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Impact of Subsidies on Indian Agriculture

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Abstract- Agriculture plays a crucial role in India's economy, supporting approximately 55% of rural households and contributing about 18% to the nation's GDP. At the time of independence, the agricultural sector was underdeveloped, with limited land dedicated to key crops. In response, the Indian government implemented programs to modernize farming by introducing high-yielding seed varieties, fertilizers, mechanization, and irrigation. However, higher the costs of these modern techniques presented challenges for many farmers. To make agricultural inputs more affordable to the farmer, the government introduced subsidies based on recommendations from the Food Grain Price Committee. While subsidies are essential for addressing market inefficiencies and promoting societal benefits like poverty alleviation and food security, they are often criticized for issues like poor targeting and governance challenges. In spite of this fact, subsidies have significantly influenced agricultural production, particularly during the Green Revolution. As India moves toward sustainable agricultural development, subsidies remain a vital tool for balancing economic, environmental, and social objectives.

Index Terms- Subsidy, Government, inputs, productivity, Fertilizers, Policy

I. INTRODUCTION

Agriculture is one of the most important sector of Indian economy. Approximately 55% of rural households depends on agriculture as their primary source of income. Approximately 18% of the nation's GDP is derived from agriculture and related industries (Anonymous, 2019–20). The Indian agricultural sector was in impoverished conditions on the eve of independence, with only 69% of the country's land under rice, 65% under wheat, and 75% under all grains, compared to 82% of the country's entire population living in undivided India (Chahal, 1999). Because of this, the Indian government took a proactive approach and was instrumental in the growth of the agriculture industry after independence (Kumar 2020).

Adopting innovative agricultural techniques is more expensive in India than using existing farming methods. The least expensive inputs are used in traditional methods; however, high-yielding seed varieties, fertilizers, farm mechanization, and irrigation are among the most expensive inputs used in modern technology, and Indian farmers, who are often struggling, cannot afford to purchase these expensive inputs.

Afterwards, the Government of India initiated a plan of subsidies on the purchase of various agricultural inputs to aid farmers, based on the recommendations of the Food Grain Price Committee (Jha Committee) (Kaur & Sharma 2020). The discussion on the subject of agricultural subsidies got underway with Dr. Madhur Gautam's keynote speech. In his speech, he emphasized that in theory, subsidies are acceptable in situations where there are deficiencies in the market. Moreover, some agricultural operations may be eligible for subsidies, particularly if there are notable externalities that increase societal benefits above and beyond personal gains and the expense of the subsidies. In actuality, though, a large number of the subsidies offered by governments in India and other countries—particularly those related to inputs—can barely be justified. Seldom is the underlying issue or market failure evaluated, yet is it determined if subsidies are the most effective way to solve the issues Furthermore, those who support subsidies and make policy rarely take into account the opportunity cost of giving subsidies. Furthermore, the majority of subsidy programs are involved in governance issues that lead to inadequate targeting, extensive leakages, and political capture (Kumar 2015).

Government policies have always included agricultural subsidies, which are given out to affect how resources are used to achieve various policy objectives. With potentially major consequences on poverty, food security, nutrition, and other sustainability issues including biodiversity, land use changes, and climate change, this support greatly shapes patterns of production and consumption (Bellmann 2019).

In the 1960s and 1970s, agricultural input subsidies were prevalent in underdeveloped rural economies and played a significant role in Asia's green revolution (Dorward et al 2008)

Subsidies make the agriculture sector's sustainable development feasible. One important factor in raising the

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production of the agriculture sector is the agriculture subsidy. In the Anthropocene, sustainable development is defined as "development that safeguards Earth's life-support system, which is essential to the welfare of present and future generations, while meeting present needs." Furthermore, "a societally accepted agriculture which meets the ecological, cultural, economic, and international standards as required by the community" is the definition of sustainable agriculture. Given their implications for the economy, the environment, and society, subsidies are a perfect topic for sustainability evaluations (Salukhe & Deshmush 2014).

II. SUBSIDIES

The Latin word "subsidium," which denotes approaching support from behind, is where the word subsidy originates. Any monetary exchange that is not directly related to paying for a service can be classified as a subsidy since it is defined as a type of financial assistance given to an economic sector (institution, business, or individual) in order to achieve specific policy objectives (Salunkhe and Deshmush, 2014). In government budgets, taxes show on the revenue side while subsidies appear on the expenditure side. Taxes decrease discretionary income, whereas subsidies increase the amount of money in circulation.

Any government that offers subsidies does so with the following goals in mind:

- To drive a wedge between producer and consumer prices;
- To encourage increased production and consumption;
- To accomplish social policy goals, such as population control and income redistribution;
- To advance general welfare (housing, sustenance, etc.) (Kumar 2020).

Impact of Subsidy

Static Effects

According to perceptions the distributive effects of subsidies are often the opposite of what policymakers aim for. Many countries that provide subsidies to farmers claim to support small-scale operators. However, subsidies linked to production or inputs typically benefit larger farming operations. Even direct payments can be unevenly distributed. Research on agricultural support programs in other nations seems to support the 80:20 rule – that 80% of the benefits go to just 20% of recipients. While direct, government-funded income payments are more efficient in reaching their targets, subsidies tied to products or inputs often end up benefiting other activities in unintended or unforeseen ways (Ashra & Chakravarty 2007).

Dynamic Effects

Over time, even the portion of subsidies that reaches the intended group tends to be diluted through the capitalization of rent into the least flexible production factor, a concept introduced by David Ricardo over 170 years ago. As a result, the benefits of subsidies are often short-lived, mainly helping those who can quickly exploit a new scheme. Their successors, however, face higher costs for resources like land. In essence, as economist David Friedman once joked, "the government can't even give anything away." Government policies that create subsidies are typically designed to serve a public purpose—redistributing wealth, supporting income, benefiting a region or industry, or keeping voters content. However, if these policies are so inefficient at achieving their objectives, why do they last so long? The "transitional gains trap" helps explain why subsidy programs are difficult to dismantle once established. In some cases, people are trapped, especially when subsidies sustain employment in rural industries like agriculture, fishing, and mining, which rely on specialized skills and less formal education. The resulting low mobility of this workforce becomes an obstacle to reform, making structural adjustments even more painful when they are eventually needed (Ashra & Chakravarty 2007).

III. THE WTO APPROACH TO AGRICULTURAL SUBSIDIES

In the WTO Agreement on Agriculture (AoA), subsidies are classified into different categories or "boxes" based on their trade-distorting effects. This system follows a "traffic-light" approach, aiming to restrict the most trade-distorting forms of support while imposing fewer restrictions on measures that cause less distortion. Appendix I of this study highlights the latest domestic support notifications for six key WTO members, both in absolute terms and as a percentage of production value. All subsidies are governed by international rules established by WTO member states, which outline the conditions under which subsidies can be challenged and set numerical limits for trade-distorting agricultural subsidies. These rules differentiate between various types of support measures, using an "effect-based approach" to classify subsidies based on their trade-distorting impacts (Bellmann 2019).

IV. AGRICULTURAL SUBSIDIES IN INDIA

Subsidies are one of the most effective tools for influencing or stabilizing production and trade growth in various sectors and regions, as well as ensuring fair income distribution to protect vulnerable groups in society. Key measures like support and procurement prices for agricultural production are designed to safeguard farmers' interests. Over the past decade, subsidies from the Indian government have grown rapidly. Subsidies increased from 1.7% of total budget expenditure in 1970-71 to over 10% by 1980-81, with agricultural and food subsidies making up more than 10% of total subsidies (Halmandage, 2010).

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The table given below illustrates the distribution of total subsidies (fertilizer, electricity, and irrigation) in India between 1980-81 and 2008-09. Total subsidies rose from Rs.1,228.54 crores in 1980-81 to Rs.4,796.16 crores in 1985-86, and further to Rs.1,15,952.20 crores by 2008-09. Fertilizer subsidies increased from Rs.471 crores in 1980-81 to Rs.13,724.05 crores in 2000-01, and further surged to Rs.1,01,180.68 crores by 2008-09. Electricity subsidies grew from Rs.357.56 crores in 1980-81 to Rs.4,621 crores in 1990-91, peaking at Rs.26,904 crores in 2000-01 before declining to Rs.14,771.52 crores in 2008-09. Irrigation subsidies (for canal water) rose from Rs.399.10 crores in 1980-81 to Rs.3,917.41 crores in 1990-91, reaching Rs.14,711.71 crores by the post-liberalization period (2000-01).

The percentage share of fertilizer subsidies in total subsidies declined from 38.41% in 1980-81 to 35.20% in 1990-91 and further to 24.80% in 2000-01, but increased significantly to 87.26% in 2008-09. In contrast, the share of electricity subsidies rose from 29.10% in 1980-81 to 35.07% in 1990-91, peaking at 48.62% in 2000-01 before dropping to 12.74% in 2008-09. The percentage share of irrigation subsidies stood at 32.49%, 34.76%, and 26.58% in 1980-81, 1985-86, and 2000-01, respectively (Kaur & Sharma 2012).

Table 1: Distribution of Total Subsidies in India during 1980-81 to 2008-09 (In Rs. Crores)

Subsidies/ Years	Fertilizers	Electricity	Irrigation	Total
1980-81	471.88	357.56	399.10	1228.54
1985-86	1804.80	1324.15	1667.21	4796.16
1990-91	4638.56	4621.00	3917.41	13176.97
1996-97	8148.41	15594.00	10404.73	34147.14
2000-01	13721.05	26904.00	14711.71	55339.76
2008-09	101180.68	14771.52	--	115952.20

Source: 1. Government of India, Fertilizers Association, Fertilizer Statistics, various issues, New Delhi.
2. Government of India, State Electricity Boards, Annual Reports, Various Years.

V. AGRICULTURAL SUBSIDIES AND PRODUCTIVITY OF CROPS IN INDIA

Through subsidies, every nation invests a significant sum of money in the agricultural industry. In India, the agricultural sector is subject to a variety of subsidies to increase productivity and prevent issues with food security. Government financial assistance given to farmers and agribusinesses to augment their revenue, control the flow of agricultural products, and affect the price and availability of those products is known as an agricultural subsidy. One of the most obvious types of subsidies is when producers or consumers receive monetary payments. It also has a lot of undetectable forms, though. Therefore, it might be disguised by decreased tax burden, low-interest government loans, or involvement in government equity (Salunkhe &Deshmush 2014).

The massive and expanding population's basic needs will require a significant increase in agricultural productivity. Additionally, agricultural surplus must be produced in order to support economic development that prioritizes job equity. The majority of the expansion in agricultural output will need to come from a steady improvement in land productivity; yield-based development cannot be sustained without lifting restrictions on soil fertility and fostering technological advancement. Fertilizer subsidies rank second in size among the major agricultural subsidies. A development subsidy that speeds up the application of fertilizer and thereby increases agricultural output is known as a fertilizer subsidy. In 2003, the central government stopped providing fertilizer subsidies.

After it, there was a progressive decline in agricultural output. Because of the increased cost, the farmers were unable to afford fertilizer. In such a situation, farmers steadily reduced their use of fertilizer in their agricultural productivity (Halmandage, 2010). The elimination of agricultural subsidies has resulted in a decline in the overall rate of agricultural production and an increase in production costs. The economy and agriculture would be impacted by the elimination of subsidies. One of the most effective tools for controlling or adjusting the rate of production and trade growth across a range of industries is the provision of subsidies, which ensure that the poorer segments of society are protected and that revenue is distributed fairly. One of the most significant actions taken to safeguard the interests of farmers and other marginalized groups is the support and procurement prices of major agricultural products. To provide for the fundamental needs of a larger and expanding population, there must be a significant increase in agricultural productivity. Additionally, it is necessary to provide the agricultural surplus needed for economic growth, with a focus on job equity. Following the initial era of modest increase in agricultural production, fertilizer subsidies were subsequently withdrawn. The entire economy was impacted. The government's subsidy program is an excellent way to safeguard marginal farmers and the weakest segments of society (Halmandage, 2010). An attempt is made to analyze the relationship between production and overall subsidies in this part, which includes fertilizers, energy, and irrigation. It has been noted that, in India, overall subsidies have gone up both before and after liberalization, but productivity has gone up overall with the exception of

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1996–1997. Total subsidies per hectare in India increased from Rs. 1,362.59 in 1980–1981 to Rs. 14,134.59 (171.02 percent) in 1990–1991 and then to Rs. 1,17,595.59 (85.38 percent as compared to 2001) at the national level. However, productivity in kg/ha climbed from 4,67,491 in 1980–1981 to 17,75,699 (44.63 percent) in 1990–1991; it then decreased to 14,56,191 (17.99 percent) in 1996–1997; it then increased once again to 19,53,815 (13.28 percent) in 2006–07(Kaur &Sharma 2012).

Table 2: Expenditure on Major Agriculture Susidies (Rs. Crores)

Name	Source	Year	Magnitude
Fertilizer	Union Budget	2017/18	70,000
Power	Based on Power Finance Corporation data	2015/16	91,000
Credit	Union Budget	2017/18	20,000
Irrigation	Central Water Commission (2017)	2013/14	17,500
Crop Insurance	Union Budget	2018/19	13,000
Price Support	Author's estimate	2014-15-16/17	24,000
Total (Without inflation to 2017/18 price levels)			2,35,500
Loan waivers	PRS Legislative Research https://www.prsindia.org/policy/discussionpapers/state-state-finances-2018-19	2017/18	1,22,200

Source: Compiled from the sources mentioned in the Table. The price support subsidy are the author's computations.

VI. INPUT SUBSIDIES

Over the past 20 years, India's agricultural sector has seen considerable growth in input and production subsidies. Between 1990–91 and 2004–05 (GOI 2004, 94), food subsidies alone climbed by more than ten times (at current prices), but the wholesale price index for all commodities nearly doubled during this time (food subsidies increased by more than five times in real terms). This increase is the result of several factors, including growing minimum support prices, the building up of massive grain stocks (which reached 64 million metric tons in July 2002), and rising Food Corporation of India operating expenses.

Subsidies for inputs come from many different places. Farmers, parastatal and private input dealers, and input businesses can all receive direct financial support from the federal, state, and local governments. Indirect input subsidies, such those pertaining to commerce and marketing, can also be created by the government. One can further break down subsidies into categories like as power, credit, irrigation, and fertilizer. Gulati and Narayanan's (2003) methodology was followed by Fan, Thorat, and Rao (2004) to estimate the data that we use here (Fan, Gulati & Thoat 2008).

VII. FERTILIZER SUBSIDY

The national food security is upheld, agricultural production is increased, and fertilizer consumption is encouraged by the fertilizer subsidy. However, there has been growing concern over the recent years about the steep increase in subsidies. A number of factors have contributed to the higher subsidy bill, but the most significant ones are the steady increase in consumption, the sharp rise in the cost of imported feedstock, fertilizers, and intermediaries, and—most importantly—the long-term stability of fertilizer farm gate prices.

Given figure shows the trends in fertilizer prices around the world. All three of the primary fertilizers—urea, diammonium phosphate (DAP), and muriate of potash (MOP)—saw significant price increases between 2007 and 2008. In the same period, the price of DAP grew from US$433 per tonne to US$967 per tonne (peaking at US$1200/tonne in April-May 2008), while the price of urea went from US$309 per tonne in 2007 to US$493 per tonne (peaking at US$770/tonne in August 2008). The price of MOP surged from approximately US$200 per tonne in 2007 to US$630 per tonne in 2009, and in February and March of 2008, it reached a peak of approximately US$875 per tonne.

On the other hand, between March 2003 and March 2010, the retail price of fertilizer did not change (FAI, 2012). In a similar vein, during the past five years, the prices of fertilizer feedstock and raw materials including phosphoric acid, ammonia, sulfur, and rock phosphate have sharply increased. The primary feedstock for di-ammonium phosphate (DAP), phosphoric acid, had price increases of about 220% from US$461 per tonne in 2006–07 to US$1480 per tonne in 2008–09. Similarly, the price of rock phosphate grew from US$79 per tonne in 2006–07 to US$377 per tonne in 2008–09.

Over the previous five years, prices for ammonia and sulfur have also skyrocketed. Due to the nation's complete reliance on imports to meet its requirements for potash (MOP) and phosphatic resources (almost 90% of which are met through W.P. No. 2012-09-01 Page No. 5), International prices directly

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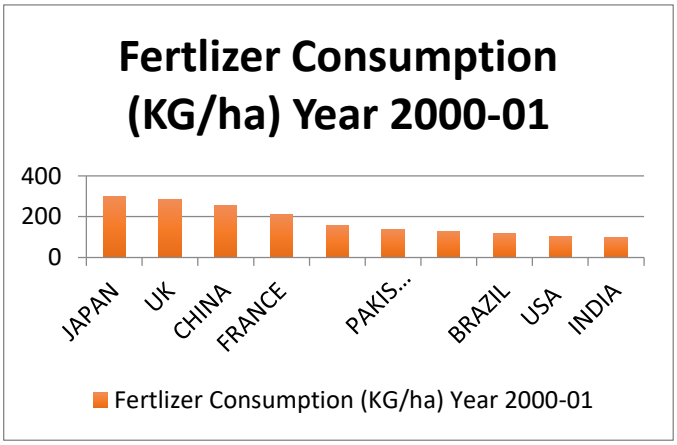
affect domestic prices, which leads to subsidies, according to IIMA INDIA Research and Publications, which imports finished phosphatic fertilizers or phosphatic raw materials/intermediates for domestic production of phosphatic fertilizers (Sharma 2012).

Role of Fertiliser Subsidy in Developing County like India
Since fertilizers are essential to agricultural output, several nations have made encouraging the use of fertilizers a key component of their national policies. 16–17. In underdeveloped nations, fertilizer use is common started in the 1960s. By the year 2000, the developing world represented more than 60% of the global total. usage of fertilizers. As the population keeps increasing .The facilitation of agricultural production in poor nations by using fertilizer has grown in importance and national and international political matter. The first chemical fertilizers were used in Indiana. mostly in the latter part of the 1960s and, in conjunction with hybrid seeds, resulting in a production explosion commonly referred to as the "Green Revolution" This era's introduction of subsidies caused the usage of fertilizer to rise from 1.1 million tons (in terms of N, P, and •Kuse) from roughly 17 million tonnes in 1966–1967 2003–2004, which led to an increase in food grain productivity from 644 kg to over 1,700 kg per hectare. But in the latter part of the 1990s, fertilizer use and productivity seemed to be stagnating, although consumption and productivity were growing annually. changed over time (Ashra & Chakravarty 2007).



Issues Regarding Fertiliser Subsidies
The specific perspective on subsidies could be misleading. The final decision needs to be made with some caution. Although subsidies have been in place since the beginning of the Five Year Plans, their scope was expanded as a result of the early 1970s oil shock. One might make a strong case that agricultural production decisions including the application of fertilizers are not only influenced by crop and fertilizer pricing. Access to irrigation makes it easier to utilize fertilizers; advancements in production techniques can promote this usage even more; extension efforts can quicken the pace of this use; and an improved distribution system can support the continued development of fertilizer use.

Table 3: Trends in fertilizer subsidy (Rs. crore) in India: 2001-02 to 2012-13

Period	Concession on decontrolled fertilizers		Subsidy on urea		Total fertilizer subsidy	Share(%) in total subsidies
	Indigenous P & K	Imported P & K	Indigenous	Imported		
2001-02	3760	744	8044	148	12695	40.4
2002-03	2488	737	7799	1.2	11016	25.3
2003-04	2606	4720	8521	0.8	11848	26.7
2004-05	3977	1165	10243	742	16128	34.6
2005-06	4499	2097	10653	2141	19390	38.8
2006-07	6648	3650	12650	5071	28019	42.0
2007-08	10334	32598	1640	9935	43319	43.7
2008-09	32957	325987	20969	12971	99495	59.1
2009-10	16000	23452	17580	7000	64033	43.3
2010-11	40766		15081	6454	62301	35.9
2011-12	34208		19108	13833	67199	31.1

Source: GoI (2011; PIB (2012a)) and GoI (2012)

Although their favorable cost, the application of fertilizers may be impeded by the absence of any one or all of these elements. Nothing remarkable would be said about this generalization. The circumstances presented a different issue in 1973–1974, and they still do now. Following the Green Revolution, which introduced a revolutionary fertilizer-seed technology, fertilizer use expanded quickly and the production of much-needed food grains increased. At this point, was a sudden, sharp increase in fertilizer prices wise? Would it not restrict, if not completely kill, the economy's existence in the 1970s and the years that followed? There was a noticeable

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increase in food grain yields, and the increased output of food grains contributed to a decrease in food imports.
Reading about the manufacturing and importation of fertilizers throughout history is fascinating. Fertilizer imports surged in 1966–1967 and 1967–1968 as a result of the Green Revolution, which opened the sluice gates. Gradually, internal manufacturing was able to meet demand. Sixty-six percent of all fertilizer supply in 1966–1967 came from imports, a number that would stay high for the next two years. From that point on, it decreased, ranging from 21 (1982–83) to 51 percent (1974–75); in the most recent year, 1984–85, it was 41 percent. Between 1966–1967 and 1971–1972, the total amount of fertilizer supplied grew at an annual compound rate of 10.5%; it then climbed at an annual rate of 11.4% through 1984–1985.

The amount has varied, and comparing different years would result in either higher or lower rates of growth in the use of fertilizer. Fertilizer use per hectare increased from 10.7 kg in 1967–1968 to 48.3 kg in 1984–1985. States used different amounts of fertilizer; in 1984–85, Punjab used the most (157 kg/ha), while Assam used the least (4.1 kg/ha). It follows that removing the growing fertilizer subsidies, even at this late date, would probably cause a shockwave and cause the nation's breadbasket states' use rates to plummet precipitously. Fertilizer subsidies damage the economy, yet we don't have many options.

We can examine them closely in order to determine the policy's future course. Later on, we will talk about that. Before we wrap up the study of fertilizer subsidies, let us add that the time of subsidies has increased domestic output and the industry's capacity utilization, which was never more than 60% in the past but increased to 72% in 1984–1985. The industry may also suffer from decreased demand (Table II). Due to the increase in domestic production, even with better capacity utilization, fertilizer subsidies per tonne are currently higher for domestic supply than for imports (Shah 1986).

VIII. WHY AGRICULTURAL SUBSIDIES?

In the past, the developing nations of today indirectly taxed agriculture, but they also significantly depended on input subsidies—a tendency that is currently expanding quickly. However, there is much disagreement about whether input subsidies are effective in accomplishing desired development goals (see, for example, Wiggins and Brooks, 2010; Chirwa and Dorward, 2013; World Bank, 2008; Morris et al., 2007; Jayne and Rashid, 2013). The conventional economists' benchmark of perfect and complete markets provides the conceptual foundations for the discussion and is helpful in assessing the effects of policy interventions like subsidies.

In markets with perfect competition, a subsidy is not justified. However, market failures—that is, incomplete, imperfectly operating, or absent markets—are also acknowledged by economic theory and are a reality in many contexts. It has long been known that when externalities exist, positive and negative externalities can be adjusted for using a careful combination of subsidies and taxes (Gautam 2015).

IX. CONCLUSION

India's fertilizer subsidy has been a crucial part of its agricultural policy, aimed at ensuring food security and providing support to farmers by reducing the cost of fertilizers. While this policy has significantly boosted agricultural productivity and played a key role in the Green Revolution, it has also led to several issues. Excessive use of subsidized fertilizers has caused soil degradation and environmental problems, disrupting the soil's nutrient balance. Moreover, the subsidy system has faced criticism for inefficiencies, such as resource misallocation and a financial burden on the government. To achieve sustainable agricultural growth, the subsidy framework needs reforms that emphasize balanced fertilizer use, better targeting of subsidies, and the promotion of environmentally friendly farming practices. A more comprehensive approach is essential to align the fertilizer subsidy with long-term environmental and economic sustainability objectives.

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