY 11	420.1
Total guava production (000' tones) in FY 10	390.9

%Δ = $\frac{420.1 - 390.9}{390.9} \times 100$

= 7.4 %

Min Achievable Benefit = incremental increase in production proportional to 1/3rd of the % Δ

Gross incremental percentage change (following the reform) = [7.4% + 1/3rd (7.4%)]

= 9.8%

Forecasted total guava production = 9.8% of 420.1

=461.2 (000' tones)

Economic Benefit (in terms of incremental production) = 41.1 (000' tones)

4.1.1.5 Calculation of Benefit through increase in volume of production (Citrus)

Total citrus production (000' tones) in FY 11	1912.0
Total citrus production (000' tones) in FY 10	2077.5

%Δ = $\frac{1912 - 2077.5}{} \times 100$

2077.5

= - 7.9 %

Min Achievable Benefit = Assuming that as a consequence of the reform, this declining trend is offset with a minimum of an incremental 10 % increase in total production.

Gross incremental percentage change (following the reform) = 10%

Forecasted total production = 10 % of 19.12

= 2103.2

Economic Benefit (in terms of incremental yield) = 191.2 (000' tones)

4.1.2 Vegetables

4.1.2.1 Calculation of Benefit through increase in volume of production (Potato)

Total potato production (000' tones) in FY 11 3339.9

Total potato production (000' tones) in FY 10 2990.9

%Δ = 3339.9 – 2990.9 × 100

2990.9

= 11.6 %

Min Achievable Benefit = incremental increase in production proportional to 1/3rd of the % Δ

Gross incremental percentage change (following the reform) = [11.6% + 1/3rd (11.6%)]

= 15.4%

Forecasted total potato production = 15.4% of 3339.9

=3854.2 (000' tones)

Economic Benefit (in terms of incremental production) = 514.3 (000' tones)

4.1.2.2 Calculation of Benefit through increase in volume of production (Tomato)

Total tomato production (000' tones) in FY 11 87.8

Total tomato production (000' tones) in FY 10 77.9

%Δ = 87.8 – 77.9 × 100

77.9

= 12.7 %

Min Achievable Benefit = incremental increase in production proportional to 1/3rd of the % Δ

Gross incremental percentage change (following the reform) = [12.7% + 1/3rd (12.7%)]

= 16.9%

Forecasted total tomato production = 16.9% of 87.8

=102.6 (000' tones)

Economic Benefit (in terms of incremental production) = 14.8 (000' tones)

4.1.2.3 Calculation of Benefit through increase in volume of production (Garlic)

Total garlic production (000' tones) in FY 11	24.3
Total garlic production (000' tones) in FY 10	22.3

$$\%\Delta = \frac{24.3 - 22.3}{22.3} \times 100$$

= 8.9 %

Min Achievable Benefit = incremental increase in production proportional to 1/3rd of the % Δ

Gross incremental percentage change (following the reform) = [8.9% + 1/3rd (8.9%)]

= 11.8%

Forecasted total garlic production = 11.8% of 24.3

= 27.16 (000' tones)

Economic Benefit (in terms of incremental production) = 2.86 (000' tones)

4.1.2.4 Calculation of Benefit through increase in volume of production (Onion)

Total onion production (000' tones) in FY 11	367.9
Total onion production (000' tones) in FY 10	285.9

$$\%\Delta = \frac{367.9 - 285.9}{285.9} \times 100$$

= 28.7 %

Min Achievable Benefit = incremental increase in production proportional to 1/3rd of the % Δ

Gross incremental percentage change (following the reform) = [28.7% + 1/3rd (28.7%)]

= 38.3%

Forecasted total onion production = 38.3% of 367.9

=508.8 (000' tones)

Economic Benefit (in terms of incremental production) = 140.9 (000' tones)

4.2 Economic Benefits from Value Chain Development & Private Distribution Centers:

Reforms in the areas of value chain development, increase private participation in setting up of distribution centers and storage facilities will cast an impact on three factors.

a) Harvest Losses
b) Increase in monthly consumption expenditure on fruits and vegetables.
c) Value of horticulture produce.

4.2.1 Harvest Losses Avoided:

Under the current marketing system, health and safety standards for food products are given low priority. Agriculture marketing should focus on quality, cold chains, hygiene, packaging, labeling

etc. none of this is mentioned in the traditional laws. According to FIRMS report "baseline survey of mandis in Punjab and Sindh", no participant in the survey was aware of SPS standards and it was found that no grading, labeling and packaging was done at market level. About 20 percent of the total production goes to waste between farms to consumers. This loss occurs every year due to factors like harvesting at inappropriate time, improper packing and packaging and lack of infrastructure for storage and transportation. Investment by private sectors in setting up of distribution centers and facilities for grading, cooling, packaging etc will reduce the losses of the horticulture produce by the amount calculated in the table below in the coming years. Data for total production of major fruits and vegetables FY 2011 is taken to calculate annual harvest losses in horticulture produce. A 20% reduction from the total production has been made to account for amount that is lost.

Table 4: Calculation of benefit through reduction in harvest losses of crops:

Crops	Production (000' tones) 2010-2011	Amount Lost (000' tones)
Citrus	1912.0	382.4
Mango	1503.2	300.64
Banana	10.3	2.06
Apple	3.4	0.68
Guava	420.1	84.02
Potato	3339.9	667.98
Tomato	87.8	17.56
Onion	367.9	73.58
Garlic	24.3	4.86
	Total	1533.78

4.2.2 Increase in Monthly Consumption Expenditure on Fruits and Vegetables:

Also the current marketing laws have a crippling effect on marketing development. The obligatory auction system prevents linkages needed to form value chains oriented towards specific market segments. Markets for high value, perishable produce like fruits and vegetables revolve around quality. There is ample evidence that market segments in Pakistan offer opportunities for quality improvement. People are willing to spend if the right product meeting their demands is provided to them. As incomes rise, so do expenditure on fruits and vegetables. Per capita expenditure on fruits and vegetables increases by a considerable amount every year as they are considered as major diet items. Super markets have evolved into a major channel for groceries and high value added items. Local investors in Lahore have begun to form large groceries stores after observing a shift in consumer choices. With the reforms in value chain development, the consumption expenditure on fruits and vegetables will increase as high value added product will add to the satisfaction level of the consumer. Statistics for consumption expenditure have been taken from household integrated survey that is compiled for alternate years. After calculating the percentage change in FY 08 & 11, criteria for calculating minimum achievable gain has been applied.

4.2.2.1 Calculation of benefit through increase in monthly per capita consumption expenditure on fruits:

Monthly per capita consumption expenditure by household on fruits in FY 08	34.90 Rs
Monthly per capita consumption expenditure by household on fruits in FY 11	57.74 Rs

$$\%\Delta = \frac{57.74 - 34.90}{34.90} \times 100$$

= 65.4 %

Min Achievable Benefit = incremental increase in per capita consumption expenditure to 1/3rd of the % Δ

Gross incremental percentage change (following the reform) = [65.4% + 1/3rd (65.4%)]

= 87.2 %

Forecasted total per capita consumption expenditure = 87.2 % of 57.74

= 108.08 Rs.

Economic Benefit (in terms of incremental per capita consumption expenditure) = 50.3 Rs

4.2.2.2 Calculation of benefit through increase in monthly per capita consumption expenditure on Vegetables:

Monthly per capita consumption expenditure by household on vegetables in FY 08 68.73 Rs

Monthly per capita consumption expenditure by household on vegetables in FY 11 124.44 Rs

$$\%\Delta = \frac{124.44 - 68.73}{68.73} \times 100$$

= 81 %

Min Achievable Benefit = incremental increase in per capita consumption expenditure to 1/3rd of the % Δ

Gross incremental percentage change (following the reform) = [81% + 1/3rd (81%)]

= 108 %

Forecasted total per capita consumption expenditure = 108 % of 57.74

= 120.0 Rs.

Economic Benefit (in terms of incremental per capita consumption expenditure) = 62.3 Rs

4.2.3 Incremental Value of Horticulture Produce:

The significance for illustrating increase in consumption expenditure was to emphasize the need of value chain development. This also implies a business opportunity for farmers where they can increase the price of their product to take into account the expenditure done on value addition. As the consumption of fruits and vegetables is significantly increasing annually and constitute a major portion of the monthly consumption expenditure, the horticulture products can fetch the same price as they are receiving in the world market. With the reforms in value chain development, it can be fairly assumed that at least 10% of the produce will be available in better grades and farmers can fetch the same price (for that produce) in the domestic market that they are receiving for exports. The domestic market will be strengthened when the needs and demands of local consumers will be met and given priority instead of relying on exports. Pakistan's horticulture produce is exported at a price 41 percent lower as compared to world average price. The need of the hour is to concentrate on domestic market that is providing a chance to obtain the same prices or even better as is being earned on exports.

In the forecasted column, an estimated 10% amount from the total production has been made to account for the amount that is processed and is available in better grades. This assumption is based on the premise that immediately entire volume of production cannot be provided in better grades. This target will be met in the long run and will take few years for the market to develop completely. As the document carries conservative measures, it is assumed that at least 10% of the produce will be available in better grades. Prices (a) are the export prices of the crops. It is assumed that these prices can be fetched for the production of crops in better quality. To calculate the value of horticulture produce i.e. fruits and vegetables, prices (a) are multiplied by the forecasted production of fruits and vegetables. It's further converted to US Dollars using the currency rate i.e. 1$ = 95 Rs.

Availability of products in better grades will increase the value of the horticulture produce.

Table 5: Calculation of benefit through incremental value addition:

Horticulture Produce	**Total Production**	**Forecasted**		
		10 % of Production	**Prices (a)**	**Value (a)**
Crop	**000'tones**	**000'tones**	**Per kg**	**US Dollars**
Citrus	2103.2	210.32	95 1	210,320,000
Mango	1566.3	156.63	95 1	156,630,000
Banana	11.53	1.153	47.5 0.5	576,500
Apple	3.74	0.374	95 1	374,000
Guava	461.2	46.12	47.5 0.5	23,060,000
Potato	3854.2	385.42	28 0.3	115,626,000
Tomato	102.6	10.26	24 0.25	2,565,000
Onion	508.8	50.88	33 0.35	17,808,000
Garlic	27.16	2.716	114 1.2	3,259,200
			Total	530,218,700

4.3 Economic Benefits from Business Development Institutions, Credit Facilities, Infrastructure Development, Training Resources:

The reforms targeting the provision of credit facilities, infrastructure development, training resources will lead to an increase in income of the person employed in agriculture. Training, more credit and infrastructure development will facilitate the farming activity thereby increasing the revenue.

The income is also bound to increase because of the stimulated responses from the demand side. The increase in production and consumer satisfaction will also result in higher revenue for the farmer as he well get better prices. Statistics for income have been taken from household integrated survey that is compiled for alternate years. Years 2007-08 and 2010-11 was taken to calculate percentage change. After calculating the percentage change in years, criteria for calculating minimum achievable gain has been applied. Same methodology has been applied to calculate yield per hectare.

4.3.1 Calculation of benefit through increase in monthly income:

Monthly income of employed person in agriculture Punjab in FY 08 9029.31 Rs

Monthly income of employed person in agriculture Punjab in FY 11 10897.48 Rs

$$\%\Delta = \frac{10897.48 - 9029.31}{9029.31} \times 100$$

= 20.7 %

Min Achievable Benefit = incremental increase in income to 1/3rd of the % Δ

Gross incremental percentage change (following the reform) = [20.7% + 1/3rd (20.7%)]

= 27.6 %

Forecasted total monthly income = 27.6 % of 10897.48

= 13905.2

Economic Benefit (in terms of incremental income) = 3007.7 Rs

4.4 Economic Benefits from Private Investment, Expansion Opportunities for Female Entrepreneurs:

The increase in private investment through reforms will increase the number of people employed in agriculture industry. With the development of alternate market channels, distribution centers etc, the opportunities for employment will increase. Also it has been highlighted in market appraisal carried by firms team that Sunday bazaars open opportunities for female business vendors. Expansion of market will attract larger number of business women thereby increasing the percentage of females employed. Statistics for employment have been taken from household integrated survey that is compiled for alternate years. After calculating the percentage change in years FY 08 and FY 11, criteria for calculating minimum achievable gain has been applied.

4.4.1 Calculation of benefit through increase in employment in agriculture Punjab:

Percentage of employed people in agriculture Punjab in FY 08 39.64

Percentage of employed people in agriculture Punjab in FY 11 40.37

$$\%\Delta = \frac{40.37 - 39.64}{39.64} \times 100$$

= 1.84 %

Min Achievable Benefit = incremental increase in employment to 1/3rd of the % Δ

Gross incremental percentage change (following the reform) = [1.84% + 1/3rd (1.84%)]

= 2.45 %

Forecasted total employment = 2.45 % of 40.37

= 41.35

Economic Benefit (in terms of incremental employment in Punjab) = 0.98%

4.4.2 Calculation of benefit through increase in number of women employed:

Percentage of women employed in agriculture Punjab in FY 08 14.18

Percentage of women employed in agriculture Punjab in FY 11 15.34

$$\%\Delta = \frac{15.34 - 14.18}{14.18} \times 100$$

= 8.1 %

Min Achievable Benefit = incremental increase in employment to 1/3rd of the % Δ

Gross incremental percentage change (following the reform) = [8.1% + 1/3rd (8.1%)]

= 10.8 %

Forecasted total employment = 10.8 % of 15.34 = 16.9

Economic Benefit (in terms of incremental women employment in Punjab) = 1.6 %

4.5 Economic Benefits from Lower Margins:

Improving wholesale market operations will lead to reduction in the margins charged by a commission agent. Currently the market is being exploited by the middle man as he is the sale trader of the entire produce and interested in high commission rates. Their earnings come from margins i.e. the spread between the price paid to supplier and the price obtained from retailer. Market appraisals carried by firms team pointed out that there is a difference of 20% in the price paid to farmer and the price obtained from retailer. Both retailers and farmers are being exploited in the hands of the commission agents. The farmer who should be the ultimate beneficiary gets low price for his effort as commission agents takes away the chunk of the revenue. Also collecting of commissions by the agents depresses farmer incentives to plant high value fruit and vegetables crops. The farmer has no contact with the end users. No feedback is provided to improve the production. Moreover, the entire produce is handled through mandis only. With the proposed policy framework, pressure on a single market channel will be released. With the development of more market channels, farmers will get a chance to market his produce to other alternate channels and will deal directly with retailers (including high-end chains) and consumers. Direct marketing implies development of various kinds of suppliers and establishment of distributors operating in and near whole sale markets. The role of middle man will be reduced. When they will no longer remain the sole trader, they will also compete for clients based on the services. As commissions are currently charged on produce supplied to mandis, farmers will be the first to feel a positive pull in terms of better overall prices offered. This will thereby increase the producer surplus i.e.

the difference between what growers are willing and able to supply/produce a good for and the price they actually receive. The margins of commission agents are assumed to drop by 5% leading to a reduction in his revenue. The table below shows the calculation for the estimated reduction in margins. First column shows the price paid to the supplier by the commission agent. The next column shows the price that is charged by the commission from the retailer. The difference of how much is extra charged by the retailer and how much less is paid to the farmer is illustrated in the third column. It shows the revenue of commission agents that is 20%. It is assumed that reforms will lead to efficient market leading to reduction in margins charged by the commission agents from 20% to 15% (a drop of 5%). The fourth column presents the revenue earned by commission agents after the reduction in margins. Their revenue will come down to 15%. The loss of the 5% reduction in margins of the commission agents is assumed to be the producer surplus i.e. additional revenue that can be earned by the farmer. They will be less exploited by the middle man and will receive a better price for their product. This has been illustrated in the last column.

Table 6: Calculation of Estimated Producer and Consumer Surplus through Lower Margins

Crops	Price Paid to Supplier (Rs) Per Dozen / kg	Price Obtained from retailer (Rs) Per Dozen / kg	Revenue Earned by Agent (Rs) Per Dozen/kg (Before Reforms) (20%)	Revenue Earned by Agent (Rs) Per Dozen/kg (After Reforms: 15%)	Producer Surplus Per Dozen/kg (After Reforms: 5%)
Apple	63	75	12	9.45	3
Banana	27	32.4	5.4	4.05	1
Citrus	52	62.4	10.4	6	4
Mango	55	66	14	8.25	6
Guava	33	39.6	6.6	4	2
Potato	16	19.2	3.2	2.4	1
Tomato	11	13.2	2.2	1.6	1
Garlic	46	55.2	9.2	6.9	3
Onion	10.6	12.7	2.1	1.4	1

5. Conclusion and Recommendations

5.1 Overall Impact on Growth Rate of Agriculture Sector

As a consequence of all the proposed policy reforms, the growth in agriculture sector is bound to increase. In the absence of any such reforms, the growth rate of the sector has remained negative in the last six years. The declining trend in the growth rate of agriculture shows that the performance of the sector has been dismal. In light of the premise that reforms are bound to have an impact over and above the past trend and considering conservative estimation, it is assumed that the agriculture sector can be expected to have minimum incremental contribution of 5% from current value of 1.2 percent. This means that the growth rate can increase to 6.5% in the following years subject to the implementation of reforms.

The following table shows the growth rate of agriculture sector for the past six years and future projection (subject to implementation of policy reforms)

Table 7: Growth Rate of Agriculture Sector

Year	Growth Rate (%)
2005-06	6.3
2006-07	4.1
2007-08	1.0
2008-09	4.0
2009-10	0.6
2010-11	1.2
Estimated Growth Rate	6.5

5.2 Recommendations:

It is evident that the current marketing laws are the prime reason for inefficient working of the agriculture industry. The challenge that lies ahead is how to reverse this situation. It requires very clearly defined policy reforms and a subsequent comprehensive strategy to strengthen the domestic market, small farmers, agriculture marketing facilities and market channels. Diversification and investments in the agribusiness value chain can help absorb the surpluses of agricultural commodities directly from the market. Value addition can not only prevent these commodities from wastage but can also provide much needed impetus to the sector to modernize This will undoubtedly bring economic and social improvement at the family, village, provincial and national levels. In such a situation it becomes imperative for the government to dedicate specific space and commitment to implementation of policy reforms in the sector. In the context of the proposed policy reforms, an analysis of the forecasts and economic benefits calculations lend credence to the idea that such policy reforms as being “statements of good intentions” can in fact help in the enrichment and uplift of the sector by having a favorable impact on the target groups.

6. References

Agriculture Policy Overview. Retrieved June 22, 2012, from Pakissan.com: www.pakissan.com/english/agri.overview/agriculture.policy.overview.html

Competitiveness Support Fund, Horticulture Action Plan, 2007.

Federal Bureau of Statistics, Government of Pakistan: Household Integrated Economic Survey, 2011

Federal Bureau of Statistics, Government of Pakistan: Household Integrated Economic Survey, 2008

Federal Bureau of Statistics, Government of the Pakistan: Agriculture Statistics, 2011

Food and Agriculture Sector in Pakistan. Retrieved June 22, 2012, from Economic Review: www.economicreview.com.pk/food-and-agriculture-sector-in-pakistan sector.

Government of Pakistan (2010-2011). Economic Survey of Pakistan

Marketing Strategies of Crops. Retrieved june 25, 2012, from Pakistan Horticulture Development & Export Board: www.phdeb.org/phs.php

MINFAL, Yearbook, (2005-06)

Pattie, P. (2011). Baluchistan Agricultural Marketing Policy Reforms. USAID Report

Punjab Board of Investment and Trade: Punjab Agriculture Sector Profile, 2010

State Bank of Pakistan, Horticulture Guidelines, 2008

UNIDO: Report on enterprise based survey of horticulture, 2010

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