INVESTIGATING THE IMPACT OF AGRICULTURE AND INDUSTRIAL SECTOR ON ECONOMIC GROWTH OF INDIA

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Abstract: Agriculture and Industry both are considered as two basic pillars of a developing economy like India. Without development of agriculture, no country can exist and without industrialization no country can develop. Both agriculture and industry play vital role in the balanced economic development of an economy. The share of agriculture and industry is 14.6% and 28.6% respectively to India's GDP, but their importance in the country's economic, social, and political structure goes well beyond this indicator. Both the sector hold the key of overall development of the economy by creating employment, generating income, ensuring self-reliance in food production and food security, providing tools and equipment to other sectors and foreign exchange earnings. The present study tries to examine the contribution of both agriculture and industrial sector to Indian economy by considering the variables like Gross Domestic Product (GDP), Per-capita Gross National Income (PcGNI), Gross Domestic Saving (GDS), Gross Domestic Capital Formation (GDCF), and Production of both agriculture and industrial sector. In this paper GDP and PcGNI are used as the proxy of economic growth and economic development respectively. The whole study is based on the secondary data which is collected from the Handbook of Statistics on Indian Economy published by Reserve Bank of India. First this study has test the stability of the variables by using the Phillips-Perron test. The study employ Ordinary Least Square (OLS) test by using the statistical package E-view 5.0 to examine the impact of both sectors on economic growth and development of India using the annual time series data from 1950-51 to 2009-10. The simple OLS test results find that both agriculture and industry have significant positive impact on both economic growth and development in India. But the result indicates that agriculture has shown more significant positive impact on economic development whereas, industry has on economic growth of India during the study period. The study concludes that agriculture is the backbone of industry as well as for the economy. Agriculture and industry are like two hands of the India economy, without which the economy neither can be functioned nor can be survived. So it's necessary for a developing country country to give importance to both agriculture as well as industry particularly in the initial stages of economic development. To attend a higher level of growth with desire level of development in India, industry as well as agriculture should develop simultaneously. An industry without compromising agriculture and vice-versa should be the main agenda of the Indian policy to attend a balanced economic growth with sustainable development in the economy. Both the sectors should be considered as they are complementary to each other rather substitute. The issue should be handled by considering industry and agriculture rather industry vs. agriculture.

Keywords: Agriculture, Industry, OLS test, India

INTRODUCTION

Both Agriculture and Industrial sector are considered as important ingredients particularly in the initial stages of economic development of a developing country. Agriculture has played a key role in the development of human civilization. Until the Industrial Revolution the majority of the population depended in agriculture for their survival. Historically and traditionally Indian economy has been considered as an agrarian economy with 3/4th of its population living in villages having agriculture and allied activities as their prime occupation.

Most of the people in India give more priority to agriculture because it provides both food and

livelihood to more than half of its population. Even after 60 years of Independence, Indian economy is regarded as an agrarian economy. Sastry (2003) found that despite substantial increase in the share of the service sector in GDP over time, the Input-Output test suggest that the agricultural sector plays an important role in determining the overall growth rate of the economy through demand linkages with other sectors of the economy. Some other people supports industry is more important for India as it contributes more to the GDP than agriculture and also helps faster economic growth. GDP shows the performance of an economy and the major indicator of economic growth. It grants the country the status of a power to estimate with, making its presence felt in the global economic platform. Currently India is considered as one of the most emerging economic power in the world. It is not much affected up to that extent as other Developed Countries like USA, Japan, Germany affected by the Global financial crisis of 2007-08. India's GDP growth rate was also much higher than other developed countries. From the growth prospective it is true that India is growing at a faster rate than other developed nations but some of the factors still remain critical. On the other hand, if we look at the India's HDI ranking which is 134th among 187 countries in the world (GHD Report, 2011). In addition to this, poverty, unemployment and inequality are also persisting in the economy which is aggravated the critical situation. In case of India, the economic growth rate is satisfactory but in case of development the result is quite undesirable.

There is no doubt that both the sectors are very much essential for Indian economy. Here the question arise "Agriculture versus Industry, which contributes more to Indian economy?" The question is in debate since last two decades. Any rational being would agree that it is essential to maintain an adequate balance of both sectors to exist in today's fast changing world. And to cope with the changing world, one must have to gradually move towards more industrialization because it will bring the possibility of higher growth for the economy in future. At the same time, there has been a major discussion going on importance of agriculture. No one denying the fact that India has been an agrarian economy. Agriculture is the backbone of Indian economy. To ensure food security and development of the society, we have to depend on agriculture. In the Indian context, some studies broadly highlight that the sectoral composition of three sectors in economic growth has important implications. The results also indicate that sectoral distribution of growth rates has a strong impact on poverty reduction (Tyler et al, 1993; Ravallion and Datt, 1996). But we need to re-look in our approach about agriculture as means of providing sustainable employment and wealth to people especially at cost of Industry. The educated youth of the farmers' family who would become surplus due to the mechanization of the agricultural sector with the aim to produce more output with lesser time and manpower, should get proper training to get themselves employed through alternative possibilities. Here exactly where the role of industry becomes so important.

Here the question arises that if industrialization is meant for greater development then why do people go against it? It's because in India, industrialization mostly takes place in an unplanned way without considering the aspect of sustainable development. The government's mainly focusing to increase the country's GDP. It feels that industries are needed to meet the growing demands of the growing population. But it forgets that these farmers are also a part of this population and their needs cannot be overlooked in the name of higher growth. Loss of agricultural land might lead to food inflation which is widespread in many industrially developed countries. When industrialization takes place without a proper understanding of the needs of these people, it benefits only few groups of the society, namely the companies, the investors and the government. Industries prefer to employing people who have prior knowledge of working in factories instead of inexperienced farmers. Hence the country faces many internal protests by the local people when any industrial development takes place with no measures for ensuring rehabilitation and securing job opportunities for the farmers. The recent spread of violence in Ratnagiri over the Jaitapur Nuclear Power Plant project and the protests and resulting massacre in Nandigram and Singur indicate people's frustration and anger at having their agricultural lands taken away for non-agricultural purposes. Another region which is a political minefield in this country is the mineral-rich state of Orissa. Companies like TATA, Jindal, Posco, Vedanta Group, Arcelor Mittal etc. are big players here, especially in the mining and minerals industries (Youth Ki Awaz, 2011).

In this context the present study tries to find out which sector is more important for India and whose contribution is more to the process of economic development.

The present study broadly examines the role of both agriculture and industry; specifically the objectives are to analyze the importance of both sectors on Indian economy. By using the regression technique, the present study aims to examine the impact of agriculture and industry on both economic growth and development of India during last 60 years. The present study tried to make a preliminary attempt to test whether these two sectors have any significant impact on economic growth and development of

India with the help of certain selected macroeconomic variables. Data on the relevant variables such as Gross Domestic Product (GDP), Gross Domestic Capital Formation (GDCF), Gross Domestic Saving (GDS), Per-Capita Gross National Income (PGNI), Monetary valuation of both agricultural production (Agr) and Industrial production (Indu) are used between the period from 1950-51 to 2009-10. The remaining part of this paper is organized into five sections including introduction. Section 2 discusses the importance of both agriculture and industrial sector for India. Section 3 reports data sources and model specification. Section 4 presents the analysis of the empirical results and discussion. Section 5 presents the conclusion.

IMPORTANCE OF BOTH AGRICULTURE AND INDUSTRY IN INDIAN ECONOMY

India is the second largest growing economies of the world and is currently the focus of a great deal of international attention. It is the ninth largest in the world by nominal Gross Domestic Product (GDP). GDP is considered as the indicator of the performance of an economy. Central Statistical Organization divides Indian economy into three major fundamental sectors i.e. Primary sector (agriculture), Secondary sector (industry) and Tertiary sector (service). The importance of these sectors to Indian economy can be examined by their contribution to GDP, generation of employment and Gross Capital Formation. This study is mainly focused on the importance of both agriculture and industry on Indian economy. Agriculture is our foundation, industry is our future. Agriculture and Industry, both are important sectors for Indian economy. Whereas the former helps meet basic needs of people like food grains and other agricultural commodities, the later fulfills multiple wants that are legacy of economic development and modern life style. Unfortunately in India the two sectors are engaged in a dog fight due to the ineffectiveness of our bureaucrats and politicians. Before finding any solution of the ongoing debate it is essential to know the contribution of these two sectors towards Indian economy. Figure 1shows the GDP and its sectoral share in India:

GDP is the major indicator of economic growth. From the above diagram-1, it is clear that the share of industry to GDP is higher than the contribution of agriculture. It shows that the contribution of industry to economic growth is much higher than agriculture. Figure 2 shows the employment generated by different sectors of India.

From Figure 2, it is clear that the contribution of the agriculture sector in employment generation is much higher than industrial sector. Employment provides direct livelihood security to a very large proportion of Indian population which directly helps in raising the standard of living of the people. Figure 3 shows the share of three major sectors in total Gross Capital Formation:

From Figure 3, it is clear that the share of industry in the gross capital formation is much higher than the agriculture sector. Capital is the life blood of all the economic activities and also very much essential for financing the development process in the economy. Higher rate of capital formation implies less dependent on foreign capital. Industrial sector of the economy acts as a major contributor to the process of capital formation. Due to their significant contribution, since from the first five year plan huge amount of plan expenditure has been sanctioned for the development of both the sectors. Table-1 shows the expenditure made by the government of India during various plan periods and the share of both sectors in total expenditure:

From table-1, it is clear that the expenditure on both agriculture and industry has been increasing in absolute amount over time but at the same time their share in total expenditure has been declining over the plan period. Agriculture share on total expenditure has been declined over plan period due to more emphasis given on other twos sectors whose contribution towards GDP are much higher. Industry share on total expenditure has been declined over plan period due to more intervention of the foreign investors in this sector.

Importance of Agriculture

Agriculture plays a crucial role in the life of an economy. It is the backbone of our economic system. It is not only provides food and raw material but also employment opportunities to more than half of India's population. It is considered as an agrarian economy where nearly 70 percent of its total population directly or indirectly involved in agriculture for their Survival. It provides food security to all the citizens of India. Agriculture is the main source of livelihood for a labor surplus country like India as it provides direct employment to 52.1 percent of the total workforce. Though its share in national GDP is 14.6 percent in 2009-10, still it is the largest economic sector and a significant piece of the overall socio-economic development in India (Economic Survey, 2010). Pani (1984) found that 1 per cent increase in agricultural production increases the net domestic product by about 0.56 per cent. During 1971-72, Rangarajan (1982) estimated 1 per cent fall in agricultural output causes 0.70 per cent fall in GDPR. Ahluwalia and Rangarajan (1986) using data from 1960-61 to 1980-81 have obtained that 1 per cent fall in agriculture output was likely to lead to a fall in overall output by about 0.8 percent.

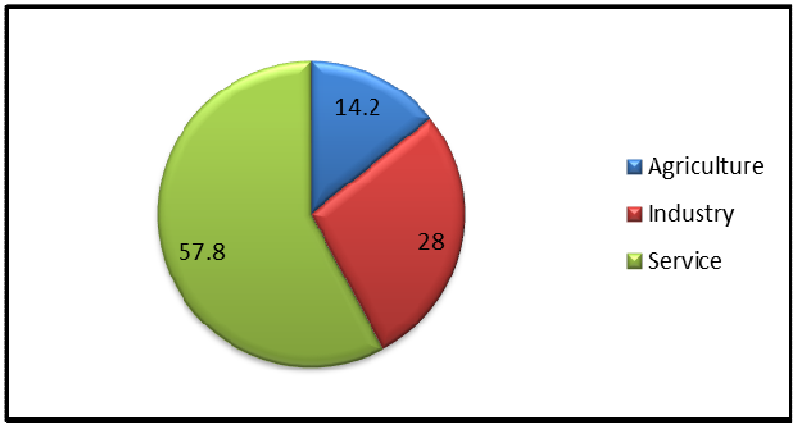

Figure 1: GDP and Its Sectoral Share in 2010-11

Source: Economic Survey 2010-11, Central Statistical Organization (CSO)

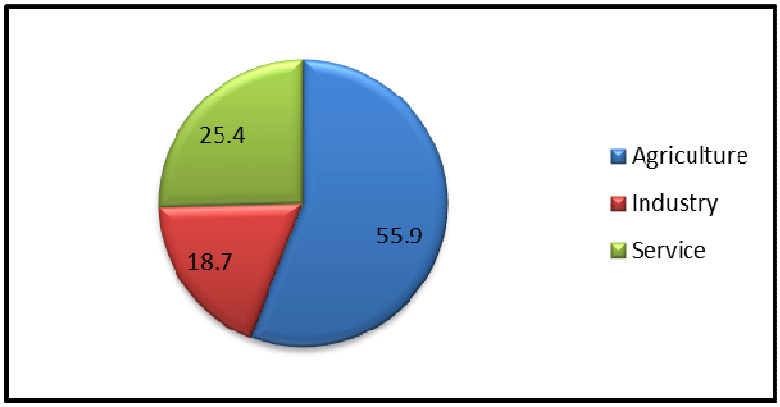

Figure 2: Share of Broad Sectors in Employment 2007-08

Source: Economic Survey 2010-11, table no: 10.1

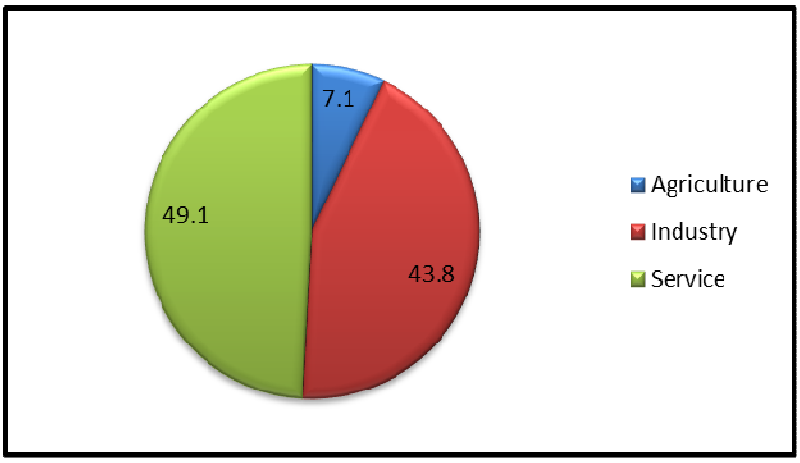

Figure 3: Share of Broad Sectors in Gross Capital Formation, 2009-10

Source: Economic Survey 2010-11, Central Statistical Organization (CSO)

Table 1: Public Expenditure on Agriculture and Industry in Different Plan Periods

Various Plan Periods	Total Expenditure (Crores)	Agriculture		Industry	
		Amount (Crores)	Percentage of Distribution	Amount (Crores)	Percentage of Distribution
Third Plan (1961-66)	15261	1088.9	12.7	1726.3	20.1
Annual Plans (1966-69)	13481	1107.1	16.7	1510.4	22.8
Fourth Plan (1969-74)	32994	2320.4	14.7	2864.4	18.2
Fifth Plan (1974-79)	67674	4864.9	12.3	8988.6	22.8
Annual Plan (1979-80)	18504	1996.5	16.4	2383.5	19.6
Sixth Plan (1980-85)	158256	6623.5	6.1	16947.5	15.5
Seventh Plan (1985-90)	363892	12792.6	5.8	29220.3	13.4
Annual Plan (1990-91)	104973	3405.4	5.8	6374.3	10.9
Annual Plan (1991-92)	112731	3850.5	5.9	6564.5	10.1
Eighth Plan (1992-97)	835206	22467.2	5.2	46921.7	10.8
Ninth Plan (1997-2002)	1485011	42462	4.9	65148.0	7.6
Tenth Plan (2002-07)	2360109	58933	3.9	58939	3.9
Eleventh Plan (2007-12)	3685973	136381	3.7	153600	4.2

Source: Directorate of Economics and Statistics, Department of Agriculture and Cooperation.
Statistical Appendix, Economic Survey of India 2010-11

India ranks second worldwide in the production of farm output. Due to special emphasis placed on agriculture in the five-year plans and steady improvements in irrigation, technology, application of modern agricultural practices and provision of agricultural credit and subsidies since the Green Revolution, productivity of all crops have shown a rising trend. India is the largest producer of milk, jutes and pulses and ranks second in the cattle population (2008). It is the second largest producer of rice, wheat, sugarcane, cotton, fruits, vegetables, and silk. India was the third largest producers of oranges, coconuts, eggs, tomatoes, peas and beans. Over last 45 years, India has shown a steady average annual increase in various agricultural items (Kg/ hect.) because of the introduction of Green Revolution (1965-66), improvement in transport and communication, infrastructural development, knowledge gains, adoption of modern cost effective technology and reforms (Economic Survey, 2010).

Importance of Industry

The industrial sector is one of the major contributors to GDP of India. The Indian industrial sector underwent significant changes as a result of the economic reforms of 1991, which removed import restrictions, brought in foreign competition, led to privatization of certain public sector industries, and liberalized the FDI regime, improved infrastructure. Industry accounts nearly 28% of the GDP and employs 14% of the total workforce. In absolute terms, India ranks 12th position in the world in terms of nominal factory output. According to some experts, it is said that share of the US in the world GDP is expected to fall, from 21% to 18% and the share of India in the world GDP is going to rise from 6% to 11% by 2015. Hence India is to emerge as a third pole after the US and China in the global economy. Among the industries, metal industries have grown significantly in India. India is fifth biggest steel producer, fourth largest cement producer fifth largest aluminum producer and 15th largest automobile manufacturer in the world (CIA- World Fact book, 2012).

METHODOLOGY OF THE STUDY

Data Sources and Variable Description

The present study empirically examines the importance of both agriculture and industrial sector on both economic growth and development of India from 1950-51 to 2009-10 by considering some selected macroeconomic variables such as GDP, GDS, GDCF, PGNI, agricultural production and industrial production. Annual time series data of these variables have been collected from available published sources. Data on Gross Domestic Product (GDP), Gross Domestic Capital Formation (GDCF) or Investment, production of agriculture and industrial sector, Gross Domestic Saving (GDS), and Gross National Income (GNI) have been collected from the *Economic Survey 2010-11*, *Central Statistics Office (CSO)* and form the *Handbook of Statistics on Indian Economy*, published by Reserve Bank of India (RBI). All the variables are presented in terms of Rupee (crores). The present study uses the statistical package named E-views to estimate the empirical results. This study has used GDP and PcGNI as the indicators of economic growth and development respectively. The Human Development Index[1] (HDI) is used to measure welfare or the level of economic development. But due to non-availability of data, the Per-capita Gross National Income (PcGNI) at constant price is used as the indicator of economic development which is defined as the GNI of a country divided by its total population of that year. It indicates the standard of living of the citizens of a country.

Methodology and Model Specification

The present study makes use of some simple econometric methods to carry out the empirical analysis. We use the following methodology for our empirical analysis:

First we calculate the descriptive statistics for all the variables. In order to examine the impact of both agriculture and industry on India economy, Ordinary Least Squares (OLS) technique is used. Before going to use OLS technique one should test the stationary properties of the variable in case of time series data. As our data is time series in nature, the study needs to test stationarity property of the variables using unit root tests, namely Dicky- Fuller (DF), Augmented-Dicky Fuller (ADF) and Phillips-Perron (PP) (1988) test to avoid the spurious regression results. Among three unit root tests only the first difference of PP test satisfies the stationary property of all the variables (see table-2). In the light of the above discussion of the literature review and variables definition section, the following equation is used as the basic model to show the impact of both agriculture and industry on economic growth of India. Here GDP is considered as the indicator of economic growth which shows the performance of the economy.

Growth in terms of GDP = f {Agr, Indu, GDS, GDCF}

The following model is specified to measure the effects of both agriculture and industry on economic

[1] The Human Development Index (HDI) is a normalized measure of life expectancy, literacy, education, standard of living, and GDP per capita for countries worldwide. It is a standard means of measuring well-being.

growth. We estimate the effects of both agriculture and industry on economic growth by ordinary least squares (OLS) techniques which can be written as:

$(g)_t = \alpha_0 + \alpha_1 \ Agr_t + \alpha_2 \ Indu_t + \alpha_3 \ GDS_t + \alpha_4 \ GDCF_t + u_t$ -------- (1)

Here g_t = Economic growth presented by GDP in terms of constant prices during the time period t

Agr_t = Agricultural production in terms of their monetary value during the time period t

$Indu_t$ = Industrial production in terms of their monetary value during the time period t

GDS_t = Gross Domestic Saving in terms of current prices during the time period t

$GDCF_t$ = Gross Domestic Capital Formation in terms of constant prices during the time period t u_t = Disturbance term

The following equation is used as the basic model to show the impact of both agriculture and industry on economic development (PcGNI) of India; here PGNI is used as the proxy of economic development.

PcGNI = f {Agr, Indu, GDS, GDCF}

We estimate the effects of both agriculture and industry on economic development by ordinary least squares (OLS) techniques which can be written as:

$(D)_t = \alpha_0 + \alpha_1 \ Agr_t + \alpha_2 \ Indu_t + \alpha_3 \ GDS_t + \alpha_4 \ GDCF_t + u_t$ -------- (2)

$(D)_t$ = Economic Development in terms of PGNI during the time period t

Agr_t = Agricultural production in terms of their monetary value during the time period t

$Indu_t$ = Industrial production in terms of their monetary value during the time period t

GDS_t = Gross Domestic Saving during the time period t

$GDCF_t$ = Gross Domestic Capital Formation in terms of constant prices during the time period t u_t = Disturbance term

EMPIRICAL RESULTS

This section presents the analysis of the empirical results and its discussion. The result is based on simple OLS regression analysis. Before going to use the regression technique, the present study used to examine the stationary property of the time series data. After that the descriptive statistics of the variables has been calculated. Next it has used the simple regression techniques to find the impact of both agriculture and industry on India economy during the study period.

Test of Stationary

The empirical model is estimated by Ordinary Least Squares (OLS) method. This study has used annual time series data which contains some trend. When working with the time series data, the first step is to identify whether the series is stationary or not. If the variables of a time series data do not satisfy the unit root test, then the regression result may be spurious one. Before going to apply OLS technique the first step is to test the stationarity of the variables, as non-stationary series will produce spurious regression estimates and the resulting outcome will be of no practical use. Unit root test is a pre-requisite of testing long run relationship between two or more time series data (Granger, 1981). Dickey-Fuller (ADF), Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests are widely used in empirical research. The criterion of selection for unit test is that the absolute value of the test statistics should be higher than the critical absolute value. The test result suggests that all the variables are stationary at their first difference with having both trend and intercept in PP test. The following table-2 shows the results of unit root test.

Descriptive Statistics Results

The results of descriptive statistics are reported in table 3. The mean values of the Agr, Indu, GDS and GDCF are similar to some extent. The variability of the variables is measured by standard deviation. Here the variability among the variables are quite differs from each other. The maximum and the minimum values show the range in between which the values of the variables are lying. Skewness helps us to determine the nature and extent of the concentration of the observations towards the highest or the lowest values of the variables. Here the skewness values of all the variables are positive which indicates that the frequency curve of all the distributions are not symmetric bell shaped curve rather they are stretched more to the right side or have a longer tail towards the right side which show all are positively skewed. Kurtosis is concentrated with the flatness or peakedness of the frequency curve. Here the kurtosis values of all the variables except Agr (agriculture) is greater than 3, which show that only the Agriculture variable has platy kurtic while others have leptokurtic (more peaked than normal curve).

Regression Results

Next, we estimated the equation with Ordinary Least Square (OLS) method. Here we calculate the simple OLS test to find out the impact of both agriculture and industry on economic growth during the period of study where GDP is considered as a dependent variable. But the result is not quite good because of low value of the Durbin-Watson d-statistics (Enders,

1995) which shows the existence of auto-correlation problem and to avoid this situation we will take the AR (1) to avoid the problem. The result of this simple OLS technique is presented in the table-4.

From table 7 it is clear that the result which is drawn from the simple OLS technique can't be considered as good one. Though the values of both R^2 and adjusted R^2 are nearer to 1 which show the goodness of the fit but at the same time the Durbin-Watson (DW) statistic is very low i.e. 1.6 which indicate the presence of auto-correlations and violates normal assumptions of OLS. This value should be nearer to 2 (Gujarati, 2004). To solve the problem of auto-correlation of error term, we have allowed an AR (1) term of residuals. The result of the OLS technique with AR (1) is presented in table-5.

From table 5, it is clear that the result which is drawn from the OLS technique with AR (1) is considered as good one in comparison to the simple OLS technique (table-4). The values of both R^2 and adjusted R^2 are nearer to 1 which shows the goodness of fit and the value of Durbin-Watson (DW) statistic i.e. 1.8 which is better than the first one. This value is nearer to 2 which indicate very low chances of the presence of auto-correlations in the error term. The R^2 or coefficient of determination is included to represent how much variation in the dependent y-variable is captured by the regression. Both Akaike Info Criterion (AIC) and Schwarz Info Criterion (SIC) which are used for the selections of better model suggest that the AR (1) model is better (where both should have lower value), as AIC and SIC have values 23. 1 and 23.35 for the AR (1) model as compared to 23.29 and 23.5 for the simple OLS model. Therefore, we consider the regression results of table 5 for our analysis, as the estimated regression results satisfy all the criteria for a good model. The estimated regression test result value helps in examining the impact of both agriculture and industry on economic growth,

$(g)_t = \alpha_0 + \alpha_1 \ Agr_t \ + \alpha_2 \ Indu_t + \alpha_3 \ GDS_t + \alpha_4 \ GDCF_t \ + u_t$ -------- (1)

$(g)_t = 43353 + 0.94057 \ Agr_t \ + 3.2928 \ Indu_t + 0.8 \ GDS_t + 0.49 \ GDCF_t \ + u_t$

t-statistics (0.91) (3.9*)
(10.98*) (1.29) (5.68*)

From the above regression results it is found that, industrial sector has highest impact on GDP (economic growth) of India. The coefficient of the variables shows the impact of independent variables on dependent variable of the model. In table 5 the coefficient of GDCF, agriculture and industry are statistically significant at 1% level. Only the coefficient of GDS is statistically insignificant, so no inference can be drawn from the result under the used data set. It cannot be said correctly that GDS has a positive or negative impact on economic growth of India. The result is ambiguous for India. On the other hand the estimated coefficient of agriculture, GDCF and industry are positive and statistically significant which indicate that all these variables have positive impact on the economic growth of India. The result shows that agriculture has significant positive impact on the economic growth of India during the study period. But the impact of industrial sector (28.1% share in GDP, 2010) is more on the economic growth of India than agriculture sector (14.6% share in GDP, 2010) which is clearly visible from their shares in GDP. R^2 and adjusted R^2 indicate that the performance of both agriculture and industrial sector in case of India is almost completely explained by the independent variables included in the model.

Next, we estimated the equation with Ordinary Least Square (OLS) method to find out the impact of both agriculture and industry on economic development of India during the period of study where PcGNI is considered as a dependent variable. But the result is not quite good because of low value of the Durbin-Watson d-statistics which shows the existence of auto-correlation problem and to avoid this situation we have taken the AR (1) to avoid the problem. The result of this simple OLS technique is presented in table-6.

From table-6, it is clear that the result which is drawn from the simple OLS technique can't be considered as good one. Though the values of both R^2 and adjusted R^2 is nearer to 1 which show a good fit of the model but at the same time the Durbin-Watson (DW) statistic is very low i.e. 1.74 which indicate the presence of auto-correlations. To solve the problem of auto-correlation of error term, we have allowed an AR (1) term of residuals. The result of the OLS technique with AR (1) is presented in table-7.

From table 7, it is clear that the result which is drawn from the OLS technique with AR (1) is considered as good one in comparison to the simple OLS technique (table 6). The values of both R^2 and adjusted R^2 are nearer to 1 which shows the goodness of fit. The value of Durbin-Watson (DW) statistic is 1.99 which indicates lower chances of the presence of auto-correlations in the error term. Both Akaike Info Criterion (AIC) and Schwarz Info Criterion (SIC) which are used for the selections of better model suggest that the AR (1) model is better as AIC and SIC have values 10.68 and 10.97 for the AR (1) model as compared to the simple OLS model. Therefore, we consider the AR (1) model reported in table 7 for our analysis. The estimated regression test result value helps in examining the impact of agriculture on economic development of India,

Table 2: Unit Root Tests Result

Variables	DF		ADF		PP	
	Without Trend	With Trend	Without Trend	With Trend	Without Trend	With Trend
Agr	1.67	-0.97	3.08**	0.042	4.68*	-0.33
Indu	6.93*	3.79*	5.10*	6.44*	9.63*	6.29*
GDCF	4.27*	2.06	3.45**	4.72*	3.91*	1.71
GDS	9.31*	5.99*	2.31	2.46	13.55*	8.77*
GDP	7.66*	4.23*	7.66*	4.23*	9.58*	6.06*
PGNI	6.71*	3.62**	6.71*	3.62**	6.65*	3.49**

Notes: -: Critical values for1%, 5% and 10% significance levels are 3.54, 2.9 and 2.59 respectively.*, ** and *** indicate significance at 1%, 5% and 10% level respectively.
Source: Author's Calculation (using E-views software package

Table 3: Descriptive Statistics Result

	AGR	GDCF	GDP	GDS	INDU	PGNI
Mean	263596.1	280411.5	1073662	263879	204455.8	1281.148
Median	222520	143958	641921	26881	112569	972.6358
Maximum	556789	1622226	4464081	2207423	916356	3816.115
Minimum	110151	23030	230034	845	24968	628.7123
Std. Dev.	127707.4	370881.2	1027095	504118.8	215586.4	772.4202
Skewness	0.782204	2.366573	1.817727	2.41068	1.776562	1.865057
Kurtosis	2.487885	7.99732	5.684451	8.072612	5.578076	5.744303
Jarque-Bera	6.661184	116.4657	50.20605	120.4016	47.37495	52.71886

Source: Author's Calculation (using E-views software package)

Table 4: Simple OLS results, Impact of Agriculture and Industrial sector on Economic Growth of India

Dependent Variable: GDP		
Variable	Coefficient	t-Statistic
C	8703.445	0.296827
Indu	2.636123	7.843159*
Agr	0.956312	3.190094*
GDCF	0.418943	4.298048*
GDS	0.345054	5.470261*
R-squared-0.99939, Adjusted R-squared-0.99934, Durbin Watson stat-1.6, Akaike Info Criterion (AIC) 23.29, Schwarz Info Criterion (SIC)- 23.5.		

Notes: *, ** and *** indicate significance at 1%, 5% and 10% levels respectively.

Table 5: Regression results with AR (1), Impact of Agriculture and Industrial sector on Economic Growth of India

Dependent Variable: GDP		
Variable	Coefficient	t-Statistic
C	43353.00	0.916947
Indu	3.292841	10.98009*
Agr	0.940573	3.903625*
GDCF	0.490389	5.685820*
GDS	0.080094	1.290018
R-squared-0.99952, Adjusted R-squared-0.99946, Durbin Watson stat-1.8, Akaike Info Criterion (AIC)-23. 1, Schwarz Info Criterion (SIC) - 23.35.		

Notes: *, ** and *** indicate significance at 1%, 5% and 10% levels respectively.

Table 6: Simple OLS results, Impact of Agriculture and Industry on Economic Development of India

Dependent Variable: PcGNI		
Variable	Coefficient	t-Statistic
C	322.7961	6.165310
Indu	-0.001326	-1.504819
Agr	0.002286	3.914871*
GDCF	0.000634	3.140616*
GDS	0.000960	6.821027*
R-squared-0.9966, Adjusted R-squared-0.9962, Durbin Watson stat-1.74, Akaike Info Criterion (AIC)-10.65, Schwarz Info Criterion (SIC)- 10.89		

Notes: *, ** and *** indicate significance at 1%, 5% and 10% levels respectively

Table 7: Regression results with AR (1), Impact of Agriculture and Industry on Economic Development of India

Dependent Variable: PGNI		
Variable	Coefficient	t-Statistic
C	319.5081	4.768387*
Indu	-0.001314	-1.325839
Agr	0.002256	3.741100*
GDCF	0.000655	2.975957*
GDS	0.000973	5.903833*
R-squared-0.9966, Adjusted R-squared-0.9962, Durbin Watson stat-1.99, Akaike Info Criterion (AIC)-10.68, Schwarz Info Criterion (SIC)- 10.97		

Notes: *, ** and *** indicate significance at 1%, 5% and 10% levels respectively.

$(g)_t = \alpha_0 + \alpha_1 \ Agr_t + \alpha_2 \ Indu_t + \alpha_3 \ GDS_t + \alpha_4 \ GDCF_t + u_t$ -------- (2)

$(g)_t = 319.5 + 0.0022 \ Agr_t - 0.0013 \ Indu_t + 0.0009 \ GDS_t + 0.0006 \ GDCF_t + u_t$

t- Statistics (4.76*) (3.74*) (-1.32) (5.9*) (2.97*)

The regression result of table 7 shows that the coefficients of agriculture, GDS and GDCF are statistically significant at 1%. On the other hand the estimated coefficient of industry (Indu) is statistically insignificant so no inference can be drawn from the result under the used data set. It cannot be said correctly that industry has a positive or negative impact on economic development of India. The result is ambiguous for India. The estimated coefficients of agriculture, GDS and GDCF are positive and statistically significant which indicate that these variables have positive impact on the economic development of India in general and the standard of living of Indians in particular. From the regression results, it is clearly shows that only the agricultural sector has significant positive impact on economic development in India during the study period. The result is quite obvious because nearly 52 percent of the total workforce depend upon agriculture for their survival. R^2 and adjusted R^2 indicate that the performance of agriculture sector in case of India is almost completely explained by the independent variables included in the model. The coefficient of determination ($R^2 = 0.99$) is quite high and reveals almost the goodness of fit of the model. This indicates the proportion of total variation in economic development (PcGNI) explained by the explanatory variables used in this model.

CONCLUSION

The importance of this study is to analyze the impact of both agriculture and industry on Indian economy during 1950-51 to 2009-10. This study uses simple regression technique for its empirical analysis. The empirical result shows that both agriculture and industry have been considered as a significant determining factor of economic growth but in case of development agriculture is the only determining factor for India. The simple regression result states that agriculture has significant positive impact on both economic growth and development during the study period. In case of industry, the results states that it has significant positive impact only on economic growth of India. In case of economic development the industry has shown ambiguous result. If we compare the impact of both sectors, then it is observed that impact of industrial sector is much higher on economic growth than agriculture during the study period. The regression result is just reverse in case of economic development where the impact of agriculture sector is higher than industry. For a labour surplus developing country like India, economic development is equal important like economic growth as growth shows the performance of the economy as a whole whereas development includes the individual standard of living of the country. A higher level of growth is meaningless unless it will accomplish with the process of development. The growth can be translated into meaningful development only when there will be equitable distribution of wealth and income.

There is no doubt that without agriculture, country cannot exist and without industry, country cannot develop. Agriculture is the backbone of industry. Both the sectors are interdependent with each other one can't survive without other. So it's necessary for a country to have both- agriculture as well as industry. We should not go for industrialization at the cost of agriculture. For a complete balanced development, industry as well as agriculture should develop simultaneously. India needs development, which needs industry to grow but at the same time agriculture also have to grow, if we neglect one sector then the other will suffer. Ignoring either of these sectors would lead to lopsided developments of economy. To keep balance there should be right policies. Need of the hour is to make these two sectors work side by side so as to ensure balanced growth of the Indian economy. An industry without compromising agriculture and vice-versa should be the main policy agenda to maintain balance between them. It should not be a matter of debate whether we should go for agriculture or industries. But the basic issue must be how to develop both simultaneously. Here the question arises how can government run both side-by sides? First, government should try to set up industries in those lands, which are either unproductive for agriculture or barren. Second, areas which have very less food production can also be utilized for industries. Third, government must ensure that the people displaced due to industrialization should be compensated adequately. The compensation may be in the form of money or in job, whichever possible. Fourth, agro based industries should be encouraged as they used agricultural products in terms of their raw materials. Fifth industries used labour intensive techniques should also be encouraged. Last but not the least commercialization of agricultural sector is also one effective major to raise the income level of the farmers. The whole discussion can be explained by one sentence:*"It is not the issue of Industry vs. Agriculture; it is the issue of Industry and Agriculture"*.

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