CHAPTER 7: SUMMARY, CONCLUSION AND SUGGESTIONS.

7.1 Summary

7.1.1 Summary of the Study.

Chapter 1 provides an overview of the fertilizer market in India. It starts with an introduction to the study and then goes on to discuss the various agriculture development programs in India. The chapter then focuses on fertilizers and their role in Indian agriculture. It talks about the fertilizer subsidy regime and how it has evolved over time. The evolution of fertilizer trade policies, including import and export policies, is also discussed.

The chapter highlights the fertilizer pricing policies and subsidies related to fertilizers in the country. It also provides information on the production, imports, and consumption of fertilizer products in India.

Chapter 2 of the thesis provides a comprehensive overview of the Nutrient-Based Subsidy (NBS) Policy in India, which has been introduced to address the issue of imbalanced fertilizer use by farmers. The chapter begins with an introduction to the policy and its importance in the Indian agriculture sector.

The thesis highlights the objectives of the NBS policy, which include ensuring balanced fertilizer use, increasing crop productivity, and reducing the cost of cultivation for farmers. The chapter discusses the challenges associated with the imbalance of fertilizer use by farmers and how the NBS policy seeks to address these challenges.

The chapter then describes the types of subsidies given under the NBS policy, which are based on the nutrient content of fertilizers. The chapter also covers the pricing behavior, fertilizer policy, and subsidies, emphasizing the need for transparency and efficiency in subsidy allocation.

The chapter further discusses the Fertilizer Monitoring System (FMS) under the NBS policy, which tracks the production, movement, and sale of fertilizers to prevent leakage and diversion. The chapter highlights the importance of fertilizer use efficiency under the NBS policy and the need for proper monitoring and evaluation of the policy's impact.

Finally, the article presents the salient features of the NBS policy for 2021-22, which include the continuation of the policy with increased coverage of micronutrients and organic fertilizers. The chapter concludes that the NBS policy has been effective in achieving its objectives, and there is a need to continuously monitor and evaluate the policy to ensure its sustainability and effectiveness in the long run.

In summary, Chapter 2 provides an in-depth understanding of the NBS policy and its objectives, as well as the challenges associated with imbalanced fertilizer use by farmers. The chapter also discusses the different types of subsidies given under the policy, the pricing behavior, and fertilizer policy, and emphasizes the importance of monitoring and evaluation to ensure the policy's effectiveness. The salient features of the NBS policy for 2021-22 are also discussed in detail.

Chapter 3 of the thesis provides a comprehensive review of the related literature on the use of fertilizers in agriculture. The chapter starts with an introduction to the importance of fertilizers in agriculture and their impact on crop productivity. It then examines the factors that influence the consumption of fertilizers by farmers, such as soil fertility, crop type, and government policies.

The chapter also discusses the issues surrounding the subsidies provided for fertilizers and presents studies that support and oppose the use of subsidies. Additionally, it reviews the literature on the Nutrient Based Subsidy (NBS) Policy, which is a scheme implemented in India to promote the balanced use of fertilizers by farmers.

The next section of the chapter looks at studies that examine the efficiency of fertilizers use under the NBS policy. Furthermore, it explores the preference of farmers for different types of fertilizers and the problems encountered by farmers and distributors in the supply chain.

Overall, this chapter highlights the importance of fertilizers in agriculture, the role of government policies in their consumption, and the need for a balanced approach to the use of fertilizers to promote sustainable agriculture. It provides a theoretical background for the research and identifies the research gaps that need to be addressed in the current study.

Chapter 4 provides an overview of the trends and patterns of fertilizer subsidies in India. The chapter starts by providing a brief history of fertilizer subsidy disbursement and highlights how the implementation of fertilizer subsidies has evolved over the years. The chapter then

discusses Direct Benefit Transfer (DBT), which is a new system of subsidy distribution introduced in recent years.

The objectives of the DBT scheme and the DBT dashboards are explained in detail. The implementation of the DBT process is also discussed, and the role of Aadhaar, India's unique identification system, is highlighted. The chapter explains how Aadhaar has been integrated into the subsidy distribution system, and how Aadhaar enabled Fertilizer Distribution System (AeFDS) has been implemented to provide a more efficient and transparent distribution system.

The chapter also discusses the NPK consumption ratio, which measures the ratio of nitrogen, phosphorus, and potassium fertilizer consumption. The One Nation One Fertilizer initiative is also being discussed, which aims to streamline fertilizer production and distribution across the country. The chapter also provides an overview of Pradhan Mantri Kisan Samridhi Kendra (PMKSK) and PM Kisan Samman Yojana, which are two initiatives aimed at promoting agricultural growth and providing support to farmers.

Finally, the chapter discusses the challenges associated with fertilizer subsidy reforms. The chapter highlights the need for improved targeting mechanisms to ensure that subsidies reach the intended beneficiaries and stresses the importance of increasing fertilizer use efficiency to reduce the environmental impact of fertilizer use. The chapter concludes by emphasizing the need for continued efforts to reform fertilizer subsidies to ensure sustainable and inclusive agricultural growth in India.

Chapter 5 of the thesis discusses the research methodology adopted for the study. The chapter begins with a brief explanation of the importance of the study, followed by the objectives of the study.

The research design and tools employed in the study are then discussed, including data sources, data types, and communication approach. A sample design is presented, which includes sample population determination, sample frame, and sample size.

The data collection process is described, and the objectives of data collection and questionnaire design are explained. The methods of data compilation, statistical analysis using SPSS, and reliability and validity testing are also discussed.

Data interpretation and analysis methods are then presented, including quantitative analysis using mean, standard deviation, and T-test, as well as qualitative analysis. Finally, the chapter concludes by discussing the limitations of the study and the ethical considerations taken into account during the research process.

Chapter *6* presents the data interpretation and analysis of the study. It is divided into three sections based on the responses received from farmers, fertilizer industry officers, and fertilizer distributors/retailers. Each section includes two sub-sections, namely demographic response, and behavioral response. The demographic response provides a description of the respondents based on their age, education, and experience in the agriculture industry. The behavioral response presents the opinions and attitudes of the respondents towards fertilizer subsidies, their usage, and their impact on agricultural productivity.

The farmer's response section provides information about the demographic and behavioral response of farmers towards fertilizer subsidies. It includes data about the age, education, and experience of the respondents, and their opinions on the effectiveness of the current subsidy system, subsidy amount, and the distribution mechanism. The fertilizer industry officer's response section provides similar information about the attitudes of fertilizer industry officers towards fertilizer subsidies. It includes data about the demographic profile of the respondents, their opinions on the subsidy regime, the role of technology in subsidy disbursement, and the need for subsidy reform. The fertilizer distributor/retailer response section provides information about the demographic and behavioral response of fertilizer retailers towards fertilizer subsidies. It includes data about the age, education, and experience of the respondents, their opinions on the subsidy amount, distribution mechanism, and their role in the subsidy disbursement process.

The chapter presents the data collected from the respondents in tabular form, which is analyzed using descriptive statistics, including mean, standard deviation, and t-test. The data is also analyzed qualitatively to identify common themes and patterns in the responses. The chapter concludes that there is a need for reform in the fertilizer subsidy system based on the responses received from the farmers, fertilizer industry officers, and fertilizer distributors/retailers.

Chapter 7 provides a summary of the study, implications of the findings, conclusion, and suggestions for policymakers.

The summary of the study highlights the research methodology, data analysis, and interpretation of findings. The study aimed to examine the trends and patterns of fertilizer subsidies in India and the impact of the Nutrient-Based Subsidy (NBS) policy on farmers, fertilizer industry officers, and distributors/retailers.

The implications of the findings suggest that the NBS policy has a positive impact on fertilizer availability. However, there is a need to improve the implementation of the policy and increase awareness among farmers about the benefits of balanced fertilization.

The conclusion of the study emphasizes the importance of fertilizer subsidies in improving agricultural productivity and the need for efficient subsidy distribution systems. The study suggests that the Direct Benefit Transfer (DBT) scheme and Aadhaar-enabled Fertilizer Distribution System (AeFDS) can help in reducing leakages and improving transparency in subsidy distribution.

The study recommends that policymakers should focus on improving the efficiency of fertilizer distribution systems, increasing awareness among farmers about balanced fertilization practices. The study also suggests that future research should focus on the impact of the NBS policy on crop productivity and soil health.

7.1.2 Summary about NBS Policy.

7.1.1.1 Pre-NBS Policy

Historically, a cushion of subsidy has been extended on fertilizer trade with an intention to make it affordable to the farmers so that its consumption can be increased, which can lead to improved productivity of agriculture in the country. Initially, in 1977, Retention Price Scheme (RPS) has been introduced for Urea followed by complex fertilizers in 1979. Here, 12% post tax return was guaranteed on manufacturing of fertilizers and MRP was decided by GoI.

As a part of liberalization process of Indian Economy, P&K sector has been decontrolled since 1992 onwards, wherein, MRP has been deregulated and fixed product wise ad-hoc concession was extended as a subsidy. The system of deciding product wise fixed subsidy has continued till 31.03.2010. Here consumption of products like DAP and MOP, where relatively higher amount of subsidy was extended has been increased phenomenally besides Urea, which was continued under RPS and its MRP was kept low and static for years together vs consumption of low analysis P&K fertilizers. The situation distorted the NPK use ratio and in turn was

impacting the soil productivity.

The emerging condition compelled the policy makers to re-think the modus operandi of P&K fertilizers, which can assure balanced use of different nutrients. To be precise, this has given birth to the Nutrient Based Subsidy (NBS) Policy.

7.1.1.2 Post-NBS Policy w.e.f 01.04.2010

To ensure balanced application of fertilizers, the nutrient based subsidy (NBS) policy has been introduced replacing product-based subsidy followed earlier. The per kg subsidy is decided for N, P, K & S nutrients. Product wise subsidy is computed based on nutrient value contained in individual product. Here, unlike pre-NBS era, per kg content of nutrient is eligible to get subsidy at uniform rate in all the products. Therefore, the product-based approach in terms of production and consumption has been diluted and adoption of NP/NPK complex fertilizers has increased phenomenally in the country. Market determined MRP was allowing flexibility to the suppliers in leveraging the prices as per the market forces.

However, GoI has continued to control supplies with it. The eligibility of subsidy has been linked with compliance of state wise supplies in accordance with the supply plan and the whole mechanism is administered through an E-system called mfms.

Thus, the intention of introduction of NBS was quite objective from multi fold point of view and has helped to achieve the same in terms of correcting NPK use ratio, enhancing availabilities and increasing fertilizer consumption in the country. Especially, a greater number of NPK grades are introduced in the post-NBS time, which well suits to the local cropping patterns in enhancing agricultural productivity.

Besides major nutrients N, P, K & S, NBS was extended on micronutrients like Boron & Zinc on fortified complex fertilizers. Looking to the rising deficiency of micronutrients, this was quite a welcome step taken by GoI.

Unfortunately, urea has been kept out of the net of NBS, continuing its MRP substantially low has maintained the gap in consumption of Urea & Non-Urea products. In spite of phenomenon growth in consumption of fertilizers in post NBS time, the ratio of consumption between Urea and Non-Urea products has remained the same in the range of 45-55 % which reveals that lower MRP of Urea has provided temptation to the farmers for its excessive use, even at the

cost of not applying P&K fertilizers. Besides anomaly in prices of Urea and Non-Urea products India's over dependence on imports of P&K fertilizers or raw material for the same is another important factor. The rising demand for fertilizers across the globe has increased the import prices over the years. The rising fertilizer prices are putting pressure on GoI for enhancing fertilizer subsidy proportionately, balancing out the MRP. Therefore, on one hand MRP of Urea has remained static, whereas that of P&K fertilizers has increased by 3-4-fold during post NBS time. The widening gap between the MRP of Urea and Non-urea products is influencing distortion in consumption of fertilizers at farmer's level.

Uncertainties in deciding NBS rates in time and in a reasonable manner have always continued. There is nothing like a guaranteed return on production/imports. Subsidies decided for the financial year are reviewed half yearly. However, under the prevailing volatile import markets at instances subsidy so declared does not insulate viability when landed prices goes up beyond a certain limit. On the other hand, if the import prices are getting reduced during the period, GoI enforce recovery for retrospective period.

For the past 2 years, significant distortion has brought in the execution of NBS policy. In spite of a significant rise in the cost of nutrients, subsidy support has been extended only to one or few elements, targeting desired availability of important products like DAP in the country. This approach is absolutely against the spirit for which the NBS policy was formed.

Moreover, although selling prices of P&K fertilizers are decontrolled, for the last few years, GoI is benchmarking the MRP of P&K products, which favors consumption of low-priced products, irrespective of nutrient values. This has significantly put the ultimate aim of NBS policy in reverse gear.

With an intention to plug the siphoning of subsidized fertilizers in industry and make the farmers to realize about actual cost of fertilizers and the kind of subsidy support extended by GoI, the disbursement of fertilizer subsidy has been shifted under DBT scheme. The scheme has helped industry in expediting subsidy compliance especially with dilution of states intervention and acceptance of subsidy claims on weekly basis as against monthly basis as earlier. However, eventually, fertilizer subsidy was to be channelized directly to the farmers as per the ultimate objective of DBT, which has yet to see the light of the day and continued to rout it through industry.

7.2 Conclusion

Conclusions have been made considering the goals that were set forth for the current study's execution. The study's goals were met, as seen in the conclusion below.

- **First objective of the study was to study the factors which influence farmers while buying fertilizers.**

It is concluded that farmer has to decide the purchase of various fertilizer quantity based on his fertility level of soil, types of crops to be grown, (high or low fertilizer consuming crops). It is also affected by the purchase power i.e., availability of cash/credit(V11). At times the availability of a particular fertilizer grade also plays an important role while deciding buying of fertilizers. For example, if DAP is his first choice and it is not available then farmer may opt other NPK grades.

- **The second objective of the study was to study the behavioural change in farmers for fertilizers.**

The study concludes that knowledge of various fertilizer grades(V34), Knowledge of correct price of fertilizer grades(V35), Knowledge of quality of fertilizer(V36) and farmer's own experience(V27) of using various fertilizers plays an important role when it comes to making decisions during fertilizer purchases. For example, the farmers beliefs in his own experience of using a particular type of fertilizer for his crop. His knowledge of various fertilizer grades helps in choosing the correct fertilizer which is required for his farm.

Although Government of India is spending huge amount on account of fertilizer subsidies, however farmers are unaware about the exact amount of subsidy they are getting. Despite per bag subsidy is mentioned on fertilizer bags. Therefore, there is need to run farmer educational programs, to educate and invite their attention towards heavy subsidy and judicious use of fertilizers.

- **Third objective of the study was to study the usage of urea & non-urea fertilizer by the farmer.**

Urea is highest N containing chemical fertilizer, it works in the soil at optimum moisture level, however in case of flooding system of irrigation or stagnation of water in the field, its nitrogen leaches down and if sufficient moisture is not there then it evaporates. To prevent such losses,

GoI has allowed production of neem coated urea, which release nitrogen slowly. Nitrogen is required basically for growth and development of the crops, whereas phosphatic fertilizers are required for root growth, flowering, and fruiting; and potassic fertilizers are used for the regulation of water balance and the activation of enzymes.

The fourth macro-nutrient i.e., Sulphur(S), plays and important role in the production of oil seed crops as it increases oil content and improves overall crop quality. In addition to macro-nutrients various micro-nutrients such as iron (Fe), boron (B), manganese (Mn), copper (Cu), zinc (Zn), molybdenum (Mo), nickel (Ni), chlorine (Cl), oxygen (O), calcium (Ca), and magnesium (Mg), are also required for overall crop quality. Thus, urea and non-urea both group of fertilizers are important for crop production. Therefore, GoI is promoting their balance use.

However, by analysing the various secondary data, it shows that usage of urea has increased over the period of time, and especially after the implementation of NBS Policy, as compared to non-urea fertilizers. Low price of urea is being the major reason for its increased use. So, this concludes that price is one of the factors which plays an important role when it comes to buying of urea and non-urea fertilizers.

- **Fourth objective of the study was to study the affordability of fertilizers by the farmers, due to the NBS policy.**

The intention of GoI in bringing NBS policy was quite noble in many aspects i) To curb over application of high analysis fertilizer like DAP, which is largely imported and promote low analysis NPK grades, which are mainly domestically produced. Ii) To promote balanced use of fertilizer and thereby bring a desired harmony in NPK ratio in the soil so as to keep it productive in the long run.

However, the situation where India has dependency on imports of either raw materials or finished fertilizers to the extent of more than 90% in phosphate and 100% in potash, we do not have significant control on landed cost of P&K fertilizers in either case and it largely depend upon demand supply conditions across the globe. With rising world demand for fertilizers, prices of both raw materials and fertilizers keep on moving upward over the years. This phenomenon is putting pressure on Govt. for higher subsidy. Since, provision of subsidy are budget oriented, baring past 2 years where Govt. is benchmarking the MRP, this result into increased MRP of P&K fertilizers for farmers from time to time. In fact, the MRP of P&K fertilizer has increased by 3-4-fold during post NBS period, whereas that of Urea has remained

stable. Being major input for agriculture, in spite of proportionate rise in output prices realized over the time, the magnitude of rise in fertilizer prices (P&K) is much higher and in reality, farmer is reflecting inability to afford for the same in a desired manner.

- **Fifth objective of the study is to study the post effect of the NBS policy on the agriculture sector.**

The objective of the NBS policy was to ensure balanced use of fertilizers and make them affordable for farmers by reducing availability constraints. Before NBS, despite ample availability, farmers faced difficulty in purchasing fertilizers due to hoarding and overcharging.

Independent of NBS, agriculture sector has grown well over past 13-14 years in the country due to all round efforts of GoI on access to credit, irrigation, MSP, besides good monsoon followed during most of the years.

Since the implementation of NBS, several upgrades have been made to increase transparency in stocks, subsidy disbursement, and availability of fertilizers to farmers. The policy was implemented in three phases, with the latest phase introducing the DBT system based on actual purchases by farmers monitored through PoS machines. This has helped increase transparency, reduce diversion of fertilizers for non-agricultural use, and ensure availability of fertilizers for farmers at an affordable price.

Based on the studies it can be concluded that international prices of various raw materials required to produce fertilizers affects production cost and finally increase in subsidy budget of GoI. Yes, NBS has facilitated in ensuring availability of fertilizers and also helped in correcting NPK use ratio to some extent, which in turn can help to sustain growth in agriculture.

- **Sixth objective of the study is to study the production & consumption pattern of Fertilizers in India.**

NBS Subsidy policy has helped in bringing adequate availability of P&K fertilizers in India, either through Imports or production. However, independently, growth in production or imports largely depend on the landed cost of fertilizers and thereby business economics through both the roots. Since major sources of importing raw materials and finished fertilizers are by far common, the cost of domestic manufacturer will remain higher than landed cost of finished fertilizers during most of the time. Since subsidy component is common for both imported as well as manufactured fertilizers, in major cases imports has edge over manufacturing. During

most of the time, Consumption, especially that of NPK grades got momentum, till 2021-22, when GoI had zero intervention in fixing MRP of such decontrol fertilizers.

However, during last 1-2 years, on account of bench marking MRP of NPKs higher than DAP by GoI, again preference of farmers has tilted towards DAP v/s NPKs. Further, the fixation of subsidy (per unit of N, P & K) is not dealt objectively for past 2 years, which is impacting the consumption of fertilizers. Moreover, the fluctuation taking place in prices of fertilizers & raw materials as well as exchange rate on higher side, once subsidy is fixed for the year is not addressed in present form of NBS, which is impacting the purpose to some extent.

In all, if Government keeps itself away from deciding MRP of decontrolled fertilizers and fix the unit rate of subsidy rationally, NBS can continue to provide momentum to production, imports, and consumption of such fertilizers in India.

- **Last objective of the study is to study the impact on utilization pattern of fertilizers after the implementation of Nutrient-Based subsidy (NBS).**

Keeping urea out of NBS Policy and providing this fertilizer at very very low price has been the first choice of farmers, as compared to other fertilizers like DAP, AS, MOP and various NPKs grades. Although use of balance fertilizer was one of the major aims of NBS Policy. However, the low price of urea has attracted the farming community for its higher use. As a result of that NPK ratio is disturbed.

7.3 Managerial Implication of the Study & Areas of Further Research

The result of the study has clear implications for the Indian fertilizer industry and its stakeholders. Furthermore, these findings have important contribution to the field of knowledge for those who are interested in further understanding of the impact of drivers which influence the buying behavior of the farmers, it also helps in understanding about the usage of urea and non-urea fertilizers, and their affordability by the farmers.

7.4 Suggestions

It is evident from findings that urea has been the center of attraction while purchasing various fertilizers by farmers, only due to low cost and regular availability *(Ref. table 6.12 & 6.30 of farmer response).* Post NBS, every year GoI has allocated approximately 70% of subsidy budget on urea alone *(Ref. table 4.1)* This has favored urea production, import and also usage at farmer's level. However, availability of P&K, have remained in short supply to some extent during season. Although, manufactures/importers are free to fix the MRP of decontrolled fertilizers (P&K group of fertilizers). However, since the year 2021-22, GoI has started intervening in fixing MRP of P&K fertilizers also *(Ref. section 6.3.2).* As a matter of fact, farmers are unaware of precious amounts on account of subsidy being given to them. They are also not giving due importance to the usage of non-urea products, due to higher costs. Therefore, following suggestions are made:

1. Urea needs to be brought under NBS within no time.

2. Imports of Urea should be decontrolled in line with P&K fertilizers.

   The action as above (1& 2) will help in eliminating the anomaly in prices of Urea & Non-Urea products and it is the single factor which can help in bringing harmony in NPK use ratio and thereby sustainable agriculture in a long run.

3. Govt. needs to unveil mechanism for fixation of per unit subsidy values on identified nutrients. Today, this phenomenon is not known to the stakeholders. This can help the industry to decide the cost economics under volatile market.

4. Some kind of redressal mechanism needs to be brought in, which can take care of volatility in prices beyond certain limit vs prevailing at the time of fixation of subsidy.

5. Govt. should not have any role in deciding MRP of fertilizers. It should be purely left on demand supply, bearing curbing its black marketing.

6. Strict linkage of supplies with supply plan granted by GoI is restricting the business expansion plans of the industry. The policy needs to be a little flexible and business friendly.

7. Looking to the logistic cycle from sourcing raw materials, finished fertilizers, its shipping from far away countries, manufacturing/bagging, and placement up to retail point, ideally, manufacturing/importer has to take a call 90 days in advance. Therefore, the decision on NBS rates for subsequent seasons has to be decided and declared well in advance.

8. Besides Zinc, Boron & Sulphur, NBS needs to be extended on a greater number of micronutrients so as to promote overall balanced use of all essential nutrients.

9. As originally thought while framing NBS, subsidy has to be extended on the quantity of required fertilizers based on soil nutrient and crop wise recommendation of fertilizer doses.

10. To curb leakage of subsidized fertilizers, State Govt. should enforce proper vigilance and administration through strict laws.

11. There is an urgent need to run farmer educational programs, to invite their attention to the high amount of subsidy being paid and judicious use of fertilizers.