International Journal of Humanities and Social Science Invention
ISSN (Online): 2319 – 7722, ISSN (Print): 2319 – 7714
www.ijhssi.org ||Volume 4 Issue 8 || August. 2015 || PP.101-105

Analysis of agricultural subsectors contribution growth rate in the agriculture GDP growth rate of Pakistan

Abbas Ali Chandio[1], Jiang Yuansheng[1*], Tanzeelur Rahman[2], Muhammad Naeem Khan[3], Xu Guangshun[4], Zhao Zhi[5]

[1, 4, 5.] *Faculty of Economics, Sichuan Agricultural University, Chengdu 611130, P.R China*
[2.] *College of Agronomy, Sichuan Agricultural University, Huimin Road 211, Chengdu 61110, China*
3, College of forestry, Sichuan Agricultural University, Huimin Road 211, Chengdu 61110, China

Abstract*: In the current study, we have analyzed the contribution of agricultural sub-sectors growth rate to the agriculture GDP growth rate of Pakistan by using secondary data from 2001 to 2015. Ordinary Least Square (OLS) method was applied to estimate the model parameter. For this purpose the study considered a dependent variable of agriculture GDP growth rate and several independents variables include major, minor crops, livestock, fishery and forestry. The regression analysis of the data showed a positive and significant contribution in agriculture GDP growth rate. However, fishery and forestry sub-sectors contribute growth rates were considered poor as compared with other sub-sectors could be due to less attention paid from the government. Our study suggests that Government of Pakistan should consider the importance of both agricultural sub-sectors to increase there's contribution growth rate towards agriculture GDP growth rate in Pakistan.*

Key words: *Agricultural sub-sectors, Agriculture GDP growth rate, Pakistan*

I. INTRODUCTION

Agriculture sector is the most important sector of Pakistan's economy. It contributing 20.9 percent towards GDP, 43.5 percent of total labour force engaged with this sector. (Economic Survey of Pakistan, 2014-15).On other hand, it also contributes raw materials for manufacturing goods and provides market for manufactured products (Ahmed et al, 2008). While, the agriculture sector provides food to consumers and fibers to domestic industries, it is also source of foreign exchange earnings and offers a market for industrial goods (Alam and Naqvi, 2003). The agriculture sector of Pakistan consists of five sub-sectors such as major crops, minor crops, livestock, fishery and forestry. Major crops include rice, wheat, maize sugarcane and cotton. Cotton crop is used as a raw material for the textile industries. There are four major cotton producing countries in the world. They are china, USA, India and Pakistan. However, Pakistan is fourth largest cotton producing country in the world. Rice, Wheat and Maize are the main food crops out of them rice is also one of the main export items of the country. Sugarcane is a cash crop grown for sugar products. Minor crops such as masoor, mung, mash, potato, onion, chilies and oilseed crops include cottonseeds, rapeseed/mustard, sunflower and canola etc. There are two main crop seasons exist in Pakistan namely the Kharif, the sowing season which begins in April-June and harvested during October while the Rabi Season begins in October-December and harvested in April-May. Rice, sugarcane, cotton, maize, mung, mash, bajra and jowar are "Kharif" crops while wheat, gram, lentil (masoor), tobacco, rapeseed, barley and mustard are "Rabi" crops (Sethi, 2002).Livestock sector includes buffalos, cows, cattle, goats, sheep, poultry, camels, asses, and horses, and is an important sub-sector of agriculture. However, livestock sector meets the domestic demand of milk, meat and eggs. It also provides net source of foreign earnings. More than 8.0 million rural families are involved in raising livestock. In Pakistan livestock sector contributes almost 56.3 percent to the value addition in the agriculture sector, and almost 11.8 percent to country GDP. Within the livestock sector, milk is the largest and the single most important commodity. However, Pakistan is the third largest milk producer in the world, following India, China and USA. (GOP, 2014-15). However, fisheries sub-sector, Pakistan has a costal line about 1,050-km and has been famous for fishing in the region. Pakistan sell abroad good quality seafood's to various countries namely, china, Thailand, Malaysia, Middle East, Srilanka and Japan etc. Fisheries sub-sector contributes 2.1 percent in agriculture sector and 1 percent towards GDP. The government aims to increase this share as fisheries can play an important role in the growth of the nation's economy by helping to reduce poverty and increase food security. Recently, livestock and fishery growth has contributed greatly to the growth of agriculture with average 4.34% growth in livestock production and 3.53% growth in fishery production in the period 2001-15.However, the

Forest production has declined over the year during the period of 2001-15 the growth rate has declined to -2.35%. On other hand, major and minor crops production growth have contributed less with 0.02% growth in minor crops and 1.95% growth in Major crops see table 1.

Table 1 Growth in the agriculture and its sectors:

Year	Agriculture	Major crops	Minor crops	Livestock	Fishery	Forestry
2000-01	-2.2	-10.3	-3.2	3.8	-3	9.1
2001-02	0.1	-1.8	-3.7	3.7	-12.3	-4.4
2002-03	4.1	6.8	1.9	2.6	3.4	11.1
2003-04	2.4	1.7	3.9	2.9	2	-3.2
2004-05	6.5	17.7	1.5	2.3	0.6	-32.4
2005-06	6.3	-3.9	0.4	15.8	20.8	-1.1
2006-07	4.1	7.7	-1	2.8	15.4	-5.1
2007-08	1	-6.4	10.9	4.2	9.2	-13
2008-09	4	7.8	-1.2	3.1	2.3	-3
2009-10	0.6	-2.4	-7.8	4.3	1.4	2.2
2010-11	1.2	-4	4.8	3.7	1.9	-0.4
2011-12	3.6	7.9	-7.5	4	3.8	1.8
2012-13	2.7	0.2	5.6	3.5	0.7	6.6
2013-14	2.7	8	-5.4	2.8	1	-6.7
2014-15	2.9	0.3	1.1	4.1	5.8	3.2
Average of the period 2001-15:						
2001-15	**2.67**	**1.95**	**0.02**	**4.24**	**3.53**	**-2.35**

Source: Economic survey of Pakistan, (2008-09, 2014-15)

After considering the importance of agriculture sector and its sub-sectors contribution, the study focused on the contribution of agricultural subsectors growth rate to the agriculture GDP growth rate of Pakistan. This research is based on the following Hypothesis that clearly defines the research criterion.

$H_{0:}$ The contribution of agricultural sub-sectors growth rate greatly to the agriculture GDP growth rate of Pakistan

$H_{1:}$ The contribution of agricultural sub-sectors growth rate poorly to the agriculture GDP growth rate of Pakistan.

Furthermore, the layout of the study is as follows: section II contains the Review of Literature. Section III contains the relevant methodology and data source and its analysis. Section IV contains the results and Discussion Section V contains the Conclusion and Recommendations.

II. LITERATURE REVIEW

Ahmed and Amjad (1984) have analyzed the importance of the development of the Agricultural growth for the growth of other sectors in Pakistan such as the Industrial Sector and Manufacturing sector.
Similarly, Zaidi (2005) accessed the Agriculture growth trends in Pakistan over the years and found the growth of the Agriculture to be highly dependent on government policies and the political scenario in Pakistan.

Jehangir et al (1998) estimated the production potential of major crops in Pakistan, it was found that with better farming methods more yield of major crops can be achieved.

Hamid and Ahmad (2009) examined the growth and productivity in Pakistan and concluded that Pakistan needs to abandon traditional farming methods and apply new technological techniques to achieve growth and productivity. This emphasis and trends were aimed at analysis the gaps that need to be accessed.

Hussain and Qayyum (2008) have analyzed the relationship between agriculture and GDP growth rate in Pakistan. They employed time series data from 1961-2007.Data was taken from economic survey of Pakistan. Augmented Dickey Fuller (ADF) wasapplied for check the stationarity of data OLS method was used to show the contribution of agriculture growth rate toward GDP growth rate. However, their results showed that 1 percent increase in agriculture growth rate; GDP growth rate will increase at 0.34 percent.

Raza et al. (2011) have analyzed the role of agriculture in economic growth of Pakistan. They used secondary data and applied OLS method. However, regression results showed that there is significance role of agriculture sub sectors towards the economic growth but only forestry should insignificant relationship with GDP.

Zaheer (2013) have analyzed the performance of agriculture in Pakistan. Researcher used secondary data and his study based on theoretical analysis. This study aims to examine the growth of agriculture sector in Pakistan from 1952-2010.Findings suggest that the growth of agriculture sector was fluctuated over the span of 60 years. Results showed that Pakistan has the lowest growth and factor productivity rate because of several problems such as poor irrigation and lack of agriculture technology etc.
The present study is different from all of the above studies conducted as it examine the contribution of agricultural sub-sectors growth rate to the agriculture GDP growth rate of Pakistan during 2001 to 2015, using OLS econometric techniques.However, this study will be further helpful for the academic teachers and students, researchers and policymakers.

III. MATRIALS AND METHODS

Scope of study

This study was designed for a period of 15 years accounting from 2001 to 2015. The secondary data was used for this study and collected from the Economic Survey of Pakistan (2008-09-2014-15) Ministry of Finance Government of Pakistan.

Method of Data analysis

In this study, secondary data was used to examine the contribution of agricultural subsectors growth rate to the agricultureGDP growth rate of Pakistan. Regression Analysis (OLS) method was performed to get desired result from the study. The basic model was

Y=f (MJCROPS, MICROPS, LIVESTOCK, FISHERY, FORESTRY,)

Econometric model
To test hypothesis empirically model can be specified as follows:
$Y= \beta_0 + \beta_1 MJCROPS + \beta_2 MICROPS + \beta_3 LIVESTOCK + \beta_4 FISHERY + \beta_5 FORESTRY+ \mu \ldots\ldots\ldots (1)$
Definition of variables
Y=Agriculture GDP (annual growth rate %).
MJCROPS= Major crops contributes towards agriculture GDP (annual growth rate %).
MICROPS = Minor crops contributes towards agriculture GDP (annual growth rate %).
LIVESTOCK = Livestock contributestowards agriculture GDP (annual growth %).
FISHERY= Fishery contributes towards agriculture GDP (annual growth rate %)
FORESTRY=Forestry contributes towards agriculture GDP (annual growth rate %)

IV. RESULTS AND DISCUSSION

Results of Regression Analysis: One of the measures of goodness of fit regression model was the coefficient of determination, R^2. It was the proportion of the total variation in the dependent variable that was explained or accounted for the variation in the independent variables. Therefore, in this study the regression model results were explained in table 2.However, the results of the regression analysis to determine the relationship between agriculture GDP growth rate (Y) and major crops (X1), minor crops (X2), livestock (X3), fishery (X4) and forestry (X5).

The equation for this model was:

$$AGR\ GDP = \beta_0 + \beta_1 MJCROPS + \beta_2 MICROPS + \beta_3 LIVESTOCK + \beta_4 FISHERY + \beta_5 FORESTRY + \mu$$

AGR GDP = 0.120 + 0.336MJCROPS + 0.133MICROPS + 0.432LIVESTOCK + 0.032FISHERY + 0.028 FORESTRY + μ…….. *(2)*

The coefficient of X1 major crops, X2 minor crops, and X3 livestock were statistically significant at 1 percent probability level. Furthermore, the coefficient of X4 fishery and X5 forestry were statistically significant at 5 percent probability level. However, the coefficient value of major and minor crops showed that 1 percent increase in contribution growth rate brings 0.33% and 0.13% increase in agriculture GDP growth rate respectively. Whereas, the coefficient value of livestock indicated that 1 percent increase in contribution growth rate, agriculture GDP growth rate will increase at 0.43%.By contrast, coefficient value of fishery and forestry increase 1 percent in growth rate, agriculture GDP growth rate will increase at 0.03% and 0.02%respectively.
According Raza et al. (2012) found that there was the significance role of agricultural subsectors towards the economic growth. Furthermore, (Zaheer, 2013) found that the growth of agriculture sectors was fluctuated over the span of 60 years.

Table 2 Results of the Regression Analysis

Explanatory variables	Coefficient	t-Statistic	Sig….
Constant(β_0)	0.120	0.824	0.431
Major crops	0.336***	22.489	0.000
Minor crops	0.133***	7.691	0.000
Livestock	0.432***	12.567	0.000
Fishery	0.032**	2.322	0.045
Forestry	0.028**	3.176	0.011
F-statistic	196.79***	……	0.000
R-squared	0.990	……	….
Adjusted R-squared	0.985	……	…..

Note: ***Indicates that the coefficient is significantly at1percent probability levels

**Indicates that the coefficient is significantly at5percent Probability level

V. CONCLUSION AND RECOMMENDATIONS

The main purpose of this study was to investigate the contribution of agricultural subsectors growth rate towards agriculture GDP growth rate of Pakistan for the period of 2001 to 2015. For the investigation we used the method of (OLS) estimation technique to show the relationship between dependent variable (Agriculture GDP growth rate) and independent variables (Major crops, Minor crops, Livestock and Forestry growth rate).The results concluded by the regression analysis where it was clearly shown that major, minor crops and livestock contributes growth rates greatly to the agriculture GDP growth rate with a coefficient of 0.337, 0.134 and 0.434 (33.7%, 13.4% and 43.4 %) respectively. By contrast fishery and forestry sector contributes growth rate very low towards agriculture GDP growth rate with a coefficient of 0.031 and 0.028 (0.31% and 0.28 %) respectively. However, fishery and forestry were not contributing growth rate as much as compare to major, minor crops and livestock subsectors but it have still importance in the agriculture sector.From the facts and figures it was clear that agricultural sub-sectors growth rate and agriculture GDP growth rate are positive correlated and rejected null hypothesis and confirm that agricultural subsectors contributes growth rate positive and significantly towards agriculture GDP growth rate. Our study suggests that Government should consider the importance of forestry and fishery sub-sectors to increase contribution growth rate in the agriculture GDP growth rate.
Government of Pakistan should make technical change, technical efficiency can increase agriculture growth to lead overall economic development.
The government should consider increasing this share as fisheries can play an important role in the growth of the nation's economy by helping to reduce poverty and increase food security

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