CHAPTER 1: FERTILIZER MARKET:AN OVERVIEW

1.1 Introduction to the Study.

India is among the top fertilizer consumers worldwide thanks to a sizable domestic fertilizer market that serves the country's agricultural demands. The three primary segments of the Indian fertilizer market are Nitrogen (N), Phosphate(P), and Potash(K) fertilizers.

The fertilizer industry plays a crucial role in the Indian agricultural sector, which employs a significant percentage of the country's population. The Indian fertilizer industry, according to a report by Mordor Intelligence, was estimated to be worth USD 22.5 billion in 2020 and is anticipated to grow to USD 30.2 billion by 2026, exhibiting a CAGR of 5.1% over the forecast period (2021-2026). *Mordor Intelligence. (2021)*

There are 164 fertilizer plants in the country consisting of 33 Urea, 20 DAP & NP/NPK Complex, 100 SSP, 10 Ammonium Sulphate and 1 Ammonium Chloride plant. The public and Co-operative sector companies such as NFL, RCF, IFFCO and KRIBHCO, have been instrumental in providing fertilizers to farmers in the country. For instance, NFL has its urea manufacturing plants in Punjab Haryana and MP while RCF has two manufacturing units and produces urea, ammonia, and other complex fertilizers. IFFCO is one of the world's largest fertilizer cooperatives and has a pan-India presence. It produces urea, diammonium phosphate (DAP), and other complex fertilizers. KRIBHCO has also a large urea manufacturing plant. IPL has always played lead role in supplying Urea, MOP, and DAP through imports.

On the other hand, private sector companies such as Tata Chemicals Limited, Coromandel International Limited, and Chambal Fertilizers and Chemicals Limited, have also made significant contributions to the Indian fertilizer industry. In addition to manufacturing urea, these companies are also into the business of DAP, NPK Grades, speciality fertilizers and crop protection chemicals.

The agriculture industry in India, which contributes around 17% of the nation's GDP and employs more than 50% of the workforce, is a major factor in the demand for fertilizers. To encourage the use of fertilizers and boost agricultural productivity, the Indian government offers subsidies to farmers.

India produced 50.82 million tonnes of foodgrains in 1950–1951 according to government data. Since then, the production has multiplied six times. India produced 314.51 million tonnes of food grains in 2021–2022—the most ever. Chemical fertilizers play a vital role in India's achievement in not only fulfilling its total food requirement but also exporting surpluses. *The Times of India. (2021, August 15)*

Chemical fertilizers were crucial to the success of the Green Revolution, coupled with irrigation, government loans, and extension initiatives. The region's continued production of food grains has greatly benefited from the increase in fertilizer consumption. The Indian government has regularly promoted policies that encourage greater regional access to and use of fertilizer. Nitrogen, phosphorus, and potassium were consumed in 2021–2022 in quantities of 29.80 thousand tons, down from 32.54 thousand tons the previous year. Potash (K) supplies in the nation are not commercially feasible, hence imports are the only way to meet demand. *FAI, 2022*

As the primary source of plant nutrients, fertilizer is one of the most crucial agro inputs for raising farm production. Fertilizer is anticipated to be responsible for between 50 and 60 percent of the enhanced agricultural yield.

In 1960-61, 293.8 thousand tons of Indian NPK was used by farmers, which increased in 1970-71 by 668 per cent. The gross intake of nutrients was 16,799.1 thousand tons in 2003-04. Such increases in the nutrients used in crops are important to help the agricultural revolution that started with the implementation of HYV (High Yielding Varieties) and the build-up of irrigation infrastructure in India in the mid-1960s. *Food and Agriculture Organization of the United Nations. (n.d.)*

For Indian soils, the optimal amount of NPK ratio is 4:2:1. The NPK use was equivalent to 4:2:1 in the 1992 period before the decontrol of the P and K segments of the fertilizer industry.

However, the P and K fertilizer prices increased due to the import portion after partial decontrol, resulting in a rise to the NPK consumption ratio in 1993 of 9.7:2.9:1. Several ad-hoc steps had to be taken to achieve the price equality of N about P and K, and in 1997-98, the ratio was reduced to 7.9:2.9:1. *Singh, B. P., & Singh, R. K. (2021)*

Increasing attention to agricultural development is crucial for ensuring food security, which is currently a topic of discussion around the world, as well as its contributions to overall economic growth. Although average agricultural growth rates and their contribution to GDP have

declined over time, they still have a significant social impact as a major source of food grains, a source of employment for a larger population, a source of raw materials for the industrial sector, a source of export revenue, etc. Given the significance of this industry, particularly after independence, the government made enormous efforts that, during the post-independence period, transformed Indian agriculture from primarily subsistence farming into one that was market oriented.

The introduction of modern agriculture technologies also resulted in substantial advancements in India's "kit of improved practises," which helped to explain the country's phenomenal increase in food grain production from 50 million tonnes in 1950-1951 to 235 million tonnes in 2010-2011. The government's efforts to redefine the role and position of agriculture in the Indian economy have led to exceptional agricultural development.

1.2 Indian Agriculture Development Programmes.

The dominant industry during Independence was farming, which contributed a large portion of the GDP (about 55%) and most of the labour force (70%) but was still dealing with a serious food grain shortage and higher prices. *Dantwala, (1986)*.

The Indian agriculture business has just the most basic initiatives. As evidenced by the then-Prime Minister's declaration that "all else can wait, not agriculture," agriculture has assumed a central role in all economic policies since the 1950s, which are primarily focused on helping it develop into a thriving market.

In 1960, the Intensive Agricultural District Plan (IADP) launched the intensive technique. Following it, more programmes for agricultural development were started.

Here are some of the significant programmes:

i. The Intensive Agricultural District Program (IADP).

In the nation, the Intensive Agricultural District Program (IADP) began in 1960's kharif. This initially began with seven districts (Thanjavur, West Godavari, Sahabad, Raipur, Aligarh, Ludhiana, and Pali.). The term "package programme" was also used to refer to this initiative.

The main objectives of this programme was Rapid improvements in agricultural productivity were to be attained in the short term with a focus on financial, technical, extension, and administrative resources; Long-term, it seeks to accelerate the physical and mental processes

of change in order to produce a self-generating "breakthrough" in productivity and increase the output potential; and also, the initiative was designed to teach principles for implementing similarly intense agricultural production programmes in other locales.

ii. High Yielding Varieties Programme (HYVP).

The intensive agriculture and package strategy were the focus of the intensive agricultural district programme (IADP) and intense agricultural area programme (IAAP), both of which to some extent boost food output. But as yield stabilised, it was unable to fulfil the demand for food production, and this experience led to the necessity for a programme for high-yielding varieties (HYVP). In Kharif 1966–1967, the HYVP was introduced.

By employing high yielding seeds from crops, the main goal of HYVP was to enhance overall food output. The crops chosen were maize, jowar, bajra, wheat, and paddy.

iii. Institute Village Linkage Programme (IVLP)

The results of field studies carried out in the past ten years worldwide strongly imply that many modern technologies are simply unsuitable for the unique requirements of small-farm production systems, which are extremely diverse in nature and heavily influenced by both socio-economic and bio-physical factors.

Social and biological experts are now learning about the complicated farming systems that are now in place and comprehending why farmers with limited resources do not adopt new technologies. As a result, they have stressed the importance of farmers' involvement in the management of the technology selection process for the development of acceptable technologies.

To develop relevant technologies, a more comprehensive approach is required in terms of problem diagnosis, technological intervention identification based on farmer knowledge, and technology identification for different production systems. To address the components and develop relevant technologies, a programme called Technology Assessment and Refinement through Institute Village Linkage Programme (TAR- IVLP) was developed.

In 1995, the programme was launched as a pilot. It was put into practise in 42 centres at chosen SAUs and ICAR institutes. Since 1999, when it became a component of NATP, the programme has gained momentum and support.

The main objectives of this programme was to implement technological innovations that prioritise stability, sustainability, efficiency, and profitability while also taking environmental concerns into account in well-resourced and small production systems; introducing and integrating the relevant technology to improve production efficiency and market surplus in industrial and off-farm systems; to track the socioeconomic effects of technology changes for various industrial systems; and to determine the extrapolation domain for new technologies and technology modules based on meso- and mega-scale environmental characterisation.

iv. Watershed Development Programme

To stop the diminishing productivity of wasteland and the depletion of natural resources, the Department of Land Resources in the Ministry of Rural Development oversees three area-based watershed development programmes for wastelands and degraded lands: the Drought Prone Areas Programmes (DPAP), the Desert Development Programme (DDP), and the Integrated Wastelands Development Programme (IWDP).

The DPAP was established in 1973–1974 to address the unique issues encountered by those regions that are subjected to drought conditions on a regular basis. In an effort to lessen the negative consequences of desertification, DDP was started in 1977–1978. In 1987, the watershed mode was introduced for DDP and DPAP. Since 1989, IWDP has been in operation. The IWDP projects are typically approved in regions that are not included in the DDP or DPAP.

With effect from 1 April 1995, all of these programmes were included in the Guidelines for Watershed Development. IWDP, DDP, and DPAP are now being implemented as part of the Harywali programmes as of April 1, 2003. Nonetheless, the projects that were approved before to the deadline are carried out in accordance with the Watershed Development Projects Guidelines.

The main objectives for this programme was to developing desert, drought-prone, and wastelands on a watershed basis while taking into account local demands, site circumstances, and land capacity; encouraging the general economic development and enhancing the socioeconomic situation of the disadvantaged and resource-poor populations residing in the programme regions; reducing the negative impacts of harsh climatic conditions, such as drought and desertification, on crops, the population of people and animals, and improving such conditions; and re-establishing ecological equilibrium through the use, protection, and development of natural resources, such as land, water, and vegetation.

v. Rashtriya Krishi Vikas Yojana (RKVY)

The Indian economy is now on a stronger growth trajectory as a result of economic changes implemented since 1991. From less than 6% in the early years of reform to more than 8% in recent years, the annual growth rate of the entire Gross Domestic Product (GDP) has risen. In its strategy paper for the Eleventh Five-Year Plan, the Planning Commission claimed that a GDP growth rate of 9% over the Eleventh Plan period would be realistic.

Yet, although making up more than 30% of the GDP overall at the start of the reforms, agriculture was unable to continue its pre-reform expansion. Instead, it had a severe slowdown in growth after the mid-1990s. This occurred despite the fact that the potential for agricultural growth was great and agricultural productivity was generally very low in most of the states.

During the 1980s, the agricultural sector's GDP grew by more than 3% annually. India has been aiming for an agricultural growth rate of more than 4% since the Ninth Five-Year Plan (1996 to 2001-02), but the actual result has been much below the target. The country's workforce still relies on agriculture for more than 50% of its income. The economy can experience severe stress as a result of slow growth in the agriculture sector and related industries because a big portion of the population still depends on these industries.

The persistent reduction in state government investments in the sector is a major factor contributing to the poor growth of the agricultural industry. While public and private investment is rising dramatically in fields like infrastructure, similar expenditures are not being made in agriculture and related fields, which is upsetting the farming community, particularly the small and marginal portion. As a result, it has become apparent that states need to be encouraged to enhance their investments in the agricultural sector and related industries.

The National Development Council (NDC), in a meeting on May 29, 2007, decided to start a special Additional Central Assistance Scheme (RKVY) because it was concerned about the weak growth in the agriculture and related industries. The NDC decided that agricultural development plans needed to be reoriented to better serve farmer demands, and it urged the federal and state governments to adopt a plan to revive agriculture. Under the 11th plan, the NDC reaffirmed its goal to achieving 4% annual growth in the agriculture sector.

The main objectives of this programme are; to provide incentives for the states to boost public investment in agriculture and related industries; To give governments flexibility and autonomy in the process of creating and carrying out policies for the agricultural sector and related

sectors; to make sure that agriculture plans are created for the states and districts based on agroclimatic conditions, technological accessibility, and natural resource availability; to make sure that the state's agricultural plans more accurately reflect local requirements, products, and priorities; by using targeted interventions, to reduce the yield disparities in significant crops; to increase farmers' returns in the agricultural industry and related industries; and to treat them holistically in order to bring about quantitative changes in the production and productivity of diverse agricultural components.

vi. National Horticulture Mission

Except for the North-eastern States, Himachal Pradesh, Jammu & Kashmir, and Uttaranchal (for which a separate Technology Mission for integrated development of horticulture exists), the National Horticulture Mission (NHM) is carried out in all the States and Union Territories of India to promote the holistic growth of the horticulture sector, which includes fruits, vegetables, root & tuber crops, mushrooms, spices, flowers, aromatic plants, cashew, and cocoa.

Through this centrally supported programme, the Government of India will give the State Missions during the Tenth Plan its full support. With a 15% contribution from the State Governments, the Government of India will provide 85% of the assistance during the XI Plan.

The main objectives for this programme are; to promote the overall expansion of the horticulture industry through area-based, regionally distinct plans that incorporate post-harvest management, processing, and marketing, in line with each State's or region's comparative advantage and its unique agro-climatic characteristics; to increase horticulture output, boost household income, and provide better nutrition; to create convergence and synergy between many ongoing and upcoming horticulture development programmes; To advance, advance, and popularise technology by fusing conventional wisdom and modern scientific understanding; and to develop work prospects for both skilled and unskilled people, particularly for young people who are unemployed.

List of Important Agricultural Development Programmes in India. (n.d.)

1.3 Fertilizers in Indian Agriculture

Many of India's agricultural growth techniques had to be implemented to enhance development throughout the 1950s due to the country's diminishing agricultural growth. the adoption of a modern agricultural strategy that promotes the use of vital inputs, such as a high seed yield, fertilizers, manures, etc., that over time became increasingly apparent, to attain self-sufficiency in the production of food grains. Further evidence from other nations suggests that greater fertilizer use significantly boosts agriculture productivity and output.

According to the *Wikipedia (2023)* article on plant nutrients in soil, Fertilizer gives plants nutrition and restores soil fertility that has been lost because of ongoing land cultivation. For a plant to grow and reproduce, seventeen nutrients or components are required. These are iron (Fe), boron (B), manganese (Mn), copper (Cu), zinc (Zn), molybdenum (Mo), nickel (Ni), chlorine (Cl), oxygen (O), nitrogen (N), phosphorus (P), potassium (K), sulphur (S), calcium (Ca), and magnesium (Mg). They must be supported by either the soil system, animal manure, or chemical fertilizer. Included as crucial plant nutrients are Nitrogenic (N), Phosphatic (P), and Potassium (K) fertilizers.

Fertilizers and/or manures are essential to provide the necessary mix of vital nutrients for crops, depending on factors such as crop type, soil conditions, and climate. The soil system alone cannot meet the nutrient requirements needed for profitable crop yields. In addition to increasing farmers' financial returns, fertilizers, which have been around for more than a century, have significantly improved yield rates, provided stronger endurance under certain conditions, and reduced the effects of climate change. When it comes to plantation crops like rice and sugarcane, the Royal Commission of Agriculture first underlined the use of fertilizer as a crucial component in agriculture output in 1928. Nevertheless, the practical usage of fertilizers didn't begin until the 1930s. Furthermore (1) growth of the sugar industry (2) setting of the low prices for sugarcane (3) efforts of certain fertilizer units in expanding the fertilizer sector outside of planting plants involve the immediate factors that will lead to the use of fertilizer. A total of 20,000 tonnes of nutrients were generated by two mills that began operating at the end of 1940, one in Kerala at Alappuzha and the other in Bihar at Sindri.

The usage of fertilizer was a necessity in 1889, and Dr. John Augustus Volker, a chemist consultant for the royal agricultural firm, was dispatched to India by the Secretary of State to advise the Imperial Government on the need for agricultural chemistry in Indian agriculture.

He had emphasised that Indian agriculture needed actual transformation rather than just a suggestion in its research on the development of Indian farming that was submitted to the Royal Agricultural Society of London. While acknowledging the issue of plant nutrient inadequacy regarding the Indian soil system, he also emphasised the use of plant nutrients.

In India, concerns about agriculture were raised by the decline in soil fertility. One of the main reasons for India's low productivity, which necessitates the usage of fertilizers, is that there is a shortfall of 10 million tons of plant nutrients supplied by fertilizers. To make up for deficits, plant nutrients are nevertheless used rather infrequently and unevenly per acre. Yet, to maximise the effectiveness of fertilizer use, it is essential to ensure that there are no limitations on plant growth by supplying nutrients or restoring soil fertility. Fertilizers give plants with nutrients that have been depleted by ongoing land exploitation. Many Western specialists have found that the reason Indian agriculture is less competitive is not because of outdated or poor methods, but rather because of a disruption in capital flow. Later, as colonialism spread, several factors (such as cash agriculture and the preservation of forests) had a detrimental effect on agricultural output in this cycle since there were not enough locally produced inputs like soil and manure.

Historically, chemical fertilizers have helped expand agriculture, particularly in developing countries. In addition to increasing agricultural productivity, it helped lay the groundwork for a technologically competitive farming business. Regarding its contribution to the output of Indian agriculture, the usage of fertilizer is becoming more and more significant. Fertilizer evolved as the primary component of the practises set to boost farm output, but initially the focus was on raising the productivity of the land through intensive farming techniques. The primary objective was to raise land output.

Use of chemical fertilizers is vital to speeding the rise of agricultural production, particularly soon. The National Agricultural Commission has correctly noted that the rising agricultural productivity is increasingly linked to the increased usage of fertilizer because of observations made around the world. *ScienceDirect. (n.d.).*

A crop's resistance to diseases and the impacts of the environment has been improved by more than a century-old fertilizer practises, in addition to the significant contribution provided by boosting production rates. The money that farmers receive has also increased over time. Studies show a favourable association between fertilizer use and agricultural yield, with wheat and rice productivity increasing in areas with relatively high fertilizer consumption.

While the first five-year plan saw fertilisation as an addition to organic manure, it was during and after the second five-year plan that there was a real push towards fertilizer. As a result, the total amount of fertilizer used increased from 66,000 tons in 1950–51 to 84,000 tons in 1961–62, or an increase of roughly 38,000 tons of NPK on average. After the second five-year plan, a needs-based strategy was established to determine the fertilizer use objectives, and as a result, the value of fertilizer consumption has soared astronomically in terms of Indian agriculture. *Ministry of Agriculture and Farmers' Welfare, Government of India. (2016).*

India is currently the second most populous nation after China, accounting for 17.7% of the world's population with its population of over 1.4 billion. With more about 1,46 billion inhabitants, it is anticipated to surpass China by 2028 and stabilise at around 1,6 billion by 2050. Less than 4% of global wealth is held in India's agricultural region and freshwater resources, which is appallingly small relative to its population. *Worldometers. (n.d.)*

India is putting enormous strain on its natural resources to produce adequate food, cattle, and fibre for its growing population, which currently numbers approximately 400 million in metropolitan areas and is expected to reach 600 million by 2030. Before 2030, India will construct "a Chicago one year" to appropriately house them. For the next 15 years, per capita income will rise by 5-6% yearly. As over 45% of average household spending goes towards food, the increased wealth and growing urbanisation would put much more strain on available land and water. So, it represents India's biggest issue, but it also presents a chance for businesses to function in a long-term, economical, and environmentally beneficial manner. Of course, the future lies in adopting better farming methods and seeds, such as precision agriculture, together with more agricultural research and development (R&D) to increase productivity both per unit of land and per unit of water. Given the degree of agro-technology currently available, fertilizers and high-performance (HYV/HYB/GMO) seeds will be essential in this endeavour to feed India and expand irrigation. *Economic Times. (2018, July 13)*

The issue of fertilizer subsidies in India, how they have changed over time, and how they affect the economy are all quite concerning. To address this matter, however, we are also examining the effects of this subsidy on the use, production, and trade of fertilizers and, consequently, on the grain production, as well as the extent to which this fertilizer subsidy regime may have helped to achieve its fundamental level of self-sufficiency in rice and wheat. The goal of this article is to investigate how to make the optimum use of fertilizers to increase grain output at a lesser cost to the government's coffers.

1.4 **Subsidies: Pre NBS Policy-Regime**

The Fertilizer Supply System has a lengthy and proven history that began in 1957, as listed below:

Period	***Event***
1957	*Fixing of Maximum Retail Price (MRP) of Urea through Fertilizer Control Order, 1957*
1973	*Fertilizer (Movement) Control Order issued for Government control of fertilizer distribution and its inter-state movement*
November 1977	*Retention Price Scheme (RPS) for Nitrogenous fertilizer introduced*
February 1979	*RPS for complex fertilizers introduced*
May 1982	*Single Super Phosphate (SSP) brought under RPS*
August 1992	*Phosphate (P) and Potash (K) fertilizers decontrolled, based on the recommendations of JPC*
October 1992	*Concession on decontrolled P and K fertilizers introduced*
April 2003	*Replacement of RPS by stage wise New Pricing Scheme (Stage I)*
April, 2004	*NPS State II – 1.4.2004 to 30.9.2006*
October 2006	*NPS Stage III – 1.10.2006 onwards*
April 2010	*Nutrient Based Subsidy (NBS) for decontrolled fertilizers ¡n replacement of existing concession scheme*

Table 1.1: Chronology of Key Events relating to Fertilizer Subsidy and Control
Source: Comptroller and Auditor General of India (CAG). (2011).

1.4.1 Fertilizer Market Reform

India's fertilizer sector was subject to a planned economic system until the middle of the 1980s. The production, distribution, and use of fertilizers are all strictly regulated by the central plan in accordance with the usage of pesticides, equipment, and other components. Government spending on fertilizer products made up about half of the country's total petrochemical output by the middle of the 1980s. The total production of fertilizers grew by more than 50%. India also imported fertilizers at the same period via the central programme, which made up around 20% of overall consumption. On the contrary, institutional reform that equally distributes lands to all families in each village and rural de-collectivization that started in 1978 and ended in 1984. With that new production system, farms could choose their own output (household rather than collective output). They may sell their grain and other products on Fertilizer and other crop inputs may be decided by farmers after meeting their responsibilities to sell a specific quantity of their crops to the government (or procurement quotas) at reduced rates. In the previously designed economic system that included the fertilizer sector, it was difficult to meet the various fertilizer demands. The distribution of fertilizers to millions of farms proved challenging.

The fertilizer sector experienced its first market reform in 1985 with the introduction of a dual-track pricing mechanism. Following the Indian Rural Institutional Reform's household accountability scheme from 1984, the dual-track pricing system, which consists of quota and out-quota rates, has been used to implement the allocation of the village's land to single households as well as agricultural production and input, including fertilizers. The government fixed a price for fertilizer that was subject to quotas that was significantly less than the market price for fertilizer that was not subject to quotas. In the interim, the retail sale of fertilizer had been progressively pushed forward and, over time, out-of-quota fertilizers had increased in market share.

By 1989, out-of-quota fertilizers sold to farmers made up nearly 80% of the nation's total fertilizer production.

From 1994, India has started several fertilizer market reforms, with an acceleration of the overall marketing reforms in the early 1990s. In addition to ordering the adoption of government reference rates for all fertilizers based on changes in supply and demand, the government eliminated the dual price system in 1994. In the meantime, authorities are also establishing a fixed price margin for the wholesale and retail sectors. For instance, this price

margin was around 10% in 1994. After 1998, almost all domestic regulations or limitations on fertilizer demand were eliminated. The reform significantly increased fertilizer production between 1998 and 2012. The actual price of fertilizers significantly decreased in the late 1990s because of increased fertilizer production.

1.4.2 Evolution of Fertilizer Trade Policy

The India's fertilizer policy package, which has varied over time as India's fertilizer policy package has evolved, includes a trading policy for fertilizers. On the import side, balancing domestic fertilizer production and imports or the trade-off between increasing total consumption by consuming fertilizer produced domestically but at a higher price and importing fertilizer that is less expensive have been significant factors influencing fertilizer import policy. India has historically relied heavily on the state trading measure to control its imports to achieve these goals. The export policy became significant in the last ten years as India switched from being an importer to an exporter of N and P fertilizers, particularly in the wake of the 2007–2008 fertilizer crisis. The import tariff policy has never been a significant factor impacting fertilizer imports. The main variables influencing export policy have been maintaining stable fertilizer prices and balancing domestic supply and demand. From the early 2000s, both export promotion and restriction policies have been put into place at various times.

1.4.2.1 Fertilizer Import Policy

India has regulated fertilizer imports via state trading, import limits, VAT, tariffs, and price management. Each measure's function, though, has evolved with time. Import regulations have generally become more liberalised. Nonetheless, there is still some import monopolisation of potash, the main imported fertilizer in India. While state trade plays a significant role in India's fertilizer imports, competition has also been present, albeit via a circuitous route. The state-owned company was created in 1950 to handle fertilizer imports. The largest company in the international trade of chemical fertilizer in India to introduce competition, India also provided all provincial corporations (provincial SOEs) with agricultural inputs and licenses to import fertilizers in the 1980s and early 1990s. However, the rising number of importers challenged the existing trade management system and monopoly power; a short-run recentralization for fertilizer imports occurred from 1994 to 1998, when once again became the only company that could import fertilizers. With India’s deepening economic reform since the late 1990s, fertilizer import policy was forced to reform by allowing the largest SOE trading company in domestic agricultural inputs, to engage in fertilizer import since 1998.

In the interim, India also began to impose quantitative import limitations on all fertilizers, although additional liberalisation was implemented once India joined the World Trade Organization (WTO) in 2001. From 2001, licences to import N and P fertilizers were granted to numerous trading companies, including SOEs and private businesses. Yet, there are still just 10 businesses with import licences for potash fertilizer. Other significant trade restrictions include VAT and tariffs, and each had a different impact on fertilizer imports over time and for different goods. The domestic supply and demand have largely determined how the VAT policy has been implemented. For instance, the government has never placed a VAT on potash fertilizers or NPK compound fertilizers, the most deficient fertilizers in India. On the other hand, a 13% VAT was first applied on imported urea in 1997 and DAP in 2000. The VAT policy for urea has never been waived due to the huge rise in domestic urea production and India's transformation into a net exporter of urea after the early 2000s. However, from 2008, two years after India switched from being a net importer to an exporter of P fertilizers, the Tax exemption for imported DAP became applicable.

Although the import tariff on fertilizer was put in place in the late 1990s, it never really became a significant trade policy. The tariffs on fertilizer were extremely low before to India's WTO membership. Since India joined the WTO, a Tariff-Rate Quota (TRQ) regime replaced quantitative import limitations for the import of urea, DAP, and NPK compound fertilizers. The in-quota tariff under the TRQ regime was 4% between 2002 and 2005 and 1% since 2006. The above-mentioned quota tariff has remained at 50% for the entire time. The aforesaid quota tariffs have not been levied because imports of all fertilizers covered by the TRQ have never gone above the import quota. Before India joined the WTO in 2001, the tariff on potash fertilizer was only 3%, and there have been no import quantitative restrictions since that time. From 2002 to 2005, a 3% tariff was maintained; starting in 2006, it was lowered to 1%. Notably, the price of imported fertilizer on the domestic market frequently varied from the import's true cost (Cost, Insurance, and Freight [CIF] plus the VAT, tariff Free on Board [FOB] and other costs at port). Prior to 1993, the domestic ex-factory price served as the price cap for the port sale of imported fertilizers. If the import price was higher than the domestic ex-factory price, the government would help pay the losses. Government income was seized if the cost of imports was less than the domestic ex-factory price. Four initiatives have been taken since 1993 to manage the price of imported fertilizer: (2) Between 2000 and 2006, imported DAP and compound fertilizers were allowed to set a price matching the domestic ex-factory price plus or minus 1.7% (while the rules to set the price of imported potash fertilizers remained the same,

the price margin increased to 1.7%); (1) between 1993 and 2000, imported fertilizers were sold in the domestic market priced at the real import costs plus 1% profit (or price margin); (3) Between 2006 and 2009, potash fertilizer was subject to the rules for regulating the prices of imported DAP and compound fertilizers, although with a 3% price flexibility; (4) starting in 2009, all price restrictions on imported fertilizer, save from potash fertilizers, were removed. *Ashok, K. R., & Satish, P. (2021)*

1.4.2.2 Fertilizer Export Policy

VAT and tax are the two main tools used to regulate fertilizer exports. Prior to 2015, the export policies had generally become increasingly restrictive. The shift in export regulations primarily happened after 2004, when India's national food security concerns increased, and following the 2007–2008 increase in fertilizer prices. However, export regulations were ineffective prior to 2000 since India had a shortage of practically all types of fertilizers and lacked a competitive advantage in the world fertilizer market. Although locally manufactured fertilizer received full VAT exemption, fertilizer exports had only limited or no VAT exemption. Since 2004 and after 2006, there has been no VAT exemption for the export of N, P, and K fertilizers due to growing real fertilizer prices since the early 2000s. Since the middle of 2005, India has been enforcing export levies and other restrictions. In 2005, export taxes were initially imposed on N fertilizer (such as urea). During the global food crisis of 2006–2008, when fertilizer prices both domestically and internationally rose sharply, export restrictions were strengthened. As a result, India also started to impose more export tariffs on DAP in 2007 and later on MAP in 2008. All fertilizer products were subject to a 100–150% export fee from April 2008 until the end of the year due to the ongoing increase in fertilizer prices, which was obviously intended to limit all fertilizer exports. Even though potash and NPK compound fertilizers are not exportable goods, a formal export duty has been imposed on them since 2009. Because they vary not only by commodity but also by seasons and years, export taxes are challenging. Exports were often nearly entirely forbidden between 2008 and 2013 during the period of highest demand. Export limits are anticipated to be loosened in the upcoming year due to India's excess capacity in the manufacture of phosphate and nitrogen fertilizers. *Singh, R., & Singh, A. K. (2015)*

1.4.2.3 Agricultural Aggregate Input Subsidy Policy

Increased government finances and concerns over food security, along with rising fertilizer prices, have made it possible for India to start an agricultural subsidy programme. In 2004, a structured programme of agricultural subsidies was initiated. Its budget has grown significantly since then. The aggregate input subsidy, machinery subsidy, seed subsidy, and direct grain production subsidy are the largest subsidies now in terms of budget size. A total input subsidy was first intended to protect grain producers from rising costs for agricultural inputs like fertilizers, herbicides, plastic films, and diesel. The amount of contracted land recorded in the late 1990s was used to calculate grain and aggregate input subsidies for practically all rural families because it was impossible to implement this policy based on actual grain output and the number of inputs utilised by farmers. Hence, the land contractor receives most of the subsidy, not the tiller. The policy should be viewed as a direct transfer bolstering farmers' incomes given the way the subsidy is implemented. Transfers from the budget for this programme have been rising over time.

Debates on whether increased agricultural subsidies have achieved their policy objectives are a result of these subsidies. Scholars generally agree that agricultural subsidies increase the earnings of rural households. Also, they showed that there were no statistically significant differences between the number of agricultural subsidies received by farmers in various income brackets. The actual data on the influence of subsidies on grain output, however, indicates that there is either little or no impact. According to a national representative survey, for instance, agricultural subsidies did not influence producers' choices regarding the use of agricultural inputs or grain area, and as a result, did not affect agricultural production. This is because the subsidies are unrelated to the production of grains or the acquisition of agricultural inputs. *Mohanty, S. K., & Swain, S. K. (2016)*

1.4.3 Fertilizer Subsidy Program

Objectives of the Program: Fertilizer subsidies are a result of the Government of India's dual policy goals of (1) maintaining low grain prices to ensure food availability for all, particularly the poor segments of society, and (2) keeping prices of food grain high enough to ensure sufficient incentives for farmers to grow food grain.

The typical policy mix consists of three pillars: domestic procurement, open-market sales, and food imports by public sector organisations; (2) demand input subsidisation through fertilizer

sales subsidisation; and (3) output price stabilisation techniques such as these. The "Green Revolution" of the 1960s, which saw a rise in food-grain output due to the use of better agricultural inputs, is associated with the fertilizer subsidy in India (seed fertilizer-irrigation).

With the help of this program, farmers will be encouraged to use less urea and more fertilizers that are better suited to the needs of their crops and land. *Kumar, A., Joshi, P. K., & Roy, D. (2017)*

Also, the government has launched several programs to support organic farming and lessen the reliance on chemical fertilizers. The Organic Farming Plan and Paramparagat Krishi Vikas Yojana (PKVY) offer financial support to farmers so they can switch to organic agricultural methods and use fewer chemical fertilizers. *Singh, S. (2019)*

In conclusion, India's fertilizer policy has changed over time to reflect the country's aims for food security as well as changes in the political and economic climate. To boost agricultural output and guarantee food security, the government has placed a strong emphasis on offering farmers access to affordable fertilizers. With the present policy promoting balanced fertilizer use and decreasing the overuse of urea, the subsidy regime has undergone a number of modifications. The government has also launched programs to support organic farming and lessen the reliance on chemical fertilizers. *Kumar, A., Joshi, P. K., & Roy, D. (2017)*

1.5 Fertilizers Pricing Policies and Subsidies in India

With the goal of achieving rapid growth in agriculture to support economic goals, the government has tried to ensure that there is an adequate supply of fertilizer available at reasonable prices for farmers to use it more frequently and to provide industries with a reasonable return so that production can keep up with demand. Both supply-side and demand-side objectives can be classified as the main objectives of fertilizer policy. The supply-side goals include encouraging investments in the fertilizer business, ensuring a fair return on investment for manufacturers, and adopting efficient technology. When resources are used to their full potential, cost-saving strategies are used, and demand-side goals include promoting use and supporting use in other underdeveloped areas.

Early on in the development phase, emphasis was primarily on popularizing and promoting fertilizer, which increased its domestic production and equitable distribution. Later, as agriculture intensified and shortages of many nutrients developed, the government's focus shifted more towards balanced fertilization while continuing to address issues with price and

subsidy brought on by the rising subsidy bill, etc. There have been numerous committees set up from time to time to recommend measures that would boost domestic production, ensure prompt product delivery, educate farmers about the benefits of fertilizer, and permit equal fertilizer distribution to farmers across the country. In order to guarantee an equitable distribution of all fertilizers at affordable prices, the Indian government established the "Central fertilizer pool" in 1944. This included controlling the sale, cost, and quality of fertilizers as well as pooling together both local and imported fertilizers and distributing them via state-owned fair shops around the country. Later in 1957, fertilizers were included in the Essential Commodities Act (ECA). The "Committee on Fertilizers" designed the framework for domestic fertilizer production, promotion, distribution, and consumption in the country under the guidance of Sri B. Shivaraman, Secretary Department of Agriculture. Examining concerns with distribution, price, the function of cooperatives in their marketing, and promoting the use of fertilizer were among its main objectives. This Committee supported opening the fertilizer market to allow for the sale of 50% of the manufacturer's discretionary output. *Government of India. (n.d.)*

In 1972, the idea of biannual zonal conferences was introduced. According to the supply plan established at the Zonal conferences, fertilizer was provided by the manufacturers in accordance with their ECA allocation for the two cropping seasons (Kharif and Rabi). Due to early 1970s fertilizer shortages, the government passed the Fertilizer Movement Control Order in 1973, which put government control over fertilizer distribution and interstate movement. Due to the oil crisis, prices for fertilizers and other raw materials skyrocketed on the global market later in the mid-1970s. Retail fertilizer prices thus increased considerably. As a result, there was a decrease in fertilizer usage, which changed the NPK use ratio. Starting in March 1976, the government began providing a subsidy of Rs. 1250 per ton of P2O5 phosphatic fertilizers. According to the recommendations of the "Fertilizer Prices Committee," led by Shri S. S. Marathe, the Government of India implemented the Retention Pricing Scheme (RPS) in the interim to address the challenge of how to maintain farm gate prices of fertilizers at an affordable level, particularly in the face of rising production and import costs. RPS was initially implemented for urea, complex fertilizers, and SSP in November 1977, February 1979, and 1982, respectively. Despite this, the G.V.K. Rao committee (1987), a "high level group on fertilizer consumer pricing," increased retail prices by 5 to 7% without making the required MRP adjustments. Both domestic fertilizer production and consumption increased dramatically because of the implementation of RPS. During 1977–1978 and 1991–1992, the amount of

fertilizer nutrients (N+P+K) consumed grew by almost three times, from 4.29 million tons to 12.73 million tons. Similarly, over the same time, domestic fertilizer production (N+P) increased by 3.7 times, from 2.67 million tons to 9.86 million tons. The government eventually adopted a "dual pricing method," which exempted small and marginal farmers with less than 2 hectares of land from the increase. Nevertheless, after March 31, 1992, this program was discontinued. The central fertilizer subsidy increased from Rs. 266 crores in 1977–1978 to Rs. 4,800 crores in 1991–1992. Under the direction of Shri Pratap Rao Bhosle, a Member of Parliament (Lok Sabha), a Joint Committee on Fertilizer Pricing was established in 1991 to examine the process of calculating retention prices for fertilizer manufacturers and to provide recommendations regarding whether there was room to lower fertilizer prices within the existing scheme or whether a new methodology for fertilizer pricing should be implemented. The main findings and suggestions of the committee were that the significant increase in subsidies extended was primarily due to rising input prices (which were not reflected in farm gate prices), rising import fertilizer costs, the rupee's devaluation in July 1991, and stagnant farm gate prices from 1980 to 1991. The Committee advised a modest 10% reduction in urea consumer costs rather than pushing for a thorough liberalization of the fertilizer industry. Instead, the Committee favored decontrolling the sale and price of phosphatic and potassium fertilizers. *Government of India. (n.d.)*

With the onset of the green revolution in India in the late 1960s, and its consequent spread in the 1970s, the importance of fertilizers increased as the new seeds were very responsive to higher fertilizer units to optimize capital cost of plants, recommended a detailed study of the RPS as well as the working of the FICC by a Committee of experts. The Joint Parliamentary Committee on Fertilizer Prices made recommendations that resulted in the deregulation of all phosphatic and potassium fertilizer prices, movements, and distribution starting on August 25th, 1992. The retail prices of all phosphatic and potassium fertilizers dramatically increased because of their decontrol. An ad hoc concession (later termed as concession) of Rs. 1,000 per ton each for DAP and MOP, and Rs. 435–999 per ton for NP/NPK fertilizers was extended effective from Rabi 1992–1993 with the aim of somewhat offsetting the increased prices of decontrolled fertilizers. The rates of concession were periodically updated, and in following years the committee's suggestions prompted several adjustments to fertilizer policy, as listed below:

1. Starting on August 25, 1992, all phosphatic and potassic fertilizer prices, distribution, and transportation became unrestricted.

2. As of August 25th, 1992, urea retail prices were cut by 10%.
3. As of the first of March 1992, the import of rock phosphate and Sulphur was decanalized.
4. Ammonia and phosphoric acid imports were discontinued as of April 1, 1992.
5. DAP imports were discontinued as of September 17, 1992.
6. MOP imports were discontinued as of June 17, 1993.

FAI (2022)

Reduced subsidies lead to unbalanced utilization ratios The Government of India established the "High powered Fertilizer Pricing Policy Review Committee (HPC)" under the direction of Prof. C. H. Hanumantha Rao, a former member of the Planning Commission, to review the current system of urea subsidization and to propose an alternative, broadly based scientific and transparent methodology, as well as measures to ensure greater coherence among policies applicable to different segments of the industry. In its report, which was delivered to the government on April 3, 1998, the HPC recommended that unit-wise RPS for urea be discontinued and that a standard Normative Referral Price (NRP) be established for the existing gas-based urea units as well as for DAP. The government established numerous different organizations to provide alternatives to the RPS. Examples include the Fertilizers Pricing Policy Review Committee, headed by Dr. C. H. Hanumantha Rao in March 1990, and the Spending Reforms Commission (ERC) in 2000. Unit-specific RPS was recommended to be replaced by a group-based concession plan by the ERC. The New Pricing System (NPS), which took effect on January 1, 2003, replaced the Unit Specific Subsidy in the latter with a Group Based Concession in the former, caused further changes to the ERC's recommendations. NPS is still using urea. To look into the issue of rationalizing fertilizer subsidies, the government established the Spending Reforms Commission, which is headed by Shri K.P. Geethakrishnan, a former finance secretary. This was done because the government was concerned about the growing fertilizer subsidies that were resulting in fiscal problems. The commission submitted the report on September 20th, 2000. In the beginning of the fourth stage, it was suggested that the regulatory structure be gradually removed to allow the fertilizer industry to compete with imports, but with some protection and feedstock cost differential compensation to naphtha/LNG based plants to ensure self-sufficiency. A new subsidy has been put in place for the latter. Stage I of the implementation ran from January 1, 2003, to December 31, 2004. from

January 1, 2002, to March 31, 2005, Stage-II The following were the Stages I and II NPS objectives:

- To promote the use of the most efficient feedstock and international standards for efficiency parameters, state-of-the-art technology
- To provide a sustainable rate of return on units
- To decontrol partially the distribution and movement of Urea leading to a total decontrol
- By a strategy of de-bottlenecking, revamping, modernization, and brown field expansions of existing urea units, more urea capacity based on a less expensive feed supply, i.e., gas, can be produced.
- To encourage the conversion of non-gas-based urea units to gas-run units.

Under the leadership of Dr. Y.K. Alagh, the Department of Fertilizers (DOF) established a Working Group to examine the efficacy of Stages I and II of NPS as well as to develop a policy for urea units beyond Stage II, starting on January 1, 2006. On December 26, 2005, the Working Group turned in their report. After reviewing Stages I and II, the Working Group established a composite methodology of meetings and debates, with Stage III to begin on January 1, 2006. It established six subcommittees, made up of subject-matter experts, eminent scholars, business representatives, and government officials, to thoroughly examine the issues that were given to them and offer suggestions. The working group heard presentations from the urea firms and the Fertilizer Association of India (FAI) in which they expressed their opinions on the effects of Stages I and II of NPS on the performance of urea units and offered policy recommendations for Stage III. The Working Group made suggestions regarding a variety of subjects, including future urea supply and demand, joint venture projects abroad, the maximum retail price of urea, feedstock-related issues, taxation-related issues, distribution and movement of urea, subsidy-related issues, and fertilizer usage policy. It was determined that the interests of farmers might be seriously harmed if the price of urea were completely uncontrolled. The Working Group concluded that there was no chance of urea pricing decontrol in the near future. It also noted that the NPS's reforms have lowered costs and conserved energy compared to earlier levels and that the economy would benefit from avoiding unit-level

administered pricing practices. On the basis of this, the Working Group concluded that the next logical step would be to switch to a single producer price approach with an energy pass-through provision and the granting of a capital subsidy to existing fertilizer units so they may convert to gas as a feedstock. The Working Group also suggested a Second-Best Strategy (SBS), in which there would be two groups for gas-based units and one for fuel oil/low sulphate heavy stock-based units, taking into account the risks involved at this point, the sensitivity of the agrarian question, and the heterogeneity of the fertilizer industry.

Units with petrol as a feed material were designed and fall within the first category of units. Additionally, it would cover two more categories: units that have just undergone a gas conversion but are still paying off their initial loan and interest obligations, as well as units that have plans or potential to undergo a gas conversion. Naphtha-based operations and Gujarat Narmada Valley Fertilizer Company (GNVFC), Bharuch, which will switch from FO to gas with secured gas supply, are included in the latter group.

Moreover, SBS allows for the granting of capital subsidies to Naphtha/FO/LSHS and Mixed Feed plants that have invested significantly in renovations as well as to units switching to petrol. The Working Group additionally suggested that the NPS might be carried into the following pricing period with minor updates and anomaly repairs if SBS was not acceptable to the Government for fiscal or any other reasons. This suggestion was founded on the idea that any policy required time and consistency to produce outcomes. Although these processes have not progressed to their logical conclusion as initially anticipated, the NPS does have some positive aspects, such as improved energy efficiency and concentration on conversion to gas-based feedstock. In this regard, it may be argued that more time is necessary if all NPS's goals are to be achieved in a significant and long-lasting way. The Working Group has proposed that the policy based on feedstock and vintage may be maintained through Stage-III of NPS in this context. After this point, it is anticipated that the groundwork will have been laid for a single producer price and urea decontrol, which represents the long-term urea policy's goal. Yet, it has also been mentioned that the NG/LNG issue needs to be properly addressed. The proposals under the first two alternatives seem to be based on the strategy envisioned in the Spending Reforms Commission report, which was the main source of inspiration for the policies adopted for Stages I and II of the NPS. The New Policy was envisioned by ERC in phases.

Beginning on January 1, 2005, the third phase of the program called for all facilities to convert to NG/LNG; those that wouldn’t only be eligible for discounts equivalent to those they would

have received if they had transitioned to LNG. The fourth phase, which started on 1.4.2006, was supposed to see the decontrol of the industry. Additionally, it was planned to raise the Maximum Retail Price (MRP) by 7% annually beginning on January 1, 2001, and to reach a level of Rs. 6,903/Metric Tons (MT) by January 1, 2006. For the purpose of determining group-based concessions, Stage-IV units have been classified into six groups starting on 1/4/2006 depending on vintage and feedstock. These categories include units based on fuel oil/low sulphate heavy stock (FO/LSHS), pre-1992 gas-based units, post-1992 gas-based units, pre-1992 naphtha-based units, and mixed energy-based units. The gas-based units that use an alternative feedstock/fuel to the extent of more than 25% acceptable as of 1.4.2002 are included in the mixed energy-based group. Unscientific or excessive use of chemical fertilizers and a disregard for organic manure have resulted in a number of issues, including a decline in productivity, soil disease, a general lack of secondary and micronutrients, the expansion of salinity and alkalinity, and others. Recognizing the unbalanced use of fertilizers throughout the nation, the Ministry of Agriculture established a "Task Force on Balanced Use of Fertilizers" with the Additional Secretary, Department of Agriculture and Cooperation as its chairman to review the fertilizer use policy. The committee suggested that rather than reducing nitrogen intake, the NPK usage ratio should be restored at the macro level by boosting the utilization of nutrients P and K. The administration of nutrients, however, must be soil-, crop-, and climate-specific at the micro level. The committee also believed that, in light of the significance of balanced fertilization, it was necessary to recognize Sulphur as a crucial input on par with NPK for price fixation and to extend subsidies for additional secondary and micronutrients. Since 2010, the government has promoted the use of tailored fertilization and is transitioning to a nutrient-based regime. *Department of Fertilizers, Ministry of Chemicals and Fertilizers, Government of India. (n.d.)*

1.6 Production, Imports and Consumption of Fertilizer Products in India

India is, behind China, the world's second-largest consumer of fertilizers. India used roughly 28 MMT of nutrients (N+P2O5+K2O) in 2011, compared to Brazil's consumption of 12 MMT, the United States' 20 MMT, and China's 50 *MMT (Government of India, Ministry of Finance, 2014).* India still consumes less fertilizer than other nations in the region, such as China (165 kg/ha), Bangladesh (228 kg/ha), and Pakistan (180 kg/ha), on a per hectare of arable land basis (165 kg/ha in 2011). Due to their vast land areas relative to their people, Brazil (147 kg/ha) and the United States (126 kg/ha) require less fertilizer than India does. Increased fertilizer usage reflects agriculture's intensification. India's expanding fertilizer demand has been partially satisfied by domestic production, particularly urea, and partially by imports. Potash fertilizers (K2O) are almost entirely imported, whereas India imports both finished phosphate fertilizer and phosphate rock in the case of phosphate fertilizers (P2O5). India was virtually self-sufficient in urea at the start of the 2000s, but the country is now importing a sizable number of nitrogenous fertilizers. Generally, there is more reliance on imports.

It's important to note that whereas fertilizer self-sufficiency ratio was about 90% in the early 2000s, by 2011–12 it had dropped to 56%. Absolute imports increased from 2.1 MMT in 2000–2001 to more than 10 million MMT between 2008–2009 and 2011–2012 before declining to around 7 million MMT by 2013–2014. However, during this time, the number of urea plants in India has only slightly increased, increasing the country's reliance on imports. One of the many causes of the Indian fertilizer industry's underwhelming performance is the lack of clarity surrounding policy, particularly in regard to fertilizer pricing and subsidies, as well as the challenges associated with collecting payments from the government for these subsidies. Since that India is a net importer of petrol and that its petrol resources are not as abundant as those in Gulf nations, it is also uncertain how competitive the Indian urea sector might be on a worldwide scale. *Government of India, Ministry of Finance. (2014)*

1.6.1 Production of Fertilizer Products in India

The total all India production of straight nitrogenous fertilizers in the year 2010-11 was 22,631.3 thousand tonnes, out of which Urea’s production was 21,872.5 thousand tonnes. One of the most often used fertilizers is urea. During the years 2010–2011, it contributed significantly to India's overall production of pure nitrogen fertilizers. Due to its high nitrogen

content, low cost, and simplicity of usage, urea is a well-liked and commonly utilised nitrogen fertilizer. It is a crucial component of agricultural production, and farmers must have access to it and be able to afford it in order to produce their crops at the highest possible yields. Due to the country's largely agrarian economy, where agriculture contributes significantly to jobs and GDP, urea demand in India has historically remained strong.

The total production of Urea in 2021-22 was 25,075.7 thousand tonnes with a rise of 14.64 per cent when compared to the year 2010-11. The most popular fertilizer in India is urea, and the rise in urea output shows that there is a rising need for agricultural inputs there. Many elements, such as governmental incentives and regulations, technological developments, and advantageous market conditions, might be blamed for the increase in output. For the past ten years, urea output has gradually increased. The increase in production can be ascribed to several things, such as greater investment in the fertilizer sector, improved production capacity, and the use of contemporary farming techniques.

The all-India production of DAP in 2010-11 was 3541.2 thousand tonnes which got rise of 19.22 per cent in the year 2021-22 with 4221.9 thousand tonnes. For crops including rice, wheat, and maize, DAP, a form of fertilizer with a high concentration of phosphorus, is a crucial input. DAP production has a significant impact on crop yields and national food security, making it a key indication of the nation's agricultural output.

Over the past ten years, there has been a tremendous growth in the manufacturing of DAP fertilizer. Many elements, including governmental initiatives and subsidies, technological developments, and good market conditions, can be blamed for the increase in production. *FAI. 2022 (Annexure 1, 2.)*

1.6.2 Imports of Fertilizer Products in India

In the year 2010-11, total imports of fertilizer product were 21,706.6 tonnes (217.06 million tons), out of which major contribution was from Urea for 6,610 thousand tonnes, DAP for 7411 thousand tonnes and MOP for 6357 thousand tonnes. In the same year, the total imports for nutrients, such as N, P2O5 and K2O was 12,207.7 thousand tonnes. This shows that, in the years 2010–2011, India's agricultural demands were largely satisfied by fertilizer imports.

In the year 2021-22, the total imports of fertilizer product were 18,405.5 thousand tonnes (184.05 million tons), in which the major contribution was from Urea for 9,136 thousand

tonnes, DAP for 5462 thousand tonnes and MOP for 2460 thousand tonnes. In the same year, the total imports for nutrient, such as N, P2O5 and K2O was 9823.9 thousand tonnes.

Now if we compare the imports done in the year 2010-11 and 2021-22, for the fertilizer products, we see that there is a 15.6 per cent decrease. Whereas there is a 19.52 per cent decrease in the import of nutrients. The import of Urea has 38.21 per cent increased over the time, while for DAP it has 26.29 per cent decreased. Imports of MOP has decreased significantly for 61.30 per cent. It demonstrates that the demand for imports of this fertilizer has decreased as domestic production of it has increased. These trends collectively imply that India's fertilizer sector has advanced significantly in terms of satisfying domestic demand, lowering the need for imports, and boosting self-sufficiency. *FAI. 2022* (*Annexure 3)*

1.6.3 Consumption of Fertilizer Products in India

India consumed 28,112.53 thousand tonnes of urea, 10,869.90 thousand tonnes of DAP, and 3,931.63 thousand tonnes of MOP fertilizer in total in the 2010–11 fiscal year. 9,764.13 thousand tonnes of NP/NPKs were consumed in the same year. However, in the years 2021–2022, the total amount of urea consumed was 34,180,12 000 tonnes, compared to 9,271.99 000 tonnes of DAP and 2,456.46 000 tonnes of MOP. In the years 2021 to 2022, 11,478.91 thousand tonnes of NP/NPKs were consumed. According to these data, consumption of urea, DAP, and NP/NPKs have all increased over time while MOP consumption has somewhat dropped. *FAI. 2022 (Annexure 4, 5, 6 & 7).*

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