



Munich Personal RePEc Archive

## **Gross Capital Formation and GDP growth in Indian Agriculture Sector**

marimuthu, sivakumar

chikkaiah naicker college, erode-4, tamilnadu, india

13 May 2013

Online at <https://mpra.ub.uni-muenchen.de/46946/>

MPRA Paper No. 46946, posted 13 May 2013 13:35 UTC

**“Gross Capital Formation and GDP growth in Indian Agriculture Sector**

By

Dr.M.SIVAKUMAR, M.A, M.Phil, Ph.d,

Assistant Professor of Economics,

Department of Economics,

Chikkaiah Naicker College,

Erode-638004.

Email : [sivakumarmarimuthu@yahoo.co.in](mailto:sivakumarmarimuthu@yahoo.co.in)

## **“Gross Capital Formation and GDP growth in Indian Agriculture Sector**

Dr.M.Sivakumar, Assistant Professor of Economics, CNCollege, Erode-4.

**Abstract:** Nevertheless the share of agriculture sector in the GDP has declined in the recent past; agriculture is the backbone and engine of the Indian economy. Agriculture continues play a vital role in the development of India. More than 60 per cent of the people, especially rural Indians, still depends agriculture sector for their subsistence and most of the industries also depend upon agriculture for their raw materials. Any developmental activity needs investment; like that GDP growth needs investment. On the other hand, any investment has to yield some benefit. Hence it is imperative to measure the effectiveness or yield of any investment. In this perspective, the Gross Capital Formation (GCF) and the Gross Domestic Product (GDP) change in Indian agriculture sector study is getting importance.

Key words: India, Agriculture, GDP, Gross Capital Formation, ICOR

## **Gross Capital Formation and GDP growth in Indian Agriculture Sector**

Dr.M.Sivakumar, Assistant Professor, Chikkaiah Naicker College, Erode-04

### **INTRODUCTION**

Nevertheless the share of agriculture sector in the GDP has declined in the recent past; agriculture is the backbone and engine of the Indian economy. Agriculture continues play a vital role in the development of India. More than 60 per cent of the people, especially rural Indians, still depends agriculture sector for their subsistence and most of the industries also depend upon agriculture for their raw materials. Any developmental activity needs investment; like that GDP growth needs investment. On the other hand, any investment has to yield some benefit. Hence it is imperative to measure the effectiveness or yield of any investment. In this perspective, the Gross Capital Formation (GCF) and the Gross Domestic Product (GDP) change in Indian agriculture sector study is getting importance.

### **METHODOLOGY**

#### **Aim of the study**

This study aims to analyze the impact of investment in Indian agriculture sector on India's agricultural GDP growth.

#### **Data**

To measure the investment and the growth, Gross Capital Formation in the agricultural sector (which includes agriculture, forestry and logging and fishing) and Gross Domestic Product at factor cost of agriculture sector have been taken into account. For the analysis, the data from the National Account Statistics 2011 at constant prices (1999-00) of the Government of India is used in this study.

## **Tools used in the study**

World Bank's incremental capital output ratio (ICOR) tool and investment elasticity of GDP growth tool have been used to analyze the impact of the GCF of agriculture on GDP of agriculture.

$$\text{ICOR} = \frac{\text{GCF (Agri)}_t}{\text{GDP (Agri)}_t - \text{GDP (Agri)}_{t-1}}$$

Where

GCF is Gross Capital Formation

GDP is Gross Domestic Product

't' is the present year of the analysis

't-1' is the previous year of the analysis period.

The equation for estimating the Investment Elasticity of Growth is

$$\eta_{\text{GCF}} = \frac{\delta \text{GDP (Agri)}}{\delta \text{GCF (Agri)}} \times \frac{\text{GCF (Agri)}}{\text{GDP (Agri)}}$$

Where

$\eta_{\text{GCF}}$  is Investment Elasticity of Growth

$\delta$  GDP is change in GDP

$\delta$  GCF is change in GCF

GDP is Gross Domestic Product and

GCF is Gross Capital Formation.

## **Capital Formation**

Capital Formation is addition to productive capacity of the economy. It is also known as investment in national accounting. Gross Capital Formation (GCF)

comprises of Gross Fixed Capital Formation (GFCF) and Changes in Stock (CIS). GFCF refers to creation of physical assets and CIS primarily measures the inventories i.e. the working capital. Investment or capital formation in public sector includes irrigation works, command area development, land reclamation, afforestation, development of State farms, etc. Capital formation in private sector includes- construction activities in private sector including improvement, reclamation of land, construction of non-residential buildings, farm houses, wells and other irrigation works etc. The machinery equipment includes tractors, transport equipment, agriculture machinery/equipment. It also includes livestock development (GoI 2011).

Capital formation through investment in agriculture helps in improving the stock of equipment, tools and productivity of natural resources, which in turn, enables the farmers to use their resources, particularly land and labour, more productively (Ramesh Goliat and SM.Loare 2008). Investment as a proportion of GDP has been on a rising trend since the 1970s, agricultural investment as a share of total investment has been falling since the 1980s and investment in agriculture has been stagnant the subsidy for agriculture has risen sharply (Raghbendra Jha 2007). One of the improvement reasons for deceleration in agricultural growth has been declining levels of investment in agriculture and allied sectors and irrigation. A key reason for declining public investment in agriculture has been ever increasing agricultural subsidies such as fertilizers, power, irrigation, food, etc. In addition there has been deterioration of institutions/ organizations providing inputs and services such as credit, seeds, technology, and extension to agricultural sector (Vijay Paul Sharma 2007).

### **Incremental Capital Output Ratio (ICOR)**

ICOR is defined as the ratio between investment in some previous period(s) and the growth in output in the subsequent period. It is the ratio of incremental investments to incremental output and is key metric in macroeconomics. Higher the ICOR, lower is the productivity- it means more incremental units of capital are needed to produce one incremental unit of output. Efficient use of capital reduces ICOR, which can lower investment requirements to achieve a higher growth rate in the economy. Higher ICOR implies that higher cost of production and lower profitability as well as marginal efficiency of capital. The concept of capital-output ratio (or capital coefficient) expresses the relationship between the value of capital investment and the value of output. It refers to the amount of capital required in order to produce a unit of output (M.L.Jhingan 1980).

There is a raging debate going on in India about the reasons why the growth rate in Indian agriculture declined since the 1990s, especially during the last several years. The underlying cause of this declaration is not very clear. Various reasons have been suggested ranging from the declining trend in public sector investments in agriculture to the adverse impact of trade liberalization resulting from the collapse in world prices of major agricultural products (Shenggen Fan et.al 2007). In fact, investment or capital formation is perhaps one of the keys to realizing India's dream of high economic growth. At the same time, stagnant capital productivity levels- measured through incremental capital output ratio have put the focus back on the need to increase the investment rate to achieve higher economic growth, at least until capital efficiency catches up (Varun Bisht and Rajrishi Singhal 2009). A relatively high and long run sustainable rate of growth depends upon improvements in the supply-side of the economy. Supply-side factors, such as investments, education and training and technological change will determine the underlying trend rate of economic growth in the long run. As

investment is the most critical supply side factor of the economy it is also a necessary condition to have a higher level of investment for ensuring high growth momentum in the economy (GoI 2012).

## **ANALYSIS**

There were ups and downs in India's GDP growth rate. India's average GDP growth rate was 3.61% in the First Plan, and then with the help of industrial investment, it rose to 4.27% in the Second Plan. But there was a slump in the Third Plan- it was only 2.87%. After that, there were increases in every Plan period in the average GDP growth rate. It was 6.54% during the Eighth Plan period and 7.81% during the Tenth Plan period.

Total GDP was Rs.1247486 crores in the First Plan and Rs.12147035 crores in the Tenth Plan. But average agriculture GDP growth rate was not as much as total GDP growth except during the Sixth Plan period, in that Plan period, India's agriculture sector GDP growth rate average was 5.78%. It was 4.78% in the Eighth Plan, 3.59% in the Fifth Plan, 3.35% in the Second Plan and 3.03% in the Seventh Plan. The average agriculture GDP growth rate was below 3% during all other Plan periods and it was -0.28% in the Third Plan. The reason behind that negative growth was there were declines in agriculture GDP during 1962-63 and 1965-66. Agriculture GDP was Rs.167095 crores in 1961-62, that declined to Rs.163771 crores in 1962-63, like that, it was Rs.183062 crores in 1964-65 and that declined to Rs.162848 crores in 1965-66. Agriculture GDP was Rs.681453 crores in the First Plan, Rs.775229 crores in the Second Plan and Rs.2446982 crores in the Tenth Plan.



Table No: 1. Agriculture GDP, GCF, ICOR and Investment Elasticity in India from First Plan to Tenth Plan

Sl.No	Plan	Total GDP (in Rs.Crores)	Average Total GDP Growth	Agriculture GDP (in Rs.Crores)	Average Agriculture GDP Growth	% of Agri GDP to the Total GDP	Total Gross Capital Formation (in Rs.Crores)	Average Total GCF Growth	Gross Capital Formation in Agriculture (in Rs.Crores)	Average Agri GCF Growth	% of Agri GCF to the Total GCF	ICOR	Investment Elasticity of GDP in Agriculture
1	First Plan (1951-56)	1247486	3.61	681453.31	2.88	54.63	151855	6.13	43171.74	9.21	28.43	0.4645	0.7337
2	Second Plan (1956-61)	1503014	4.27	775229.27	3.35	51.58	241397	7.47	53875.89	0.24	22.32	-1.3042	0.2868
3	Third Plan (1961-66)	1822808	2.87	844379.61	-0.28	46.32	348322	7.96	60180.46	5.31	17.28	14.1819	19.7652
4	Fourth Plan (1969-74)	2381057	3.35	1016917.85	2.77	42.71	494786	4.98	100657.07	2.88	20.34	-0.4210	-6.7837
5	Fifth Plan (1974-79)	2843275	4.88	1147997.89	3.59	40.38	637827	7.02	130324.11	10.41	20.43	-0.3639	-0.0653
6	Sixth Plan (1980-85)	3369458	5.51	1315592.79	5.78	39.04	775799	4.12	132166.18	-5.09	17.04	-4.5774	0.0538
7	Seventh Plan (1985-89)	4297720	5.66	1497655.24	3.03	34.85	1019902	5.60	128630.83	1.02	12.61	1.9732	0.0584
8	Eighth Plan (1992-97)	6589268	6.54	1908835.58	4.78	28.97	1596907	7.74	143206.77	4.69	8.97	-0.7950	-0.0986
9	Ninth Plan (1997-02)	8875104	5.52	2209097.64	2.49	24.89	2258004	7.62	218018.45	15.73	9.66	-8.4261	1.0327
10	Tenth Plan (2002-07)	12147035	7.81	2446982.38	2.51	20.14	3820732	15.99	306408.17	5.41	8.02	46.8163	0.2640

Source: National Account Statistics, Government of India

The percentage contribution of agriculture sector's GDP to the total GDP was 54.63% during the First Plan period, after that, its contribution to the total GDP was on the declining path and the contribution of agriculture sector to the total GDP was 20.14% in the Tenth Plan.

Total GCF average growth rate was on the increasing phase. It was 6.13% during the First Plan period and 15.99% during the Tenth Plan period. It was Rs.151855 crores in the First Plan and Rs.3820732 in the Tenth Plan. Whereas there were variations in the agriculture sector's GCF average growth rate. It was 9.21% in the First Plan but in the Second Plan it was 0.24% only. It recorded 10.41% and 15.73% growth in the Fifth and Ninth Plan respectively. But during the Sixth Plan period it was -5.09% only. This was because of the decline in the agriculture GCF during 1980-81 and 1981-82. Agriculture GCF was Rs.33982 crores in 1978-80 but that diminished to Rs.28558 crores in 1980-81 and further declined to Rs.24272 crores in 1981-82. Agriculture GCF was Rs.43172 crores in the First Plan and Rs.306408 in the Tenth Plan.

The percentage contribution of agriculture sector GCF to the total GCF was continuously on the declining phase during all the Plan periods. Agriculture GCFs contribution to the total GCF was 28.43% in the First Plan and that was diminished to 8.02% in the Tenth Plan.

Average ICOR has been estimated on the basis of the five year GCF in agriculture and agriculture GDP. Average ICOR was negative in the Second, Fourth, Fifth, Sixth, Eighth and Ninth Plan periods, it was -1.3042, -0.421, -0.363, -4.5774, -0.795 and -8.4261 respectively. The main reason for the negative growth was there was lesser agriculture GDP growth than the previous year agriculture GDP. For example, agriculture GDP was Rs.150298 crores in 1956-57 but it was

only Rs.143547 in the next year i.e. 1957-58. Like that, agriculture GDP was Rs.158010 in 1958-59 and Rs.156420 in 1959-60. ICOR was 0.4645 in the First Plan, 14.1819 in the Second Plan, 1.9732 in the Seventh Plan and 46.8163 in the Tenth Plan. Minimum ICOR reveals that the investment yields a good return and in India the ICOR was least in the First and Seventh Plan periods only. This shows that the marginal efficiency of capital in India's agricultural sector was good in the First and Seventh Plan only.

Elasticity concept has been utilized in this study to analyze the responsiveness of agriculture GDP for the change in GCF in agriculture. Investment elasticity of GDP in agriculture was higher during the Third Plan period that may be the effect of green revolution, i.e. 19.7652. It was 0.7337 in the First Plan, 0.2868 in the Second Plan, 0.0538 in the Sixth Plan, 0.0584 in the Seventh Plan and 0.2640 in the Tenth Plan. It was negative in the Fourth (-0.7837), Fifth (-0.0653) and in the Eighth Plan (-0.0986) Plan periods.

### **Agriculture Growth after Reforms**

There was high growth rate of GDP after the introduction of reforms in Indian economy. The Tenth Plan all sector GDP growth rate was 7.81% and the Eighth Plan agriculture GDP growth rate was 4.78%. This was echoed in the GCF also, the total GCF growth was 15.99% in the Tenth Plan and that was the maximum among the all the Plans after the independence of India, like that, agriculture GCF growth rate was 15.73% during the Ninth Plan and that also was the maximum growth rate attained in agriculture GCF after the independence. But ICOR recorded negative growths during the Eighth and Ninth Plans which shows the GDP growth was lesser than the GCF in the agriculture sector. ICOR was high in the Tenth Plan period which implies that the output was least when comparing

with the investment as well as there was need of high investment in the agricultural sector. Even though investment elasticity of GDP in agriculture was greater than 1 during the Ninth Plan, it was only 0.2640 during the Tenth Plan and -0.0986 during the Eighth Plan. This shows out of three Plan periods during two Plan periods investment elasticity of GDP in the agriculture sector was not elastic. This reveals two aspects of growth in Indian economy after the reforms, one is, there was high growth in the overall GDP and another aspect is, in the agriculture sector the growth was inadequate.

## **SUMMARY and CONCLUSION**

There were variations in India's GDP growth; it was maximum in the Tenth Plan and minimum in the Third Plan. But average agriculture GDP growth rate was not as much as total GDP growth except during the Sixth Plan period, in that Plan period, India's agriculture sector GDP growth rate average was 5.78% and it was -0.28% in the Third Plan. Total GCF average growth rate was on the increasing phase. It was 6.13% during the First Plan period and 15.99% during the Tenth Plan period. Whereas there were variations in the agriculture sector's GCF average growth rate, it was 15.73% in the Ninth Plan and -5.09% in the Sixth Plan. The percentage contribution of agriculture sector GCF to the total GCF was continuously on the declining phase during all the Plan periods. Agriculture GCFs contribution to the total GCF was 28.43% in the First Plan and that was diminished to 8.02% in the Tenth Plan. ICOR was least in the First and Seventh Plan and Investment Elasticity was more in the Third, Ninth and First Plans. Thus from this analysis, with the help of ICOR and Investment Elasticity of GDP in agriculture it is observed that the agriculture investment yielded a good return in the First Plan.

There was improvement in the overall GDP growth rate in Indian economy after the introduction of Liberalization, Privatization and Globalization but in the agricultural sector that growth was not reflected, this can be observed with the help of ICOR.

Sustainable rate of growth depends upon perpetuated investment. Higher level of investment in agriculture sector is essential for capital formation to generate agriculture growth. But after the First Plan there was a decline either in the investment or growth in agriculture sector. Since agriculture is the engine of an economy, the growth of that sector should be ensured for India's overall economic growth. On the other hand, there is an insufficiency in the capital in India. So the scarce capital has to be invested in a careful manner to yield a good return. Indian agricultural sector investment needs to take these two aspects to ensure the effective marginal efficiency of capital.

## REFERENCES

Government of India (2011): “Annual Report 2010-2011”, Ministry of Agriculture, New Delhi.

Government of India (2012): “ Report of the Working- Group on Estimation of Investments, its Composition and Trend for Twelfth Five- Year Plan (2012-13 to 2016-17), Planning Commission, New Delhi.

ML Jhingan (1980): “The Economics of Development and Planning”, Vrinda Publication. Delhi.

Raghbendra Jha (2007): “Investment and Subsidies in Indian Agriculture”, ASARC Working Paper 2007/03, Canberra.

Ramesh Goliat and SM.Lokare (2008): “Capital Adequacy in Indian Agriculture: A Riposte”, Occasional Paper Vol.29, No.1, Reserve Bank of India, Mumbai.

Shenggen Fan, Asok Gulati and Sukhadeo Thorat (2007): “Investment, Subsidies and Pro-Poor Growth in Rural India”, IFPRI Discussion Paper 00716, IFPRI, New Delhi.

Varun Bisht and Rajrishi Singhal (2009): “Capital Formation in India”, Dhanalakshmi Bank, Mumbai.

Vijay Paul Sharma (2007): “India’s Agrarian Crisis and Smallholder Producer’s Participation in New Farm Supply Chain Initiatives: A Case Study of Contract Farming”, Indian Institute of Management Working Paper No: 2007-08-01, Ahmadabad.