

## SHRI RAM COLLEGE OF COMMERCE

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# STRIDES - A STUDENTS' JOURNAL OF SHRI RAM COLLEGE OF COMMERCE

VOLUME 4 – ISSUE1 & 2

JULY 2019 - JUNE 2020

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ISSUE 1 & 2

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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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To maintain high *academic standards, academic ethics and academic integrity* each research paper received by COPE (Committee on Publication Ethics) is sent for screening of plagiarism on "Turnitin". The committee adheres to the maximum tolerance limit of 25%.

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- 2. Name(s) of the student(s) and mentor along with their details
- 3. Abstract
- 4. Keywords

#### Abstract

The abstract should capture the essence of the article and entice the reader. It should typically be of 100 - 150 words, and in Italics.

#### Font type and word limit

The research paper is to be typed on A-4 size paper with single line spacing. The complete length of the paper should not exceed 5000 words including endnotes and references. The font size should be 12 and font style should be Times New Roman.

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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

#### Endnotes

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

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#### Table, Figures, Graphs

The first letter of the caption for table, figure, graph, diagram, picture etc. should be in capital letter and the other words should be in small letter - e.g. Table-1: Demographic Data of Delhi, Figure-1: Pictorial Presentation of Population etc.

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#### Hard Copy

The hard copy (3-Sets) of the manuscripts should be submitted in the Administrative Office of the College.

#### Declaration

As part of the submission process, the student and mentor needs to declare that they are submitting original work for first publication in the Journal and that their work is not being considered for publication elsewhere and has not already been published elsewhere. Again, the paper should not have been presented in any seminar or conference. The scanned copy of duly signed declaration by the students and their respective mentors has to be emailed along with the research paper.

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## **Principal's Message**



To achieve and promote excellence in research and publish quality academic as well as educational resources as guided by the Mission Statement of the College, Shri Ram College of Commerce had launched a Journal, "Strides- A Students' Journal of Shri Ram College of Commerce" on the occasion of 91st Annual Day of the College held on 13th April, 2017. The Journal was released by then the Hon'ble Union Minister of Human Resource Development, Shri Prakash Javadekar. The Journal publishes the research papers and articles written by students of the College under the mentorship of Faculty Members which go through an intense review mechanism before getting published.

Through the Journal, students get an excellent platform to enhance their research calibre, display their academic perspective, and practically apply their classroom learnings to real-world situations. The present Issue includes several multi-disciplinary and contemporary topics such as "Quantum computing: A futuristic frontier in the financial sector", "Unfolding the Global Hunger Index 2020", "Role of Monetary and Fiscal policies during Covid-19: India and Comparative Analysis", "An analysis of macroeconomic and bank-specific causes for burgeoning NPAs in India", "The political leaning paradox", and "Reengineering climate change solutions through carbon credit trading".

I wholeheartedly congratulate the Editor, Strides, Dr. Rajeev Kumar and students whose research papers got published in Volume 4 Issue 1 & 2 of the Journal. Simultaneously, I encourage more students to contribute their research papers for the successive Issues.

My best wishes for your future endeavours!

Prof. Simrit Kaur Principal



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## **Editor's Message**

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 acknowledges and values the role of research in education and is firmly committed to develop and encourage an inclination towards research in both faculty and students. To reaffirm this ethos, the College has taken the initiative to launch a new Journal named 'Strides - A Students' Journal of Shri Ram College of Commerce' to encourage students to pursue research under the guidance of the faculty of Shri Ram College of Commerce.

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 is the apex authority which authorises over all the decisions related to publication of research papers and articles in Strides. The recommendations and decision of COPE is 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 absolutely original and not published or presented in any form 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, Honb'le Union Minister of Human Resource Development, Government of India. The successive issues of 'Strides - A Students' Journal of Shri Ram College of Commerce' have been released biannually. However, due to the COVID19 pandemic and ensuing lockdowns the current issue has been delayed.

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.



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#### STRIDES - A STUDENTS' JOURNAL OF SHRI RAM COLLEGE OF COMMERCE

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# Environmental Impact of Fertilizer and Power Subsidy

#### ABSTRACT

Subsidies had evolved as an important component of Indian agriculture system over the years. After independence, India's population was growing at a faster rate in order to fulfil the food requirement for the masses, food production was given the highest priority. The government played a proactive role, it incentivized farmers through various kinds of subsidies to achieve selfsufficiency in food production. The rapid progress in food production is credited to the Green Revolution. But this journey had deepened some environmental issues. The objective of this paper is to study the environmental impact of agricultural subsidies mainly fertilizer and power subsidies in India. This paper analyses the work of various researchers.

**Keywords:** Eutrophication, Greenhouse Gases, Over-exploitation, Leaching, Nutrient Loss, Fertilizer Subsidy, Power Subsidy

#### **INTRODUCTION**

India, in the last 70 years, has transformed itself in the agriculture sector. At one time India was being labelled as "*ship to mouth*", due to heavy reliance on imports for food grains, but now we are one of the major net exporters for agricultural commodities [Gulati & Saini, 2017]. The performance of agriculture and allied sectors continues to be critical for India's growth story as it ensures food security to about 1.37 billion people, engages more than 54.6% of the workforce and makes a contribution of about 17.8% to the country's Gross Value Added (GVA) [Source: Economic Survey, 2020-21].

This sector, however, encounters complex and often contradictory dynamics as evident from increasing agricultural production and a persistent agrarian distress in different parts of the country. The volatile nature of agriculture due to its heavy reliance on weather conditions, makes it difficult for farmers to earn their livelihood. After independence, though agriculture played a dominant role in Indian economy, agricultural yields were very low and food shortages were frequent, which were solved by the Green Revolution [Tongia 2003, World Bank]. Agriculture sector in India is heavily dependent on subsidies as it supplements the income of the farmer. However, these agricultural subsidies had several shortcomings, according to the **National Institute of Public Finance & Policy** "Subsidies in India are unduly larger, non-transparent, largely input based, poorly targeted, generally regressive & inducing waste & misallocation of resources".

## **TYPES OF AGRICULTURAL SUBSIDIES IN INDIA**

*Input Subsidies* - These are subsidies granted through distribution of inputs at prices that are less than the standard market price for these inputs. Input subsidies are given to the farmers mainly in the form of fertilizer subsidy, power subsidy, agricultural equipment's subsidy, irrigation subsidy, seed subsidy, credit subsidy.

*Price subsidy* - It includes mechanisms such as Minimum Support Prices (MSPs) at which the government procures food grains from farmers at a higher price than its market price.

*Infrastructural subsidy* - Government allowing use of public goods such as roads, storage facilities, power, information about the market, transportation to the ports, etc. at lower prices to the farmers.

Export Subsidy - Subsidies provided to encourage exports of specific

agricultural products. It also gives a comparative advantage to our commodities in the international market.

## FERTILIZER SUBSIDY

Fertilizer is a nutrient enriching material, applied to soils or plants in order to fulfill nutrient deficiency, and increase productivity to get maximum output from the plants/crops. With only marginal increase in acreage, the increase in productivity levels play a vital role in the growth of the agriculture industry, as fertilizers account for at least half the crop yield. India has the largest area of arable and permanently cropped land in the world, but, on account of low crop productivity, India still ranks 3rd in case of food-grain production after China and the US [Cassey, 2020].

India's fertilizer consumption had been rising, owing to limited arable land and increasing food demand as the result of increase in population growth. India is the 4th largest producer as well as consumer of fertilizer in the world [Shumacher & Sathye, 1999]. These fertilizers contain three crucial elements required in order to boost the production, i.e., Nitrogen (N), Phosphorous (P) and Potassium (K). These fertilizers are effective only when they are applied in optimal ratio, specific to the local soil and climatic conditions. ICAR had recommended an ideal ratio for N:P:K to be 4:2:1; any diversion from this ratio had a negative effect on the soil. In India, farmers have access to fertilizers below the price of what it actually costs to produce.

Due to the low cost of fertilizer for farmers, it is being misused and diverted for non-agricultural uses. It also limits the expenditure by the government on other sectors, as the government needs to pay a huge subsidy. Fertiliser subsidy increased 88 percent during 2020-21 to Rs 133,947 crore in a revised estimate from Rs 71,309 crore in the budget estimate. The provision for fertiliser subsidy during 2021-22 was kept at Rs 79,530 crore (Source: Ministry of Chemicals & Fertilizers). Together, it is one of the top three subsidies that the government gives on food, fertilizer and fuels.

YEAR	Sub	osidy Released	Total Subsidy	
	Urea P & K Fertilizers		(including city composi)	
			Disbursed	
2016-17	51,256.59	18,842.87	70100.01	
2017-18	46,953.70	22,237.00	69197.96	
2018-19	49,344.86	24,080.35	73435.21	
2019-20	54755.49	26368.85	81124.33	
2020-21*	94957.42	38080.88	133947.30	
2021-22**	58,767.81	20762.00	79529.68	

### Subsidy released during 2016-17 - 2021-22

Source: Department of fertilizers, Ministry of Chemicals & fertilizers

\* - Revised Estimate ; \*\* - Budget Estimate

#### **Environmental Concerns due to Fertilizer Subsidy**

#### **Air Pollution**

India's fertilizer industry is classified under the **"red category"** of polluting sectors by the Central *Pollution Control Board of India* (CPCB). According to CPCB, fertilizer industry in India can be categorised into three i.e., Phosphatic fertiliser, Nitrogenous fertiliser, and Complex fertiliser. Pollutants like sulphur dioxide, fluoride, and particulate matter are released from phosphatic fertiliser plants. Nitrogenous fertiliser plants are also a source of pollutants like SO2 & NOx, in addition they also release emission of ammonia. Cyanide is produced from ammonia plants when a partial oxidation process is followed. These plants are a major source for arsenic effluents. Naphtha-based fertilizer plants or those with fuel oil or coal-based captive power plants are associated with high carbon emissions and air pollution.

#### **Greenhouse Gas Emissions**

High application rate of chemical fertilizer for enhancing crop production is generating numerous harmful greenhouse gases, depleting the protective ozone

layer hence exposing the humans to harmful ultraviolet rays. Agricultural practices are a major source for greenhouse gases, it contributes around 10-12% of total greenhouse gas (GHG) emissions, emits nearly 60% of nitrous oxide and around 50% of methane. Methane emissions from transplanted paddy fields is also a serious concern, as methane is a potent greenhouse gas and its concentration is increased by the application of ammonium-based fertilizers. Compared to CO2, methane has 28 times more potential for global warming [Lenka, Dotaniya, & others, 2016]. All these emissions contribute to global climate change. Nitrogen use efficiency in India is very low, at below 35% in lowland rice and under 50% in upland crops. The rest of nitrogen is lost to the environment which can become nitrous oxide, a *greenhouse gas* (GHGs) contributing to climate alterations, or nitrogen oxide, which contributes to Photochemical smog and ground-level ozone [Chandini, Kumar & Prakash, 2019]. There was a report by FAO, which predicts that by 2030 N20 emissions are bound to increase by 35-60%, due to increased consumption of nitrogen fertilizer.

#### **Water Pollution**

Wastewater generated at urea plants contains nitrogen, and cyanides in varying concentrations, which can lead to groundwater and surface water pollution, if not treated properly. Excess nitrogen and phosphorus can be washed from farm fields and into waterways and can also leach through the soil into groundwater over time. High levels of nitrogen and phosphorus can cause *eutrophication* of water bodies, which can lead to hypoxia ("dead zones"), causing fish kills and a decrease in aquatic life. Excess nutrients can also produce *harmful algal blooms* (HABs) in freshwater systems, which not only disrupt wildlife but can also generate toxins harmful to humans. Since nitrate is the most common form of nitrogen present in water. Excess concentration of nitrate (>50 mg NO3/L) in drinking water causes many health related issues like blue baby syndrome in infants, gastric cancer, birth defects, heart disease etc. In India, the permissible level of Nitrate is 45 mg NO3/L, but this limit has been surpassed in 11 states, covering 95 districts and two blocks of Delhi [Lenka, Dotaniya, & others, 2016].

#### **Soil Pollution**

For short term gains, farmers tend to use fertilizer recklessly without considering its adverse impact on the soil. Fertilizers more than

recommended lead to formation, accumulation and concentration of mineral salts of fertilizers which results in compaction of layer and soil degradation for long term [Chandini, Kumar, Prakash, 2019]. Overuse of fertilizers has led to problems such as soil acidification and soil crust which further reduces productivity of the soil. It also causes a change in pH level of the soil. Beside this, acidification changes the ratio of natural nutrient contents, which inhibits the growth of crops. Excessive use of fertilizers, brings widespread deficiency of micronutrients like Magnesium, Copper, Zinc etc.

#### **Disruption in Optimum Nutrient Requirement**

In 1992, the government decontrolled the prices of Phosphatic & Potassic (P&K) fertilizers on the recommendation of Joint Parliamentary Committee (JPC), in order to reduce its subsidy bill. After that prices of P&K fertilizer shot up, but urea consumption increased many times due to low cost. The prices of urea have been constant over a long period of time, while P & K prices erupted after 2010-11, when a nutrient-based subsidy scheme was accepted for P & K, but not for nitrogenous fertilizers. This further aggravated the N, P & K dis-balance in certain regions such as Punjab & Haryana. Indicating large inefficiency in the use of chemical fertilizers and the current ratio for N:P:K is approx. 6.6 :2.6 :1 (2016-17), which shows a huge variance from the optimal ratio i.e., 4 : 2 : 1, due to lowering in price of urea. [According to *Indian Council of Agricultural Research (ICAR)*]

S.No.		1991-92	2000-01	2012-13	2013-14	2014-15	2015-16	2016-17
1	Nitrogenous (N)	80.46	109.2	168.21	167.50	169.46	173.72	167.35
	Phosphatic (P)	33.21	42.15	66.53	56.33	60.98	69.79	67.05
	Potassic (K)	13.61	15.67	20.62	20.99	25.32	24.02	25.08
	Total (N+P+K)	127.28	167.02	255.36	244.82	255.76	267.53	259.49
2	Consumption of NPK, (Kg/Ha)	69.84	89.63	131.36	118.49	127.45	130.66	123.41

#### **Consumption of fertilizers**

Source: Department of Agriculture, Cooperation and Farmers Welfare (DAC&FW)

#### **Diversion of fertilizer**

Being super-subsidised, urea is always prone to diversion for non-agricultural use - as a binder by plywood/particle board makers, cheap protein source by animal feed manufacturers or adulterant by milk vendors - apart from being smuggled to Nepal and Bangladesh. When urea is used as an adulterant, it causes many health-related problems, like dermatitis and also high concentration can be damaging.

#### Government initiative to control menace of fertilizer subsidy

**New Urea Policy - 2015:** it was launched by the Department of fertilizers with the objective to maximize the indigenous urea production, promote energy efficiency in urea production and rationalize subsidy burden.

**Neem coating of Urea**: Department of Fertilizers has made it mandatory for all the domestic producers of urea to produce 100% Neem Coated Urea with an extra MRP of 5% to be charged by the fertilizer manufacturing entities from farmers. It is done in order to curb diversion of urea towards industrial use, it also increases efficiency of the soil, reduces pollution as neem coated urea gets dissolved easily. Due to its multi-pronged benefits, the government is promoting neem coated urea for agricultural usage.

**Nutrient based subsidy scheme**: Initiated in 2010, a fixed amount of subsidy decided on an annual basis is provided on each grade of subsidized Phosphatic & Potassic fertilizers based on its nutrient content. It is being implemented by the Department of Fertilizers, under the Ministry of Chemical & Fertilizers.

**Promotion of City Compost** - This is going to be a game changer for our cities, as it will be converting landfill/dumpsite waste into useful by-products. This will also prevent production of harmful greenhouse gases and toxic material that pollutes groundwater and environment both. If it is implemented properly it will give better output.

**Biofertilizer** - it contains living microorganisms; it expands the root system and germinates better seeds. They are also known as microbial inoculants. They help in improving soil fertility and crop productivity. Rhizobium, Azotobacter, Azospirillum are some of the best biofertilizers [Ghosh, 2003].

**Organic manure** - Government is promoting the use of Organic manures under the scheme *Paramparagat Krishi Vikas Yojana* (PKVY) of *National Mission for Sustainable Agriculture* (NMSA). It is doing so by providing various kinds of incentives to the beneficiaries.

**Soil Health Management** is also important to control usage of fertilizers. Government is trying to make available scientific tools to the farmers in order to check soil fertility, also the government is giving soil health cards after analysing the soil nutrient contents, so that only need based fertilizers are used.

#### **Power Subsidy**

After independence the government constructed dams, canals and other water bodies through a planned process, in order to provide water to farmers for irrigation purposes. But this couldn't solve the issue of farmers, as dams and canals cater to only small farmers and in addition there were some natural barriers to it also, like India has only 4 percent of the world renewable water resources (DAC&FW), uneven distribution of rainfall in India and that's too for short period of time.

Since rainfall in India is uneven and unreliable, therefore farmers prefer to use pump sets more as it has dual benefit, it is independent from any seasonal variation, & can be used at any point of time, due to which there has been energization of pump sets in Indian Agriculture System. In our agricultural practices groundwater has been a major source for irrigation, according to a report by DAC & FW, groundwater accounts for 60% of irrigated land. There has been a sharp growth in electricity use in the agriculture sector, especially after the 1980s with consumption rising from 8% of total consumption in 1969 to 17% in 2016 (DAC&FW). Close to 85% of pumping energy used in agriculture comes from electricity, the rest being mainly from diesel. This is supplied either free or at subsidised rates, and a large part of it is not metered. This power subsidy has a dual impact; it increases the fiscal deficit of the government and limits its expenditure on other sectors, and it has a negative impact on our environment.

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There is a strong linkage between electricity, water and agricultural policy. There has been a shift in cropping pattern in many regions as now farmers have almost free access to groundwater using electric tube wells. They are now able to grow more water-intensive crops. A study done by S. Chatterjee, Rohit Lamba & Esha Zaveri in M.P highlights that an increase in MSP for wheat by the government leads to more extraction of groundwater, as farmers shifted from less water intensive crops to more water intensive crop i.e., wheat [Chatterjee, Lamba, Zaveri, 2017].



#### Various source of irrigation in 2014-15

(Net Irrigated Area 68 Million Ha)

Source: Land use statistics (2014-15)

## **CONCERNS WITH POWER SUBSIDY**

#### **Overexploitation of Groundwater**

Power subsidy for irrigation leads to excessive groundwater usage that is already visible in states such as Punjab & Haryana. The over-exploitation of groundwater is highest in Punjab, where 79% of groundwater reservoirs are

over-exploited, followed by Delhi (65%), Rajasthan (63%), Haryana (61%) [Department of Water Resources]. The overexploitation of groundwater, had led to a decrease in water-table. Groundwater extraction in India had increased by 18% between 1995 and 2004, and also the number of over-exploited districts - those in which annual demand exceeds annual recharge - grew by 18%. [Badiani & Jessoe, 2013]. Power subsidies had a direct relation with groundwater extraction.

#### Loss in Fertility of Soil

With the energization of pumps, farmers now had access to water most of the time for irrigation due to which they use it irrationally, without giving a second thought about its adverse impact. Excessive use of surface water leads to drainage problems, which in turn leads to water logging in some areas. Water logging is mainly caused due to poor maintenance of the canal and other water bodies used for irrigation.

#### Virtual water trade

Virtual water trade refers to the import and export of hidden water in the form of products such as crops, textiles, machinery and livestock - all which require water for their production. India had been losing water virtually due to its large agricultural exports, which put water availability at risk [Vidhya & Elango, 2019].

#### No incentive for farmers to use it efficiently

Enabling farmers to access electricity by providing power subsidies by the government, has deviated its use prone to irrationality as they are not needed to pay the electricity bills. Thus, declining its efficient usage.

#### Loss to electricity boards

Power subsidy had impacted the balance sheet of many DISCOMs. Since the government gives subsidies to farmers on power, DISCOMs are compelled to provide free electricity, but the government is unable to compensate DISCOMs on time, in most of the cases, which affects the performance of these companies.

#### Water pollution

Excessive use of fertilizers when combined with over-exploitation of water resources causes water pollution, which over a period of time settles with water in ground, which depletes the quality of soil available for farming.

#### Government initiatives to resolve the issue of power subsidy

PMKSY - (Pradhan Mantri Krishi Sichayi Yojana)

It was launched with the aim to improve the irrigation system in India, expand cultivable areas under assured irrigation, and minimize wastage of water during the irrigation process. Its motto **"more crop per drop"** is self-explanatory. It also focuses on introducing new technology in the irrigation system in order to make irrigation sustainable and enhance recharge of aquifers. It had following major components;

- Accelerated Irrigation Benefit Program (AIBP) & Command Area Development and Water Management - focus on faster completion of ongoing irrigation projects.
- *PMKSY (Har Khet Ko Pani)* focuses on restoration/renovation of water bodies.
- *PMKSY (Per Drop More Crop)* focuses on micro level storage structures.
- *PMKSY (Watershed)* focuses on ridge area treatment and many more other structures.

**Drip irrigation system** - In drip irrigation, water is applied near the plant root through emitters or drippers, on or below the soil surface, at a low rate varying from 2-20 litres per hour. The soil moisture is kept at an optimum level with frequent irrigation. Under PMKSY, the government is trying to increase the usage of drip irrigation methods in order to maximize benefits and minimize losses.

**Micro Irrigation Fund** - created by National Bank for Agriculture and Rural Development, with a corpus of ₹ 5,000 crore, implemented from 2019-2020. It aims to expand the coverage of micro irrigation facilities by providing interest subvention on loans by states.

#### SDGs Goals & Indian Agricultural Practices

For the sake of the economy we can't sacrifice our environment. The ambitious target of sustainable development goals by 2030, to fight against climate change, is being chased by all nations. Among the 17 measurable SDGs set by UNGA, to tackle modern global challenges by 2030, agriculture forms the nucleus of all goals directly or indirectly. SDGs aims to eradicate poverty, achieve zero hunger and many other goals, which can be achieved only when we have food security, but due to limited arable land, more and more chemicals and fertilizers are being employed, in addition groundwater is also used in an exploitative manner.

The need of the hour is to bring more innovation, and modern techniques for agricultural farming, which are sustainable. The goals of the 21st century can't be achieved with the tools of the 20th century, we can't rely only on chemicals & fertilizers to increase productivity. If we want to achieve SDGs by 2030, we need to ensure that our agricultural practices are also sustainable.

## CONCLUSION

In today's scenario, mankind is facing a dilemma, on one hand there is limited arable land available for farming, but on the other hand the food requirement is rising by many folds, and in order to achieve food security, we need to increase food production. Total exclusion of fertilizer is not the solution, but excessive usage can be controlled and need to practice sustainable agricultural practices. It is important to use a scientific and systemic problem identification approach so as to understand the fertilizer and water requirement of the soil. Government is promoting the adoption of modern scientific tools which could reduce losses and maximize benefits for farmers. It is trying to make modern equipment accessible to all. There is a need to cut subsidies in order to reduce groundwater extraction, 10% reduction in average subsidy which amounts to roughly a 50% increase in price of electricity, would lead to 6.6% reduction in groundwater extraction [Badiani & Jesso, 2013]. At last but not the least, we can say that government welfare programs should be multi-perspective, it should consider all the impacts of the program, which might arise in future. Giving subsidies is not always the solution, there have been many cases in which subsidies have been diverted. We need to cut subsidies on power and fertilizers as these have an adverse impact on human health, and it impacts the environment in a negative manner. These are acting as impediments in achieving *17 Sustainable Development Goals by 2030*, which India intends to achieve. The need of the hour is to use sustainable methods in the agricultural system. Indian farmers need to diversify their crop patterns, they need to change with change in the climate, relying on the past practices would cause misery to them.

## REFERENCES

- Economic Survey 2020-21, Ministry of Finance, Government of India
- Ashok Gulati and Shweta Saini "25 Years of Policy Tinkering in Agriculture", Rakesh Mohan (ed), India Transformed, Penguin (Viking), 2017
- Jessica Casey "India's Fertilizer under Pressure", World Fertilizer, September 24, 2020
- Katja Schumacher and Jayant Sathaye "India's fertilizer industry; Productivity and energy efficiency", The evolution of the US ESCO industry, From ESCO to SuperESCO, 1999
- S. Lenka, S. Rajendira, M. V. Coumar, M.L Dotaniya and J.K Shah, "Impact of fertilizer use on Environmental Quality", 2016
- Chandini, R. Kumar and O. Prakash, "Impact of chemical fertilizers on our environment and ecosystem" Research Trends in Environmental Sciences (pp.69-86) Edition: 2nd, Chapter: 5,2019
- **S. Chatterjee, R. Lamba, E. Zaveri**, "The water gap; environmental effects of agricultural subsidies in India", www.rohitlamba.com, 2017
- **R. Badiani, K. Jesso**; "The impact of electricity subsidies on groundwater extraction & agricultural production", www.economics.ucdavis.edu, 2013
- K.S Sree Vidhya, L. Elango.; "Temporal variation in export and import of virtual water through popular crop and livestock products by India" Agris; FAO (2019)

• **N Ghosh**; "Promoting bio-fertilizer in Indian Agriculture"; Economic and Political Weekly (2003)

#### **DATA REFERENCES**

- Annual Review of Fertilizer Production Consumption 2019-20
- Parivesh: A newsletter from Envis Centre; Central Pollution Control Board
- State of Indian Agriculture, 2017 by Department of Agriculture, Cooperation & Farmers Welfare (DAC&FW), Ministry of Agriculture & Farmers Welfare, Gol
- mowr.gov.in ; Department of Water Resources, Ministry of Jal Shakti www.icar.org.in; Indian Council of Agricultural Research (ICAR);
- fert.nic.in; Department of Fertilizer, Ministry of Chemicals & Fertilizers, Gol
- Economic Survey 2020-21, Ministry of Finance, Government of India

# STRIDES - A STUDENTS' JOURNAL OF SHRI RAM COLLEGE OF COMMERCE ISSN 2581- 4931 (PRINT)

#### **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 the high academic standards of publication.

On behalf of SRCC, **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, Honb'le 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 SRCC 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 Shri Ram College of Commerce, 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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## **RELEASE OF FOUNDATION ISSUE OF STRIDES**



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, Honb'le Union Minister of Human Resource Development, Government of India.



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