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Agricultural Sub-Sectors Performance: An Analysis of Sector-Wise Share in Agriculture GDP of Pakistan

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Abstract

This study focused on the agricultural sub-sectors performance: an analysis of sector-wise share in agriculture GDP in Pakistan by using secondary data from 1998 to 2015. Ordinary Least Square (OLS); an econometric method was applied to estimate the model parameters. For this purpose the study considered dependent variable of agriculture GDP and several independent variables were contain major, minor crops, livestock and forestry. The empirical results indicate that agricultural sub-sectors contribute positively and significantly in the agriculture GDP. However, forestry sub-sector had expected sign but the variable was not significant. In agriculture, forestry sub-sector share was considered very poor compared with other sub-sectors could be due to less attention paid from the government. The results suggest that the Government of Pakistan should make some intervention in the agricultural sub-sectors by introducing innovative agriculture technologies that could improve the sub-sectors share in the overall agriculture GDP.

Keywords: crops subsector, livestock, forestry, agriculture GDP, Pakistan

1. Introduction

Agriculture sector is the backbone of Pakistan's economy .This sector contributes about 20.9 percent to the Pakistan's gross domestic product (GDP) (GOP, 2015). Agriculture sector does not only contribute to Pakistan's GDP, but also is a source of livelihood of 43.5 percent of rural population. Agriculture sector provides raw materials to agro-based industries. In Pakistan, the GDP growth rate was 4.0 percent in 2013-2014 which was slightly increased to 4.2 percent in the year of 2014-2015. Whereas, agriculture sector was growth rate of 2.7 percent in 2013-2014, mildly increased to 2.9 percent thereafter in the year of 2014-2015 (at constant factor cost), (Statistical Supplement, 2014-15). However, agriculture sector contains of five sub sectors such as livestock, fisheries, major crops, minor crops and forestry**.**

Major Crops: major crops such as wheat, cotton, sugarcane, rice and maize. Major crops accounts 25.6 percent in agriculture value addition and it contributes 5.3 percent exclusively to the GDP. In major crops, cotton crop is a source of raw materials to the textile industries. There are four major countries which are producing cotton in the world such as China, USA, India and Pakistan. Sugarcane crop is a cash crop and it is important for sugar and sugar related production. On the other hand, wheat and rice are staple food crops; rice crop is a source of foreign exchange earnings item of Pakistan.

Minor crops: include Bajra, Jowar, Gram, Barely and Tobacco. Furthermore, minor crops such as oil seed crops, sunflower, rapeseed, mustered, cottonseed, canola mung, mash, masoor, onion, chilies and potato etc. Minor crops share 11.1% value added to the agriculture sector and 2.3 percent contributes towards GDP. (Economic Survey of Pakistan, 2014-15).

Livestock subsector: Livestock sub-sector was contributed 56.3 percent value added to the agriculture sector and 11.8 percent share to the GDP in the year of 2014-15. While, gross value addition of livestock was greatly increased from Rs. 778.3 billion in the year of 2013-14 as compared to Rs. 801.3 billion corresponding period of 2014-15. Livestock sub-sector plays vital role in economic development and it is also source of foreign earnings. This sector meets the domestic demand of meat, milk, and eggs. Pakistan is the 3rd largest milk producer country in the world. In this sector more than 8.0 million of rural families are engaged in raising livestock. Livestock sector

plays an important role to reduce poverty and can uplift the socioeconomic conditions of small farmers and landless rural poor.

Fishery sub-sector: Fishery sub-sector plays an important role in Pakistan's economy and it is source of export earnings. This sector contributed 2.1 percent in agriculture value addition. Pakistan sells good quality of seafood's to Malaysia, Thailand, China, Middle East, Sri Lanka, Japan, etc. Fishery sub sector is playing most important role in poverty alleviation and increase food security.

Forestry subsector:forests are recognized a key factor of our environment and degradation of forests may create severe socio-economic challenges for the future generations. The share of forestry sub-sector in agriculture was 2.0 percent with main components of forestry, timber and fire wood in the year of 2014-15.

By contrast, contribution of agriculture to overall GDP went from 26.0 percent in 1997-98 to 20.9 in 2014-15.This is as a result of its subsectors' Performing decimally as given in table 1.However, table 1 indicates that with the exception of major, minor crops sub-sectors decline from 8.0 percent and, 3.1 percent in 2001-02 to 5.3 percent and, 2.3 percent in2014-15. Whereas, livestock 12.0 percent to 11.8 percent and forestry from 07 percent to 0.4 percent respectively.

Table1. Percentage share of agricultural subsectors to the growth of agricultural GDP

Year	Agriculture	Major crops	Minor crops	Livestock	Forestry
1997-98	26.0	10.7	4.8	9.3	0.1
1998-99	25.7	10.4	4.9	9.3	0.1
1999-00	25.9	10.9	4.8	9.2	0.1
2000-01	24.7	9.9	4.2	9.3	0.4
2001-02	24.1	8	3.1	12	0.7
2002-03	24.0	8.2	3	11.7	0.7
2003-04	22.9	7.8	2.9	11.2	0.6
2004-05	22.4	8.4	2.7	10.6	0.4
2005-06	23.0	7.6	2.6	12.1	0.5
2006-07	22.5	5.9	3.2	11.7	0.4
2007-08	21.9	5.4	3.2	11.6	0.5
2008-09	22.5	5.8	3.3	11.8	0.5
2009-10	22.0	5.4	2.9	11.9	0.5
2010-11	21.7	5.3	2.9	11.9	0.5
2011-12	21.6	5.5	2.6	11.9	0.5
2012-13	21.5	5.4	2.6	11.9	0.4
2013-14	21.0	5.4	2.5	11.8	0.4
2014-15	20.9	5.3	2.3	11.8	0.4
Mean	23.02	7.29	3.25	11.17	0.43

Source: (GOP, 2000-01 & 2014-15).

Agriculture sector contributes less in Pakistan' economy, in all aspects like agricultural productivity, production, consumption, and export earnings remain below as compared to the developed countries. Agriculture sector is confronting a number of problems such as shortage of energy, lack of modern technology, improved agronomic practices, old method of harvesting and cultivation, timely availability of water, rising price of inputs like seed, fertilizers, pesticide and supply of credit (Ali, 2010; Planning Commission of Pakistan, 2011)

Therefore, agricultural growth is an important and it can be realized with an increase in the use of inputs and accumulative the output. Agriculture growth depends upon labor, land, improvement of infrastructural facilities; supply of timely irrigation water, land reclamation, mechanical power and farm inputs such as seeds, pesticides, and fertilizers etc.

After in view of the status of agriculture sector and its contribution, this study emphasis on the agricultural sub-sectors performance: an analysis of sector-wise share in agriculture GDP in Pakistan. This study is based on the following Hypothesis that clearly defines the research criterion.

H_0: Agricultural sub-sectors share substantially in the agriculture GDP of Pakistan

H_1: Agricultural sub-sectors share marginally in the agriculture GDP of Pakistan.

Furthermore, the outline of this study is as follows: section two covers the Review of Literature. Section three contains the data and methodology Section four Results and Discussion Section finally section five contains the Conclusion and Recommendations.

2. Literature Review

A lot of research has been documented regarding the performance of agriculture sector over the years. According, Anweret al. (2015) have analyzed the role of agriculture sector share in GDP. They used time series data by using OLS method. The study reveals that positive and significant relationship between GDP and agriculture in Pakistan. Iganiga and Unemhilin (2011) and Oji-Okoro (2011) found that agricultural output is significantly influenced by government capital expenditure. According, Zaidi (2005) have investigated the agriculture growth trends in Pakistan and he found out that the agriculture sector growth and its development is the mostly depend on policies of government and political scenario in Pakistan.

Ahmad, K. (2011) investigate that in Pakistan during the period of 1950, sixty eight (68) percent of labor force and mostly eighty (80) percent of population was engaged with agriculture sector.

Hamid and Ahmad (2009) estimated that the growth and productivity in Pakistan. The results of their study show that growth and productivity can be achieved due to apply modern farming methods such as mechanization, land, water, labor and use of inputs such as certified seed, sufficient fertilizer and pesticide etc.

Abedullah, etal. (2009) tried to investigate that supply of agricultural credit enhanced the income of livestock growers and it is evidently describing the role of agricultural credit in livestock sector. The finding suggests that supply of credit on cheap and easy way to growers is much considerably helpful.

Jehangiret al. (1998) have tried to explore the production of major crops in Pakistan, the researcher determined that production of major crops such as wheat, rice, sugarcane, and cotton and maize can be increased with use of advance farming methods.

Olajideet al. (2012) have applied Ordinary Least Squares (OLS) regression method to estimate the relationship among agricultural resource and economic growth in Nigeria between 1970 and 2010. They found a positive causal relationship between GDP and agricultural output in Nigeria;however their study was limited to show only that agriculture and GDP growth rate are correlated.

Moreover, Razaet al. (2011) have analyzed the role of agriculture in economic growth of Pakistan by using time series data and applied OLS method. However, regression results show that there is positive and significance role of agriculture sub sectors to the economic growth but only forestry sub-sector should insignificant relationship with GDP.

Similarly, Suleiman and Aminu (2010) have tried to found that the contribution of economic sectors such as agriculturesector, petroleum and manufacturing sector of the Nigerian economy. The empirical resultsindicate that agricultural sector is contributing higher than petroleum and manufacturing sectors. The coefficient value of agriculture sector is 1.7978 which means 1 unit increase in contribution, GDP will increase at 1.7978 units. However, petroleum is contributing 1.14 units to the GDPthat is low ascompare to contribution of agriculture sector.

Nawaz Ahmad(2011) tried to investigate the impact of formal credit on agricultural output: A case study of Pakistan by using time series data from the period of 1974 to 2008.The results suggests that there is positive and significant impact of formal credit in agriculture sector.

Nazish, Iqbal and Ramzan (2013) have estimated the impact of economic sectors like agriculture sector, manufacturing sector and services sector on the GDP growth of Pakistan. They employed secondary data and applied multivariate co integration technique. The findings of the study suggested that agriculture, industry, manufacturing and service sector are significantly affecting the annual GDP growth of Pakistan. The result of their study indicates that agriculture sector is more important than other sectors of the economy of Pakistan.

Zaheer (2013) has investigated that the performance of agriculture in Pakistan. Researcher used secondary data and his study based on theoretical analysis. The purposes of this study is to examined the growth of agriculture sector in Pakistan from 1952-2010.The results suggest that the growth of agriculture sector has fluctuated over the period of sixty(60) years.Thefindings of this study show that Pakistan has the lowest growth and factor productivity rate because of problems such as shortage of irrigation and lack of modern technologies.

From the literature review, In Pakistan agriculture sector growth is most important to realizean economic growth worldwide. Therefore, the present study is conducted as to investigate sector-wise share in agriculture GDP of Pakistan during the period of 1998 to 2015, using Ordinary Least Square (OLS) econometric techniques.

3. Data and Methodology

In this chapter, we have presented the data source and methodology about the sector-wise share in agriculture GDP of Pakistan. The section 3.1 was about framework of analysis, which gives us information about econometric model and variable used in the model to get regression result. Section 3.2 provides information about data sources.

3.1 Framework of Analysis

In this study, Time series data was used to investigate the sector-wise share in agriculture GDP of Pakistan. Regression analysis (OLS) method was performed to get desired result from the study. The basic model was:

$$Y=f\ (AGR\ GDP,\ MAJOR\ CROPS,\ MINOR\ CROPS,\ LIVESTOCK,\ FORESTRY)$$

3.1.1 Econometric Model

To test hypothesis empirically model can be specified as follows:

$$Y = \beta_0 + \beta_1 MJCROPS + \beta_2 MICROPS + \beta_3 LIVESTOCK + \beta_4 FORESTRY + \mu \quad (1)$$

3.1.2 Definition of Variables

Y=Agriculture gross domestic product (annual share %).

MJCROPS= Major crops share in agriculture gross domestic product (annual %).

MICROPS = Minor crops share in agriculture gross domestic product (annual %).

LIVESTOCK = Livestock share in agriculture gross domestic product (annual %).

FORESTRY=Forestry share in agriculture gross domestic product (annual %).

3.2 Data Sources

In this study we used secondary data for the period of 1998 to 2015. The Data was collected from Economic Survey of Pakistan (2000-01, 2008-09 and 2014-15) Ministry of Finance Government of Pakistan.

4. Results and Discussion

In this present study, we have used secondary data of Agri GDP, Mjcrops, Microps, Livestock and Forestry from the period of 1998 to 2015.The secondary data was collected from the Economic Survey of Pakistan. The results of descriptive statistics of these variables were presented in Table 2.The summary of descriptive statistics contain the Mean, Median, Max, Min, Std.Dev, Skewness and Kurtosis. In Table 2, we observed the mean value of Agri GDP, Major crops Minor crops, Livestock and Forestry were 23.016, 7.294, 3.250, 11.166 and 0.427 respectively. The ranges of Std.Dev of these variables were from 1.666, 2.081, 0.837, 1.093 and 0.177 respectively. Furthermore, Figure 1 represents the share of agricultural subsector as given bellow.

Table 2. Represent the results of descriptive statistics

Variable	Mean	Median	Max.	Min.	Std.Dev.	Skewness	Kurtosis
AgriGDP	23.01667	22.50000	26.00000	20.90000	1.666010	0.622831	2.121144
Mjcrops	7.294444	6.750000	10.90000	5.300000	2.081140	0.548781	2.121144
Microps	3.250000	2.950000	4.900000	2.300000	0.837538	1.069414	2.731273
Livestock	11.16667	11.75000	12.10000	9.200000	1.093295	-1.073900	2.378677
Forestry	0.427778	0.450000	0.700000	0.100000	0.177584	-0.627544	2.922096

Source: Results are based Author's calculations using Eviews 9.

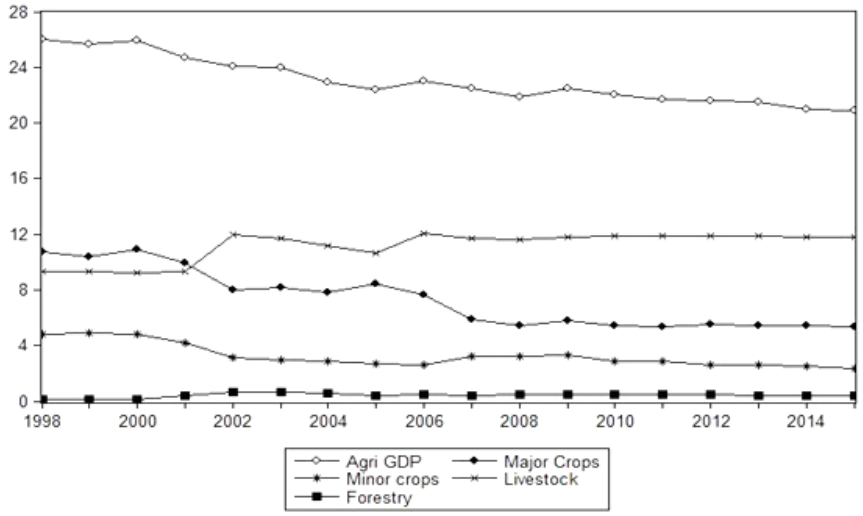

Figure 1. Represents the share of these variables in Agri GDP during the period of 1998 to 2015

4.1 Results of Regression Analysis

The value of R-Square was 0.99 percent which indicates that fit was good and about 99 percent of total change in dependent variable (Agriculture GDP) were explained by four included explanatory variables such as (Livestock,Major crops, Minor crops, and Forestry).In this study, we have investigated that the sector-wise share in the agriculture GDP in Pakistan. Therefore table 3represents the estimated results of regression the relationship between agriculture GDP (Y) and Major crops (X_1), Minor crops (X_2), Livestock (X_3) and Forestry (X_4). The equation for this model was:

$$Agr\ GDP = \beta_0 + \beta_1 Mjcrops + \beta_2 Microps + \beta_3 Livestock + \beta_4 Forestry + \mu$$

$$Agr\ GDP = 4.055 + 0.682 + 1.436 + 0.812 + 0.565 + \mu \quad (2)$$

$$(3.107)\quad (18.730)\ (16.696)\ (8.429)\ (1.764)$$

Table 3. Represents the results of regression analysis of agricultural sub-sectors share in agriculture GDP in Pakistan

Explanatory Variables	Coefficients	t-statistic	Sig…
Constant(β_0)	4.055***	3.107	0.008
Major crops	0.682***	18.730	0.000
Minor crops	1.436***	16.696	0.000
Livestock	0.812***	8.429	0.000
Forestry	0.565	1.764	0.101
F-statistic	714.61***	……	0.000
R-Square	0.995	……	……..
Adjusted R-Square	0.994	……	……..

Note. ***Indicates that the coefficient is significantly at1 percent probability level.

**Indicates that the coefficient is significantly at 5percent Probability level.

Source: Results are based Author's calculations using Eviews 9.

The coefficient of X_1, X_2 and X_3 were significant at 1 percent probability level but the coefficient of X_4 was non-significant where their absolute t-values were more than 2 and the p-values were less than 0.05. Thus, hypothesis null was rejected. However, the coefficient value of major crops (X_1) indicates that 1 percent increase in share; agriculture GDP will increase 0.68 percent. Whereas, the coefficient value of minor crops (X_2) showed that 1 percent increase in share, agriculture GDP will increase by 0.43 percent. Moreover, the coefficient value of livestock (X_3) indicating that 1 percent increase in share brings 0.81 percent increase in agriculture GDP. The share of agricultural sub-sectors such as major, minor crops and livestock sector were positive and significant influence in the agriculture GDP. Recently, livestock, major crops and minor crops contributes substantially to

the growth of agriculture with 11.8%, 5.3% and 2.3% respectively in the period 2014-15. (GOP, 2014-15). In agriculture, forestry sub-sector contributes very poor at 0.4% during the period of 2014-15 compared with other sub-sectors could be due to lack of interest from the government. According Raza et al. (2012), Chandio et al. (2015) found that there was the significance role of agricultural subsectors towards the economic growth. Another study, Anwer et al. (2015) found that agriculture sector contributes to the GDP positively and significantly. Furthermore, (Zaheer, 2013) found that the growth of agriculture sectors was fluctuated over the period of sixty (60) years.

Table 4. Correlation test

Variables	Agr GDP	Mjcrops	Microps	Livestock	Forestry
Agr GDP	1.00				
Mjcrops	.947**	1.00			
Microps	902**	.821**	1.00		
Livestock	-.814**	-.876**	-894**	1.00	
Forestry	-499*	-530*	-718**	.772**	1.00

Note. ** and *meansat 1% and 5% significant level (2-tailed).

Table 3 represents the estimated results of correlation test. The results showed that there was a strong positive correlation between the agricultural sub-sectors such as major crops, minor crops, livestock and forestry. This implies that increase in the share of these sub-sectors will lead to increase agriculture GDP. While the correlation between agriculture and its subsectors such as major crops, minor crops and livestock were statistically significant at 1 percent that of forestry was statistically significant at 5 percent.

5. Conclusions and Policy Implications

The main objective of this study was to explore the sector-wise share in agriculture GDP in Pakistan for the period of 1998 to 2015. For the investigation we applied the method of Ordinary Least Square (OLS) estimation technique to show the relationship between dependent (Agriculture GDP) variable and independent variables (Major crops, Minor crops, Livestock and Forestry).The results concluded by the regression analysis where it was clearly shown that major crops, minor crops and livestock substantially share to the agriculture GDP with a coefficient of 0.682, 0.436 and 0.812 (68.2%, 43.6% and 81.2 %) respectively. However, forestry sub-sector was not significant but it has still importance in the agriculture sector. Therefore, the analysis revealed findings that rejected null hypothesis and confirm that agricultural sub-sectors share significantly at substantially towards agriculture GDP in Pakistan.

The results suggest that the Government of Pakistan should make some intervention in the agricultural sub-sectors by introducing innovative agriculture technologies that could improve the sub-sectors share in the overall agriculture GDP.

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