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STRIDES – A STUDENTS' JOURNAL OF SHRI RAM COLLEGE OF COMMERCE

ISSN 2581-4931 (Print)

Shri Ram College of Commerce is well known for its academic excellence and dedicated approach towards dissemination of knowledge in the academic world. The college appreciates the role of research in education and is committed to developing an inclination towards research in both faculty and students. In this pursuit, the college has taken the initiative to launch a new Journal named 'Strides – A Students' Journal of Shri Ram College of Commerce'.

ABOUT THE JOURNAL

It is a double blind reviewed bi-annual Journal launched exclusively to encourage students to pursue research on the contemporary topics and issues in the area of commerce, economics, management, governance, polices etc. The journal provides an opportunity to the students and faculty of Shri Ram College of Commerce to publish their academic research work.

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The journal adheres to a rigorous double-blind review policy. Each research paper received by COPE is sent for review to the *Referee* (Subject Expert). The reports submitted by the *Referees* are sent to the respective students for improvement (if any, suggested by the *Referees*). After reporting all the suggestions recommended by the *Referees*, the revised and improved version of the papers are re-submitted by the students to the COPE.

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- c) Abstract
- d) Keywords

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The Journal adheres to the APA (American Psychological Association) Referencing Style, Sixth Edition. Students must refer to the APA Referencing Guidelines to ensure conformance to this reference style. For further information you may visit the following link - <http://www.apastyle.org>

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Endnotes should be serially arranged at the end of the article well before the references and after conclusion.

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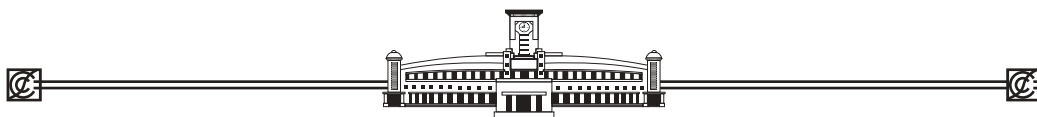
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AWARD

The authors of best three papers from every Issue are awarded – First Prize, Second Prize and Third Prize on the SRCC Annual Day.



Principal's Message



The mission statement of the college signifying the existence and its road map to the achievement of its vision, reads as:

"To achieve and sustain excellence in teaching and research, enrich local, national and international communities through our research, improve skills of alumni, and to publish academic and educational resources"

To achieve and promote excellence in publications and applied research, the college has taken the initiative to launch a new journal exclusively to publish students' research papers and articles. It will be an add-on to the enriched catalogue of college publications and academic literature.

The Journal has provided an opportunity to the students of our college to focus on research. Since the students were not opened to the research methodologies at the undergraduate level, they were mentored by experienced faculty of our college. Simultaneously, their articles were also reviewed by the referees and tested for plagiarism before publication. After reporting all the suggestions recommended by the referees, the articles were revised and then finally published. The college had successfully released the foundation issue of the Journal **"Strides – A Students' Journal of Shri Ram College of Commerce, Volume 1, Issue 1, 2016-17"** on the occasion of 91st Annual Day of the College held on 13th April, 2017. The Journal was released by Shri Prakash Javadekar, Hon'ble Union Minister of Human Resource Development, Government of India.

I would like to congratulate the students whose papers are published in this issue of the journal and simultaneously encourage all the students to contribute their research papers and articles for the successive issues of the Journal.

Best wishes for their future endeavors.

Prof. Simrit Kaur
Principal



Editor's Message

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It is a bi-annual Journal launched exclusively to publish academic research papers and articles by the students on contemporary topics and issues in the area of commerce, economics, management, governance, policies etc.

In order to maintain high standards of publication, COPE (Committee on Publication Ethics) has been constituted. The COPE shall be the apex authority to take all decisions related to publication of research papers and articles in Strides. The decision of COPE shall be final and binding.

To maintain high *academic standards*, *academic ethics* and *academic integrity*, a rigorous process of double blind review of research papers is followed along with screening of plagiarism of each manuscript received by the COPE



for publication. The research work published in Strides is original and not published or presented at any other public forum.

The foundation issue of the Journal **“Strides – A Students' Journal of Shri Ram College of Commerce, Volume 1, Issue 1, 2016-17”** was successfully released on 91st Annual Day of SRCC held on 13th April, 2017 by Shri Prakash Javadekar, Hon'ble Union Minister of Human Resource Development, Government of India.

The successive Issues of 'Strides – A Students' Journal of Shri Ram College of Commerce' shall be bi-annually released.

I congratulate all the students whose research papers are published in this Issue of Strides and express my sincere thanks to their mentors and referees.

Dr. Santosh Kumari
Editor



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Structural Breaks in the Indian Agriculture : A Painful Journey

Abstract

This paper econometrically analyses the relationship between the growth of the agriculture sector and Gross Domestic Product (GDP) of the Indian economy. It uses a vast time series data from 1950-51 to 2016-17 to conclude the momentousness of the agriculture sector in the Indian economy. Furthermore, it seeks to scrutinize the question "Whether various reforms induced structural breaks in the agriculture sector or not during the given period?" with the help of Chow Test and concludes the fact that the paramount sector experienced various unfavourable structural breaks and its share in GDP declined notably but on the other hand the sector remained as the highest employer.

Keywords: Growth of the Agriculture Sector, Gross Domestic Product, Time Series Data, Structural Break

INTRODUCTION

Few scientists think of agriculture as the chief or the model science. Many indeed do not consider it a science at all. Yet it was the first science - the mother of all sciences; it remains the science which makes human life possible; and it may be that, before the century is over, the success or failure of science as a whole will be judged by the success or failure of agriculture.¹

-T.W, Schultz

Mentor

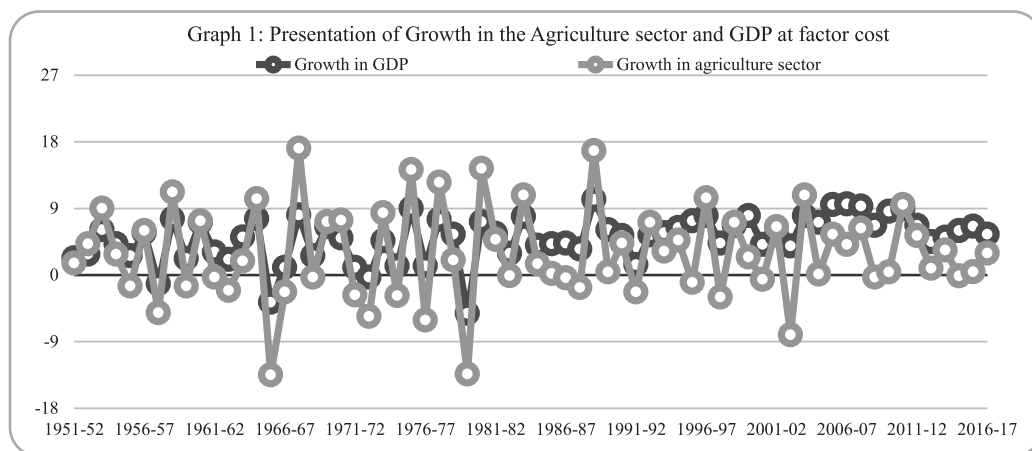
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In today's world, agriculture is paramount to survival as the idea of food security is uppermost. Secondly, it plays a strategic role in the process of economic development of a country. It has made significant contributions to the economic prosperity of advanced countries and its role in the economic development of developing countries is of vital importance. It makes its contribution in the following ways : by providing food and raw material to non agriculture sectors, by creating demand for goods produced in non-agriculture sector, by earning valuable foreign exchange through the exports of agriculture products and most importantly by playing a central role in the lives of many people and being one of the most powerful tools to eradicate poverty from the world.

The agriculture sector, diverse and extensive sector is the backbone of the Indian economy as it is a source of basic ingredients to the mankind, raw materials for the non-agriculture sector, exports of agriculture products and employment to a large number of people. It is pivotal for sustained growth and development of Indian economy. Since the inception of planning in 1951, Indian agriculture has travelled a long journey with too many peaks and valleys.

HISTORICAL GROWTH TRENDS OF INDIAN AGRICULTURE

Indian agriculture has been playing a decisive role in shaping the overall growth trajectories of the Indian economy since independence. 200 years of the British rule reduced India from its glory of one of the richest countries in the world to the poorest one. They left the most crucial sector of India in a state of despair and the conditions of the peasants were deteriorated. Thus, at the inception of planning in 1951, the primacy was given to the agriculture sector and the intend was also successfully achieved. But, despite that due to various challenges on its path such as shifting of the primacy from the agriculture sector to other sectors from second five year plan, years of severe droughts and many more exacerbated the conditions. This convinced India to reform its

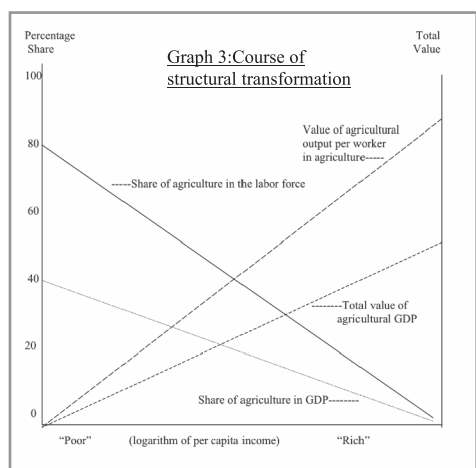
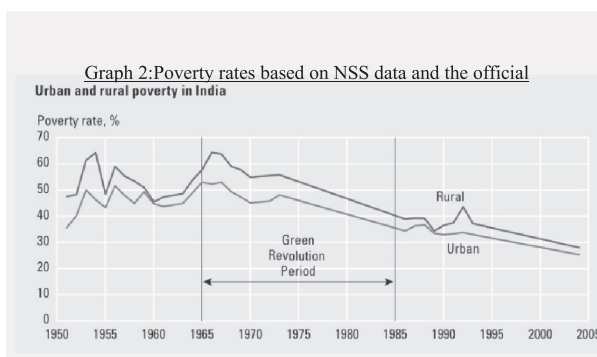


agriculture and thus green revolution was initiated in 1966 to relieve the plights. Accompanied with this phase came the phase of wider dissemination of technology period to achieve a sustained growth in the sector. Further, economic reforms initiated in the early nineties had a significant impact on the agriculture sector, primarily due to opening up of the economy to external competition, liberalization of trade and deregulation of input and other sub-sectors resulted into a major stagnation of public expenditure on agriculture infrastructure. Indeed, the sector has gone under various structural changes along with an anticipated decline in the contribution of the primary sector in Gross Domestic Product (GDP) drastically. In spite of this decline it is still the most important sector as half of India's population is still dependent on agriculture for the major source of their livelihood. Moreover, as a source of raw materials for a number of sectors and its share in the country's exports, the linkages of agriculture with economic growth and well being are well established.

REVIEW OF LITERATURE

There are several studies scrutinizing the impact of the agriculture sector on an economy. Some studies shed their light on the momentousness of the agriculture sector as being a major source of poverty reduction for instance Green Revolution in India raised farmers' incomes and led to

decline in rural poverty from 64 percent in 1967 to 50 percent in 1977 and to 34 percent in 1986 accompanied with a decline in urban poverty (World Bank's World Development Report, 2008). It presents the results of a study by University of California at Berkeley by



economists Ethan Ligon and Elisabeth Sadoulet who compared the effects of 1% increase in GDP in agriculture with non-agriculture on the expenditure of each decile of the income distribution. Cross country econometrics indicate that growth in agriculture sector has large benefits for poor and is at least three times as effective as the growth in any other sector in reducing poverty.

Further, it is believed that the central feature of the economic development is that at low levels of income, agriculture sector dominates both as

a share of GDP and as a share of employment. However as an economy grows, the share of agriculture sector both in GDP and employment declines. This is both a cause and an effect of economic development (see figure 3). It was observed that there are more lawyers in the United States than farmers, more dry cleaning establishments than farms (C. Peter Timmer, 2007). Also, over long historical periods, agriculture's role seems to evolve through four basic stages : the early "Mosher" stage when getting agriculture moving is the main policy objective (Mosher, 1966) ; the "Johnston-Mellor" stage when agriculture contributes to economic growth through a variety of linkages (Johnston and Mellor ,1961) ; the "T.W.Schultz" stage when rising agriculture incomes still fall behind those in a rapidly growing non-agricultural economy inducing serious political tensions (Schultz,1978) ; and the "D Gale Johnson" stage where labour and financial markets fully integrate the agricultural economy into the rest of the economy (Johnson, 1997 ; Gardner, 2002).

The agriculture sector, backbone of the Indian economy was deteriorated under the British regime as a result of which one of the chronic problems India faced following Independence was the insufficiency of food. Thus, the primary concern of the First Five Year Plans was agriculture. But, with the success of the First Five Year Plan, in the Second Five Year Plan there was a shift of priority from agriculture to industries and within industries to basic heavy industries. It emphasized the growth of heavy industries which would enable the economy to accelerate the rate of capital formation and therefore economic growth (Mahalanobis Growth Model, Prof.P.C.Mahalanobis). In the critique of it, an alternative model was formulated according to which a top priority was given to agriculture and other wage-goods industries for the growth of employment and income instead of to capital goods industries (Wage-Goods Model, Vakil and Brahmananda). As a consequence of the abandonment of the agriculture sector consecutively for several years, the sector was degenerated and thus in mid-1960's to combat the problem of food shortage Green Revolution was implemented. There are several studies investigating the impact of the Green Revolution on agriculture. However, there is roughly an equal split between their conclusions. Some studies cast a light on the positive impacts of Green Revolution stating that the green revolution didn't contribute much initially but in 1980's it led into increase in rural income and alleviated poverty substantially (Koichi Fujita, 2010) while some cast a light on the negative impacts of it stating that it led into increase in interpersonal inequalities, regional disparities etc (Kathryn Sebby, 2010). Further, in 1991 there was an initiation of economic reform which led to an additional deceleration in the total agriculture output (G S Bhalla, Gurmail Singh, 2009).

A number of studies have highlighted the various characteristics of Indian agriculture such as an important attribute of the Indian Agriculture is the presence of surplus labor within families. For instance, peasant families with five working members, each of whom was 20 percent idle. In that case, withdrawing one member would leave output unchanged,

indicating the presence of surplus labor (Amartya Sen). In support of this various studies also shed their light on surplus labour in Indian Agriculture such as by using panel data at the plot and farm level it was observed that over 20% of the Indian agricultural labour force is surplus if minimum farm scale is 20 acres (Andrew D. Foster and Mark R. Rosenzweig, 2010). Further, it has been highlighted that in the presence of increasing agriculture productivity, withdrawal of excess labor from agriculture will lead to an increase in industrial growth and GDP (W. Arthur Lewis, 1964). He famously wrote, "industrialization is dependent upon agriculture improvement; it is not possible to produce a growing volume of manufacturers unless agriculture production is growing simultaneously. This is also why industrial and agrarian revolutions always go together, and why economies in which agriculture is stagnant do not show industrial development."

METHODOLOGY

This paper uses an extensive time series data from 1950-51 to 2016-17 of the growth rates in Gross Domestic Product by economic activity at constant (2004-05) prices. To build up the research in the subsequent time series data regression analysis, the dependent variable is the growth rate of GDP at factor cost at constant (2004-05) prices and the primary independent variable is the growth rate of the agriculture sector at constant (2004-05) prices. The other independent variables of interest are the growth rate of the manufacturing sector and service sector at constant (2004-05) prices. The variables are concisely presented in the following table :

Variable	Data source	Expected sign of coefficient
Gross Domestic Product at factor cost (Dependent Variable)	Ministry of Statistics and Programme Implementation	-
Agriculture sector (Independent Variable)	Ministry of Statistics and Programme Implementation	Positive
Manufacturing sector (Independent Variable)	Ministry of Statistics and Programme Implementation	Positive
Service sector (Independent Variable)	Ministry of Statistics and Programme Implementation	Positive

Firstly, in order to examine the extent of the momentousness of the agriculture sector in the Indian economy and compare it with the manufacturing and service sector, correlation, a statistical tool to scrutinize how strongly each independent variable is related to the dependent variable is calculated. A positive correlation indicates the extent to which the pair of variables increase or decrease in parallel while a negative correlation indicates the extent to which one variable increases as the other decreases.

Secondly, to further analyze the relationship between the explained or dependent variable (Y) and the independent or explanatory variables (X) Ordinary Least Squares regression is undertaken. The general expression of the model can be written as :

$$Y_i = \beta_1 + \beta_2 X_i + e_i \quad (\text{sample regression function})$$

Where: Y_i is the dependant variable
 X_i is the independent variable
 e_i is the residual term

The sample regression functions obtained in the paper are as follows :

$$\begin{aligned} \text{GDP} &= \beta_1 + \beta_2 \text{Agriculture} + e_i \\ \text{GDP} &= \beta_1 + \beta_2 \text{Manufacturing} + e_i \\ \text{GDP} &= \beta_1 + \beta_2 \text{Service} + e_i \end{aligned}$$

In the above regression model the following parameters are analysed :

- The goodness of fit of a regression line is measured by coefficient of determination, r^2 which measures the percentage of total variation in Y explained by the regression model.
- In order to check that whether the independent variable is significant or not i.e. the independent variable has an effect on dependent variable or not , the following hypothesis is made :

Null Hypothesis , H_0 : Independent variable is insignificant

Alternative Hypothesis , H_1 : Independent variable is significant

If the |t-ratio| is greater than t-critical then the null hypothesis is rejected and hence the independent variable is significant.

- In order to check whether the regression equation is relevant or not F statistic is calculated and the following hypothesis is made :

Null Hypothesis , H_0 : Model is irrelevant

Alternative Hypothesis , H_1 : Model is relevant

If the F calculated is greater than F-critical then the null hypothesis is rejected and hence model is relevant.

Further, in order to test whether various reforms like green revolution , liberalisation etc brought a structural change in agriculture sector or not Chow Test, a statistical and econometric test by Gregory Chow to check whether the coefficients in two linear regressions on different data sets are equal or not is conducted. In order to conduct the test the following hypothesis is made :

Null Hypothesis, H_0 : There is no structural change

Alternative Hypothesis, H_1 : There is a structural change

Then we calculate -

$$F = \frac{((RSS_{RESTRICTED} - (RSS_{UNRESTRICTED}))/k)}{(RSS_{UNRESTRICTED})/(N_1 + N_2 - 2k)}.$$

If F calculated is greater than F statistic then the null hypothesis is rejected and hence a structural change is concluded.

DISCUSSION OF RESULTS

Table 2 : Correlation

Dependent Variable (Y)	Independent Variable (X)	Correlation	Regression Equation	r^2
GDP At Factor Cost	Agriculture Sector	0.79	$Y = 0.3877X + 3.3369 + e$	0.6279
GDP At Factor Cost	Manufacturing Sector	0.48	$Y = 2.818 + 0.387X + e$	0.2337
GDP At Factor Cost	Service sector	0.64 ²	$Y = 0.8704X - 0.3531 + e$	0.4083

*Refer appendix for the entire output table

The results shown in the table explains that strongest uphill (positive) linear relationship exists between GDP and the agriculture sector. Also, all the independent variables have significant impact on the GDP and all the regression equations are relevant but, r^2 is highest between GDP and the agriculture sector that implies approximately 63% of total variations in the GDP are explained by the variation in the agriculture sector.

Based on the above results it would be safe to conclude that the Agriculture sector has a significant impact on the GDP of India and is the most important sector in the Indian economy. In order to examine the structural changes in the agriculture sector the data is divided into several periods as follows:

Table 3 : Periods

Pre Green Revolution	1951-52 To 1965-66
First Wave Of Green Revolution	1966-67 To 1979-80
Second Wave Of Green Revolution / Wider Technology Dissemination	1980-81 To 1990-91
After Liberalization	1991-92 To 2016-17

• PRE GREEN REVOLUTION

Agriculture has always played a significant role in the Indian society. India was a self-sufficient economy and was largely dependent on the agriculture sector at the start of the British rule. However, Britishers' policies had a major effect on the agriculture sector and it was left backward in every aspect on the eve of Independence in 1947. The commercialization of agriculture, introduction of new land reforms (zamindari system), use of primitive technology etc lead to stagnation, famines and scarcities.

Thus after independence, the government launched the First Five Year Plan (1951-56) focusing on agriculture, price stability, power and transport. It was a successful plan as the target growth was 2.1% while the actual growth rate was 3.6%. But, with the Second Five Year Plan (1956-61) the focus was shifted from the agriculture sector, as a result, there was a shortfall in the production of all commodities except sugar cane and tea along with that an increase in price level. Besides that, an increase in population from 36.1 crore in 1951 to 41.9 crore in 1961 increased the pressure on the agriculture sector further worsened the situation and India was not able to meet its food demand. As a result of all the above-stated series of activities food grains were imported which were cut in the First Five Year Plan. Now with the Third Five Year Plan (1961-66), the priority was again shifted to the agriculture sector but in spite of that, the plan failed due to a series of crisis such as - Chinese aggression (1962), Indo-Pak war (1965) and two successive years of severe drought. All this further exaggerated the situation leading to inflation, food shortage (decline in production of food grains by 19%) and strained foreign exchange.

• FIRST WAVE OF GREEN REVOLUTION

In 1966 government adopted a new agricultural policy to combat food shortage. It emphasised technological innovation such as high yielding variety (HYV) seeds, tractors, pump sets etc. This period is referred as the First Wave of Green Revolution.

In order to examine whether green revolution brought a structural change or not, Chow test is conducted and the results are as follows:

Table 4:Output

Model	Equation	RSS	Number of Observations
Restricted Model (1951-51 TO 1979-80)	$Y=2.495+0.439X_i+e_i$	30.966	29
Unrestricted Model (1951-52 TO 1965-66)	$Y=2.626+0.469X_i+e_i$	11.965	15
Unrestricted Model (1966-67 TO 1979-80)	$Y=2.331+0.423X_i+e_i$	17.079	14

*Refer appendix for the entire output table.

Null Hypothesis , H_0 : There is no structural change

Alternative Hypothesis , H_1 : There is a structural change

$$F = \frac{((RSS_{RESTRICTED} - (RSS_{UNRESTRICTED}))/k)}{(RSS_{UNRESTRICTED})/(N_1 + N_2 - 2k)} \\ = 0.826597689686636 < F_{0.01, 2, 25}$$

The null hypothesis is not rejected at 1% level of significance. Hence there is no structural change from the period of pre green revolution to the period of the first phase of the green revolution.

This happened because the first phase of the green revolution didn't contribute much to the development of the economy as it was only confined to a few areas such as Punjab and was confined to only some crops like wheat. Also, during this period there was a severe drought in 1979 which adversely affected the production in Eastern Rajasthan, Punjab, Himachal Pradesh, and Uttar Pradesh and resulted in the decline of production of food grains by 17.5% against 19% in 1965-66.

Thus despite the introduction of green revolution, it didn't bring a favourable change in the agriculture sector and the share of agriculture sector kept on declining during the period.

- **SECOND WAVE OF GREEN REVOLUTION / WIDER TECHNOLOGY DISSEMINATION PERIOD**

The period from 1980-81 to 1990-91 is referred to as the wider technology dissemination period. The area under High Yielding Varieties (HYV) had a downfall in 1979-80 (38.4 million hectares) but the area increased in this period from 45.3 million hectares in 1980-81 to 63.9 million hectares in 1990-91. Various steps were taken to increase the use of HYV seeds in irrigated areas such as diffusion of tube wells. Also in 1983, the use HYV was also increased to paddy.

Agriculture credit is an indispensable part of the agriculture sector as the modern farm technology is costly and the personal resources of the farmers are inadequate. It increases the efficiency and profitability of the agriculture sector. During the period an important development took place which was the establishment of National Bank For Agriculture And Rural Development (NABARD) with the motto of providing short-term credit to agriculture, rural small scale industries etc in order to promote integrated rural development. This led to an increase in the agriculture credit and in 1982 it sanctioned Rs1019 crore.

The growth in the agriculture sector also depends on effective utilization of existing irrigation facilities and creation of new potential. Each year marked the creation of

additional irrigation facilities and by 1990-91 the irrigation potential reached 82.8 million hectares.

During the period scheme for free distribution of improved varieties of seeds of cereals, oilseeds and pulses to farmers in form of mini kits were also started and it proved very helpful. In 1985, crop insurance was implemented by General Insurance Corporation (GIC) on behalf of the Central and State government. It provides financial support to insured farmers in event of a crop failure.

In order to examine whether wider technology dissemination brought a structural change or not, Chow test is conducted and the results are as follows:

Table 5: Output

Model	Equation	RSS	Number of Observations
Restructed Model (1966-67 TO 1990-91)	$Y_i = 2.968 + 0.401X_i + e_i$	40.188	25
Unrestricted Model (1966-67 TO 1979-80)	$Y_i = 22.331 + 0.423X_i + e_i$	17.079	14
Unrestricted Model (1980-81 TO 1990-91)	$Y_i = 4.144 + 0.306X_i + e_i$	8.181	11

*Refer appendix for the entire output table.

Null Hypothesis, H_0 : There is no structural change

Alternative Hypothesis, H_1 : There is a structural change

$$F = \frac{((RSS_{RESTRICTED} - (RSS_{UNRESTRICTED}))/k)}{(RSS_{UNRESTRICTED})/(N_1 + N_2 - 2k)}$$

$$= 6.20435 > F_{0.01, 2, 21}$$

So, the null hypothesis is rejected at 1% level of significance. This means that as the economy moved from the first face of the green revolution to the second it experienced structural change but not a favorable one as in spite of all the pros experienced during the period, the agriculture sector suffered from many problems which resulted in its decline. It experienced poor rainfall for four periods in succession after last good monsoon in 1983-84. The major drawback of HYV seeds experienced during the period was that the increase in output was concentrated in a few areas having good infrastructure as a result it widened regional disparities. This period experienced a rise in agriculture credit but at the same time it faced the problem of increasing overdue which has slowed down the credit expansion by eroding the lending capacity. Also, Command Area Development Programme established to achieve optimal utilization of irrigation potential lagged behind the completion of main works of the project like the construction of field channels and drains which further widened the gap between the utilization and creation.

• AFTER LIBERALIZATION

On 24th July 1991, Manmohan Singh, the minister of finance, facing a balance of payment crisis, liberalized the economy by scrapping licensing and opening up to traders and investors. The liberalization had both positive and negative impacts on the agriculture sector. It led to an increase in horticulture output and diversification of agriculture. However, as compared to the growth in the other sectors, the primary sector was left behind. This period marked the shift of the focus from the agriculture sector to other sectors. There was an increase in irrigation facilities but then there was persistent underutilization of potential.

Agriculture credit increased but the problem of overdue prevailed. The stagnation in investment along with the downscaling of production due to fragmentation excessively worsened the situation. All this has led to an increase in farmer suicides (12% of total suicides in the country in 2000). In order to check the structural change the following output is obtained:

Table 6: Output

Model	Equation	RSS	Number of Observations
Restricted Model (1980-81 TO 2016-17)	$Y_i = 5.343 + 0.254X_i + e_i$	91.744	37
Unrestricted Model (1980-81 TO 1990-91)	$Y_i = 4.144 + 0.306X_i + e_i$	8.181	11
Unrestricted Model (1991-92 TO 2016-17)	$Y_i = 5.768 + 0.247X_i + e_i$	68.053	26

*Refer appendix for the entire output table.

Null Hypothesis , H_0 : There is no structural change

Alternative Hypothesis , H_1 : There is a structural change

$$F = \frac{((RSS_{RESTRICTED} - (RSS_{UNRESTRICTED}))/k)}{(RSS_{UNRESTRICTED})/(N_1 + N_2 - 2k)}$$

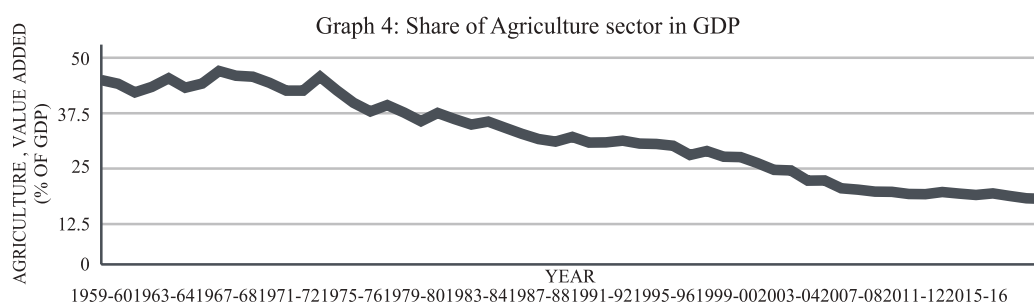
$$= 3.3566706286 > F_{0.05, 2, 33}$$

The null hypothesis is rejected at 5% level of significance. Thus an unfavorable structural change is observed due to the reasons stated above and hence as a consequence of this structural change it has been observed a deceleration of output.

CONCLUSION

The paper endeavored to firstly show that agriculture sector has the largest impact on the GDP of Indian economy i.e. it is the most crucial sector of the Indian economy and the sector plays an important role in the lives of a large number of people. After the Independence, it contributed around 45% in GDP. It has made substantial progress in

terms of production and productivity in the beginning of the Planning process. The successive Five Year Plans have directly or indirectly emphasized growth in the agriculture sector, as a result of which food grains production increased a lot. However, the challenges are far from over. With the help of the Chow test and the trends experienced in the sector, it has been concluded that the sector has experienced various unfavourable structural breaks and as a consequence its share in GDP has continuously declined. In 2016, the sector contributed only 17% in GDP. The figure below indicates that initially at low levels of income, agriculture sector dominated as a share of GDP and as the economy moved towards middle levels of income per capita, the share of agriculture sector in GDP has declined.



However, the conclusion is juxtaposed with the fact that the share of the sector in employment has not declined by that much proportion and it still dominates in employment and hence, it accounts for a large amount of labor surplus.

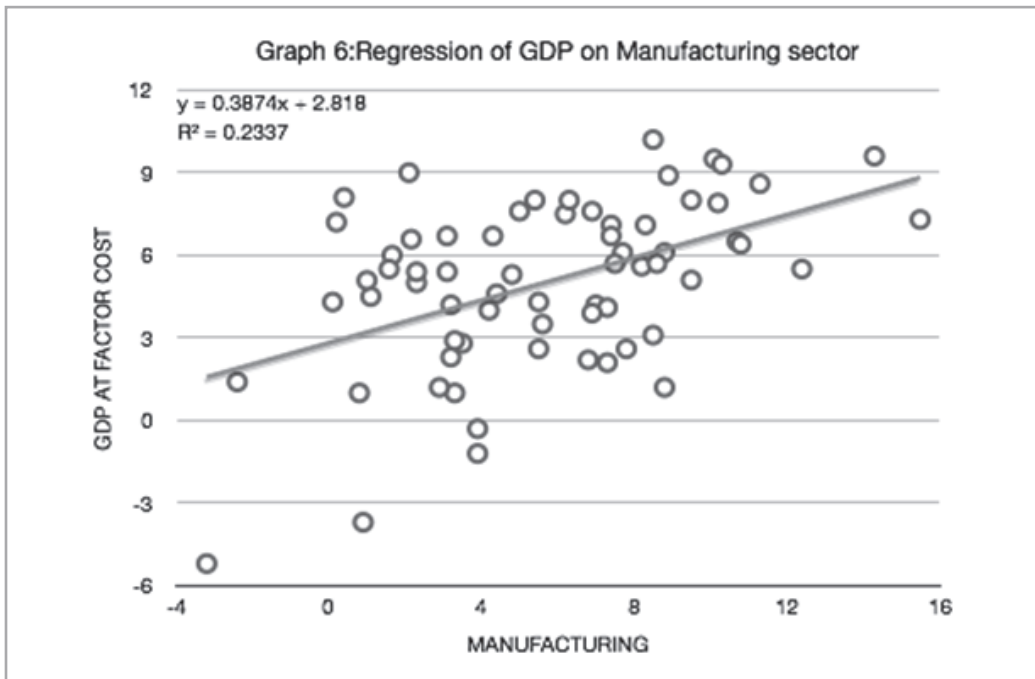
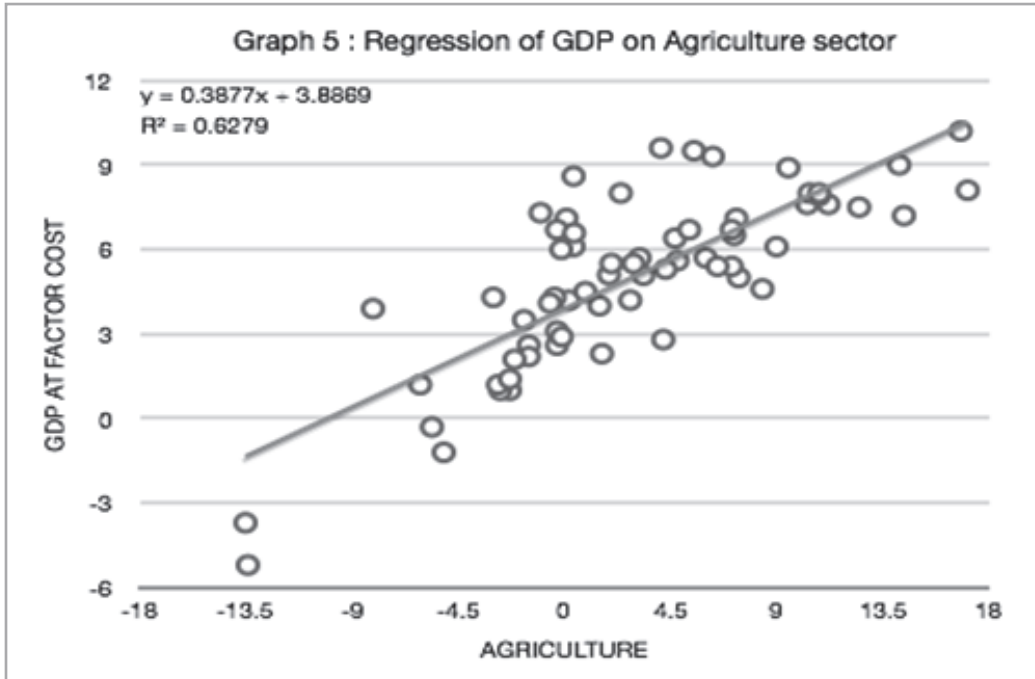
Given this unpleasant situation it is recommended that the agriculture sector can play an important role to increase the GDP of the economy by firstly increasing the productivity in the agriculture sector through various measures like increasing the investment in research and development, effective coordination and monitoring of ongoing agriculture and allied sectors programmes, pooling of many landholding for economies of scale, increasing the utilisation of irrigation facilities to reduce the dependence on monsoons etc and secondly by removing excess labour from agriculture sector without reduction in agriculture output which would lead into an increase in the industrial sector and hence an increase in total GDP.

END NOTES

□¹ Ordinary least squares (OLS) states that the residual sum of squares (RSS), $\sum e_i^2$ is as small as possible.

□² The correlation is calculated taking into consideration the period from 1950-51 to 2012-13 but if we consider that period for all the other sectors then also Agriculture sector has the highest correlation with GDP at factor cost.

APPENDIX



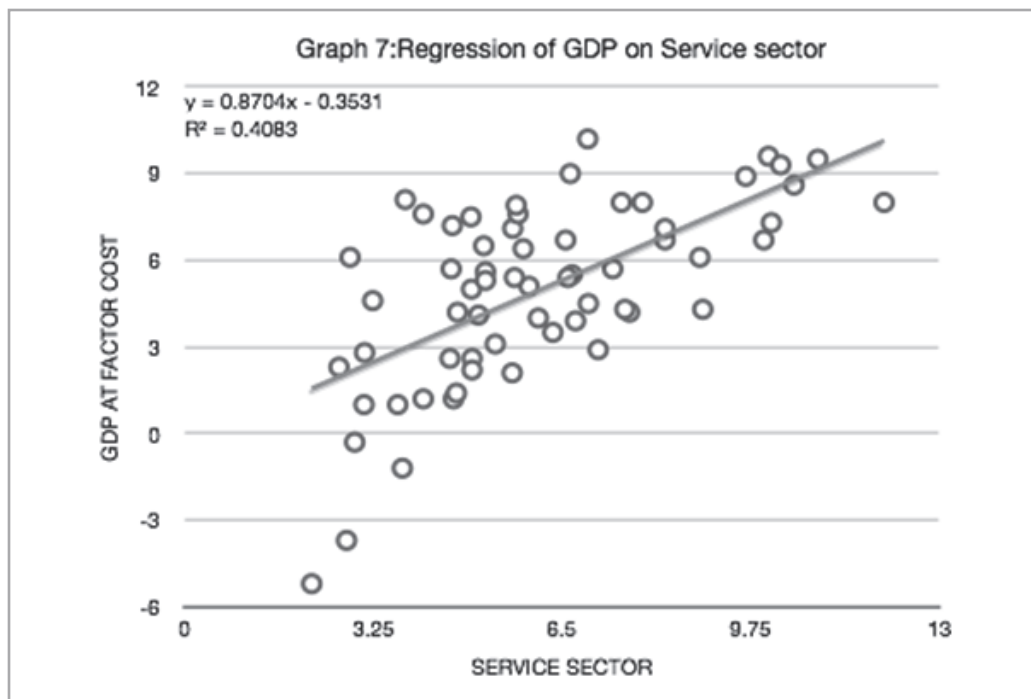


Table 7 : Regression of GDP on Agriculture sector

	Coefficients	Standard Error	t stat	Significance
Intercept	3.886907	0.2563883	15.16	Yes
Agriculture	0.3876924	0.0373043	10.39	Yes
	Regression	Statistics		
R square			F(1,64)	Relevant
0.6279			108.01	Yes

Table 8 : Regression of GDP on Manufacturing sector

	Coefficients	Standard Error	t stat	Significance
Intercept	2.817994	0.5990348	4.70	Yes
Manufacturing	0.3873508	0.087667	4.42	Yes
	Regression	Statistics		
R square			F(1,64)	Relevant
0.2337			19.52	Yes

Table 9 : Regression of GDP on Service sector

	Coefficients	Standard Error	t stat	Significance
Intercept	-0.3530581	0.8834019	-0.40	Yes
Service	0.8703981	0.1352602	6.43	Yes
	Regression	Statistics		
R square			F(1,64)	Relevant
0.4083			41.41	Yes

Table 10 : Output Summary for Period from 1951-52 to 1965-66

	Coefficients	Standard Error	t stat	Significance
Intercept	2.625983336	0.260251591	10.09017207	Yes
Agriculture	0.468985147	0.039512873	11.86917357	Yes
	Regression	Statistics		
Multiple R	0.956826574		F	Relevance
R square	0.915517093		140.8772811	Yes
Adjusted R square	0.909018408			
	Anova	Table		
	SS	df	MS	
Regression	129.6640756	1	129.6640756	
Residual	11.96525777	13	0.9204044438461	
Total	141.6293333	14	10.11638095	

Table 11 : Output Summary for Period from 1966-67 to 1979-80

	Coefficients	Standard Error	t stat	Significance
Intercept	2.331373762	0.332840219	7.004483326	Yes
Agriculture	0.423055262	0.037547734	11.26713162	Yes
	Regression	Statistics		
Multiple R	0.955843562		F	Relevance
R square	0.913636915		126.9482546	Yes
Adjusted R square	0.906439991			

	Anova	Table	
	SS	df	MS
Regression	180.68932	1	180.68932
Residual	17.07996571	12	1.42333047583333
Total	197.7692857	13	15.2130219769231

Table 12 : Output Summary for Period from 1980-81 to 1990-91

	Coefficients	Standard Error	t stat	Significance
Intercept	4.144286686	0.35988771	11.51549935	Yes
Agriculture	0.306134244	0.046699655	6.555385494	Yes
	Regression	Statistics		
Multiple R	0.909303814		F	Relevance
R square	0.826833426		42.97308	Yes
Adjusted R square	0.807592696			
	Anova	Table		
	SS	df	MS	
Regression	39.06412107	1	39.06412107	
Residual	8.181333477	9	0.909037053	
Total	47.24545455	10	4.724545455	

Table 13 : Output Summary for Period from 1991-92 to 2016-17

	Coefficients	Standard Error	t stat	Significance
Intercept	5.76877533	0.397015102	14.53036747	Yes
Agriculture	0.247070213	0.075787136	3.260054749	Yes
	Regression	Statistics		
Multiple R	0.554002161		F	Relevance
R square	0.306918395		10.62796	Yes at 1% l.o.s
Adjusted R square	0.278039995			
	Anova	Table		
	SS	df	MS	

Regression	30.13619914	1	30.13619914
Residual	68.05341625	24	2.8355590104166
Total	98.18961538	25	3.9275846152

Table 14 : Output Summary for Period from 1951-52 to 1979-80

	Coefficients	Standard Error	t stat	Significance
Intercept	2.495398445	0.207958593	11.99949665	Yes
Agriculture	0.43905076	0.026764176	16.40441898	Yes
	Regression	Statistics		
Multiple R	0.953318477		F	Relevance
R square	0.908816118		269.104962	Yes
Adjusted R square	0.905438937			
	Anova	Table		
	SS	df	MS	
Regression	308.6327	1	308.6327	
Residual	30.96592065	27	1.14688595	
Total	339.5986207	28	12.128522167857	

Table 15 : Output Summary for Period from 1966-67 to 1990-91

	Coefficients	Standard Error	t stat	Significance
Intercept	2.967632	0.290375	10.21998	Yes
Agriculture	0.400799	0.034673	11.55939	Yes
	Regression	Statistics		
Multiple R	0.92366		F	Relevance
R square	0.853147		133.6194	Yes
Adjusted R square	0.846762			
	Anova	Table		
	SS	df	MS	
Regression	233.4736	1	233.4736	
Residual	40.18797	23	1.7473030434782	
Total	273.6616	24	11.4025666666666	

Table 16 : Output Summary for Period from 1980-81 to 2016-17

	Coefficients	Standard Error	t stat	Significance
Intercept	5.34314638	0.322048152	16.59114124	Yes
Agriculture	0.254109404	0.052987293	4.795666875	Yes
	Regression	Statistics		
Multiple R	0.629710483		F	Relevance
R square	0.396535293		22.99842077	Yes
Adjusted R square	0.379293444			
	Anova	Table		
	SS	df	MS	
Regression	60.28446871	1	60.28446871	
Residual	91.74353429	35	2.621243836857	
Total	152.028003	36	4.223000083333	

Table 17 : Growth Rates in Gross Domestic Product by Economic Activity at Constant (2004-05) Prices

Period	GDP at Factor Cost	Agriculture	Manufacturing	Service
1951-52	2.3	1.6	3.2	2.67
1952-53	2.8	4.2	3.5	3.11
1953-54	6.1	9	7.7	2.86
1954-55	4.2	2.8	7	4.71
1955-56	2.6	-1.5	7.8	4.96
1956-57	5.7	6	7.5	4.60
1957-58	-1.2	-5.1	3.9	3.76
1958-59	7.6	11.2	5	4.12
1959-60	2.2	-1.5	6.8	4.96
1960-61	7.1	7.3	8.3	5.66
1961-62	3.1	-0.3	8.5	5.36
1962-63	2.1	-2.1	7.3	5.65
1963-64	5.1	1.9	9.5	5.94

1964-65	7.6	10.3	6.9	5.75
1965-66	-3.7	-13.5	0.9	2.80
1966-67	1	-2.3	0.8	3.1
1967-68	8.1	17.1	0.4	3.81
1968-69	2.6	-0.3	5.5	4.58
1969-70	6.5	7.2	10.7	5.16
1970-71	5	7.4	2.3	4.95
1971-72	1	-2.7	3.3	3.68
1972-73	-0.3	-5.6	3.9	2.94
1973-74	4.6	8.4	4.4	3.25
1974-75	1.2	-2.8	2.9	4.12
1975-76	9	14.2	2.1	6.65
1976-77	1.2	-6.1	8.8	4.64
1977-78	7.5	12.5	6.2	4.94
1978-79	5.5	2	12.4	6.68
1979-80	-5.2	-13.4	-3.2	2.20
1980-81	7.2	14.4	0.2	4.62
1981-82	5.6	4.8	8.2	5.19
1982-83	2.9	-0.1	3.3	7.13
1983-84	7.9	10.8	10.2	5.72
1984-85	4	1.5	4.2	6.10
1985-86	4.2	0.2	3.2	7.67
1986-87	4.3	-0.4	5.5	7.59
1987-88	3.5	-1.7	5.6	6.35
1988-89	10.2	16.8	8.5	6.95
1989-90	6.1	0.4	8.8	8.88
1990-91	5.3	4.3	4.8	5.19
1991-92	1.4	-2.3	-2.4	4.69
1992-93	5.4	7.1	3.1	5.69
1993-94	5.7	3.2	8.6	7.38
1994-95	6.4	4.7	10.8	5.84

1995-96	7.3	-1.0	15.5	10.11
1996-97	8	10.4	9.5	7.53
1997-98	4.3	-3.0	0.1	8.93
1998-99	6.7	7.1	3.1	8.28
1999-00	8	2.4	5.4	12.05
2000-01	4.1	-0.6	7.3	5.07
2001-02	5.4	6.5	2.3	6.61
2002-03	3.9	-8.1	6.9	6.74
2003-04	8	10.8	6.3	7.89
2004-05	7.1	0.1	7.4	8.28
2005-06	9.5	5.5	10.1	10.91
2006-07	9.6	4.1	14.3	10.06
2007-08	9.3	6.3	10.3	10.27
2008-09	6.7	-0.3	4.3	9.98
2009-10	8.6	0.4	11.3	10.50
2010-11	8.9	9.5	8.9	9.67
2011-12	6.7	5.3	7.4	6.57
2012-13	4.5	0.9	1.1	6.96
2013-14	5.083333333333333	3.36	1	N/a
2014-15	6	-0.12	1.66	N/a
2015-16	6.583333333333333	0.42	2.16	N/a
2016-17	5.5	2.94	1.58	N/a

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STRIDES – A STUDENTS' JOURNAL OF SHRI RAM COLLEGE OF COMMERCE

HISTORY OF THE JOURNAL

The idea to launch this Journal was discussed in December 2016 by the former Officiating Principal, **Dr. R.P. Rustagi** with **Dr. Santosh Kumari**, the Editor of the Journal. Since the idea appealed to **Dr. Santosh Kumari**, she took the initiative to contribute to SRCC by creating this new academic research Journal and took the responsibility for its Creation, Registration, License and ISSN (International Standard Serial Number) etc. along with *Editorship*. Therefore, **Dr. Santosh Kumari, Assistant Professor in the Department of Commerce, Shri Ram College of Commerce** was appointed as the Editor of the Journal vide. Office Order – SRCC/AD-158/2017 dated March 14, 2017. She meticulously worked hard in creating the concept and developing the structure of the Journal. She introduced the concept of COPE (Committee on Publication Ethics) to maintain high academic standards of publication.

On behalf of the college, **Dr. Santosh Kumari** made every effort in seeking License from Deputy Commissioner of Police (Licensing), Delhi to register the Journal at "The Registrar of Newspapers for India, Ministry of Information and Broadcasting, Government of India". The paper work for seeking license started under the former Officiating Principal, **Dr. R.P. Rustagi** on March 27, 2017. The foundation Issue of the Journal "**Strides – A Students' Journal of Shri Ram College of Commerce, Volume 1, Issue 1, 2016-17**" was successfully released on the 91st Annual Day of SRCC held on April 13, 2017 by **Shri Prakash Javadekar, Hon'ble Union Minister of Human Resource Development, Government of India**. The title of the Journal got verified and approved by the Registrar of Newspapers for India, Ministry of Information and Broadcasting, Government of India on April 21, 2017. On September 1, 2017, **Prof. Simrit Kaur** joined SRCC as Principal and signed each and every legal document required for further processing and supported **Dr. Santosh Kumari**.

On December 18, 2017, the College got the license "**License No. - DCP / LIC No. F. 2 (S / 37) Press / 2017**" to publish 'Strides – A Students' Journal of Shri Ram College of Commerce'. Due to change of Printing Press, the License got updated on March 09, 2018. On April 26, 2018, the SRCC Staff Council unanimously appointed **Dr. Santosh Kumari** as the '**Editor of Strides**' for the next two academic years.

On April 27, 2018 (The Foundation Day of the College), **Dr. Santosh Kumari** submitted the application for the registration of the Journal. On May 04, 2018, the college received the 'Certificate of Registration' for Strides – A Students' Journal of Shri Ram College of Commerce and got the **Registration No. DELENG/2018/75093** dated May 04, 2018. ***On behalf of SRCC, it was a moment of pride for Dr. Santosh Kumari to receive the 'Certificate of Registration' on May 04, 2018 at the Office of Registrar of Newspapers for India, Ministry of Information and Broadcasting, Government of India (website - www.rni.nic.in).***

On May 07, 2018, **Dr. Santosh Kumari** submitted the application for seeking ISSN (International Standard Serial Number) at "ISSN National Centre – India, National Science Library, NISCAIR (National Institute of Science Communication and Information Resources). Weblink - <http://nsl.niscair.res.in/ISSNPROCESS/issn.jsp>". Finally, the College received the International Standard Serial Number "**ISSN 2581-4931 (Print)**" on June 01, 2018.

We are proud that this journal is an add-on to the enriched catalogue of SRCC's publications and academic literature.

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