Policy-Induced Market Distortions in Indian Agriculture: An Examination of Crop Diversification for Sustainable Agriculture

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Abstract

Agriculture constitutes the backbone of the Indian economy by employing a large segment of the population and supporting industrial activity. Despite its pivotal role, it remains in a state of distress as farm incomes have dwindled, making agriculture unprofitable and unsustainable over the years. Much of this crisis can be understood and averted from the perspective of policy-induced distortions. The agricultural policy in India has introduced several distortions in the market, creating a bias towards the cultivation of food grains, at the cost of other crops such as oilseeds and pulses. This distortion has presently created a wide supply demand mismatch in the economy owing to diversifying consumption patterns, leading to reliance on imports of essential commodities such as edible oils. In this context, this paper seeks to examine the extent of supply demand imbalance along with an analysis of market distortions created by agricultural policy. It uses data on production, consumption and market distortions for specific agricultural commodities from sources such as Food Corporation of India, Monthly Per Capita Expenditure Survey of NSSO and OECD Agricultural Policy Indicators. It further looks at examining the extent of crop diversification and its role in alleviating agrarian distress. In doing so, it builds an index of crop diversification and seeks to estimate the impact of agricultural policy variables on crop diversification. With India making efforts towards sustainable development, the findings of this paper will contribute towards empirically understanding some of the fundamental challenges in Indian agriculture which are impediments to sustainable development.

Keywords: *Indian Agriculture, Minimum Support Price, Sustainable Development Goals, Food Grain Bias, Crop Diversification*

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Introduction

Agriculture constitutes the backbone of the Indian economy by employing a large segment of the population and supporting industrial activity. Despite its pivotal role, it remains in a state of distress as farm incomes have dwindled, making agriculture unprofitable and unsustainable over the years. Much of this crisis can be understood and averted from the perspective of policy-induced distortions. The agricultural policy in India has introduced several distortions in the market, creating a bias towards the cultivation of food grains, at the cost of other crops such as oilseeds and pulses. These distortions have resulted in a range of issues including growing buffer stocks, misallocation of fiscal resources in agriculture and mismatch in supply and demand. To highlight, it has created a wide supply demand mismatch in the economy owing to diversifying consumption patterns, leading to reliance on imports of essential commodities such as edible oils.

Public procurement policies, specifically in the form of Minimum Support Price (MSP) Scheme, have come to become price signals for farmers and have contributed to the reduction in price volatility. However, the MSP declared for each cropping season has been in the upward direction, greater than the MSP declared in the previous marketing season. While the focus on food grains extends from the food security concerns of the 1960s and the Green Revolution, the demands of the present day seem to have changed towards nutritional security and doubling farm incomes. This raises the question of relevance and the need to introduce a policy shift to bring about changes in outcomes. Crop diversification has been presented as a viable solution to address agrarian distress and diversifying market demand.

In this context, this paper seeks to examine the extent of supply demand imbalance along with an analysis of market distortions created by agricultural policy. It further looks at examining the extent of crop diversification and its role in alleviating agrarian distress. In doing so, it builds an index of crop diversification and seeks to estimate the impact of agricultural policy variables on crop diversification. With India making efforts towards sustainable development, the findings of this paper will contribute towards empirically understanding some of the fundamental challenges in Indian agriculture which are impediments to sustainable development.

Review of Literature

Foodgrain Policy Bias and Market Distortions

Indian Agriculture faces a food-grain bias primarily owing to the policy interia existing in the sector. The present scenario can be argued to constitute the remnants of the Green Revolution period which focused on rapid increase in production, especially of food grains such as rice and wheat. Owing to the emergency of the situation at hand, Green revolution focused on regions that were equipped to provide results within a short span of time. Despite the attainment of self-sufficiency in food grains, the policy bias continues to exist even today. For instance, Pal and Mruthyunjaya (1993) have highlighted that rice and wheat are the major components of public procurement through the MSP scheme and that the scheme has, in general, increased the weighted average price of food grains received by farmers, altering the price signals for cultivators. As shown in section 3, these trends continue to persist even into the 21st century.

While this area of study is pertinent, existing research has not directly examined this question but has only tangentially approached this question. There exists some evidence to argue that there is a supply-demand imbalance emerging in the Indian agricultural markets which can be attributed to policy inertia. To substantiate, the annual growth in domestic demand stands at 6 percent while domestic production is expanding only at 2 percent (Jha et.al., 2012). While the production and area under cultivation of oilseeds

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have increased, the growth constitutes a small fraction compared to the growth in production and area under cultivation for cereals (Reddy & Immanuelraj, 2017). This creates an opportunity to examine the nature of market distortions introduced by the MSP scheme and the food grain oriented public procurement policy. In this regard, this paper is a step towards understanding the nexus between public procurement and crop diversification.

Determinants of Crop Diversification: Role of Foodgrain Policy

There has been a significant adoption of high-value crops over the last two decades along with a decline in the area under subsistence and traditional agriculture (Kumar & Gupta, 2015), indicating a trend of crop diversification. Crop diversification as an objective for agricultural policy presents a range of benefits associated with sustainable growth. Crop diversification in a cereal intensive system to include pulses and oilseeds is associated with greater land use efficiency and harvest density (Sharma & Sharma, 2005), a necessity in a circumstance of dwindling farm incomes. It was observed that average farm incomes were higher in diversified districts in Odisha when compared to less diversified districts (Basantaray & Nancharaiah, 2017). Particularly in association with increased climate risks, it is found to be an effective adaptive measure that has long term benefits (Birthal & Hazrana, 2019). Despite the potential benefits, the extent of diversification remains regionally determined and sporadic in nature (Kumar & Gupta, 2015), necessitating a comprehensive evaluation of potential determinants for agricultural policy development.

The factors that have an impact on crop diversification can be categorised into supply side and demand side factors. For instance, Mithiya, Mandal and Dutta (2018) group the determinants into six groups - technology factors, infrastructure factors, resources and knowledge factors, market demand, climate related factors and relative income. In similar lines, other studies have identified the major determinants to include cropping intensity, irrigation, annual rainfall, agricultural credit, crop insurance (Kumar, Nayak & Pradhan, 2020; Kumar & Gupta, 2015; Kumar, Kumar & Sharma, 2012). More interestingly, some recent works have delegated their focus towards the policy environment while incorporating a micro-level analysis. Market access was found to have an effect on the extent of crop diversification in spatially disaggregated data of tehsils in India and this effect was found to be exacerbated by government policy and policy-induced distortions (Negi et.al., 2020).

While crop diversification is a pertinent component of agricultural policy, there are some limitations associated with its widespread adoption. With a large proportion of small cultivators, it needs to be kept into consideration that small farmers need to allocate at least half of their land area for high value crops for it to prevent poverty (Birthal, Roy & Negi, 2015). This becomes even more important to consider in the context of agrarian credit crisis and rural indebtedness. Examination of diversification and its types showed that there was "great heterogeneity in terms of typology of diversification among states" and that shift towards high value crops is not solely sufficient to increase output (Mehta, 2009). Policy environment and market development become essential characteristics in determining the nature of crop diversification and the impact of its outcomes. In this context, there is a need to divert existing research on crop diversification towards policy variables, specifically the ones that have created market distortions and ones that can redesign agricultural markets to attune production decisions towards sustainable agriculture.

Policy-Induced Market Distortions: Impact of Procurement Policies

The public procurement system in agriculture has created a bias towards the cultivation of foodgrains, resulting in a range of market distortions and impacts (Gulati, Chatterjee & Hussain 2018; Saini & Gulati, 2017). Some of the concerns include inefficiencies in public procurement, dominant role of state in agricultural markets and fiscal implications for investment and capital formation. To begin with, the trends

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in MSP have been upward, lack flexibility and disregard the demand side (Chand, 2009). Figure 1 shows that MSP has always been increasing compared to the previous year. In addition to being the procurement price, MSP acts as a price signal for farmers before the cropping season and a minimum assured price after harvest in case of any fall in prices (Economic Survey, 2020).

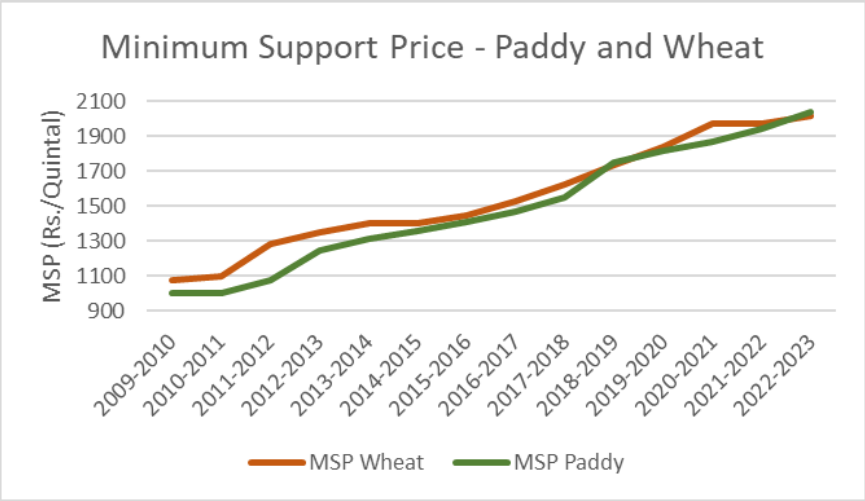

Figure 1: Trends in MSP declared for Paddy and Wheat (Source: FCI)

The inefficiency in public procurement, a system aimed at preventing the market failures latent in agrarian markets owing to production concentration, has imposed higher fiscal costs for the government and also created constraints in the form of storage (Chand, 2009). For instance, the carrying cost of buffer stock and the cost of consumer subsidy, MSP net of issue price of food grains, have been increasing sharply lately. These concerns tend to be associated with a range of issues and pressures facing Indian agriculture and economy at large. Figure 2 summarises potential impacts worth further exploration.

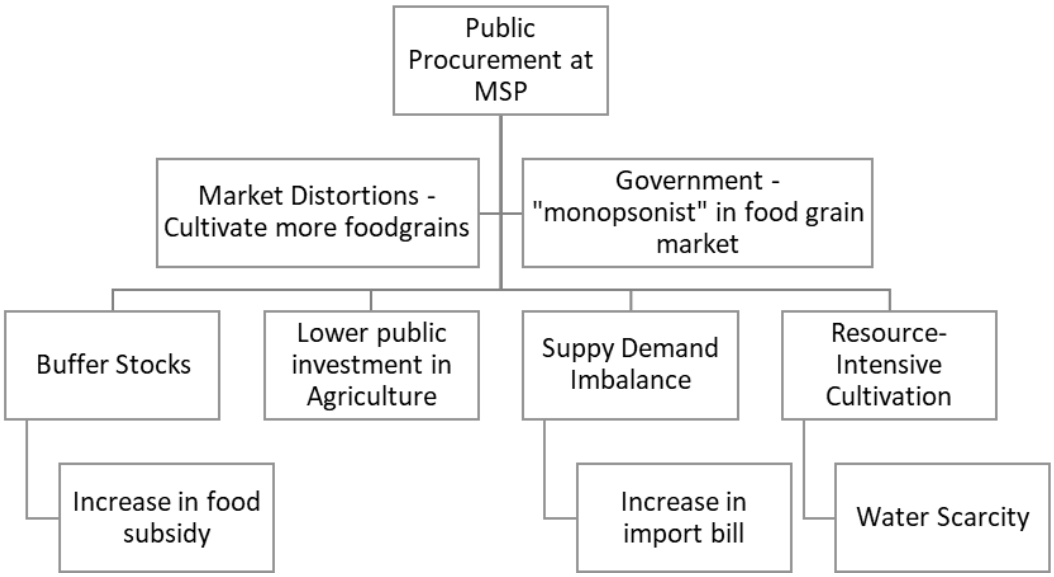

Figure 2: Impact of public procurement of foodgrains at MSP (Source: Own Construction)

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The government, through FCI, has become a "monopsonist" in the grain market in India, as it is the largest procurer of food grains cultivated in the country, ultimately contributing to the crowding out of private players (Economic Survey, 2020; Deodhar, 2021). In addition to being the largest buyer in the market, this has also increased buffer stocks with the government beyond required limits. As observed from Figure 3, it can be noted that foodgrain stocks with the FCI, as recorded at the start of Q2, have exceeded the total stocking requirements (13.54 MMT Rice and 27.58 MMT Wheat).

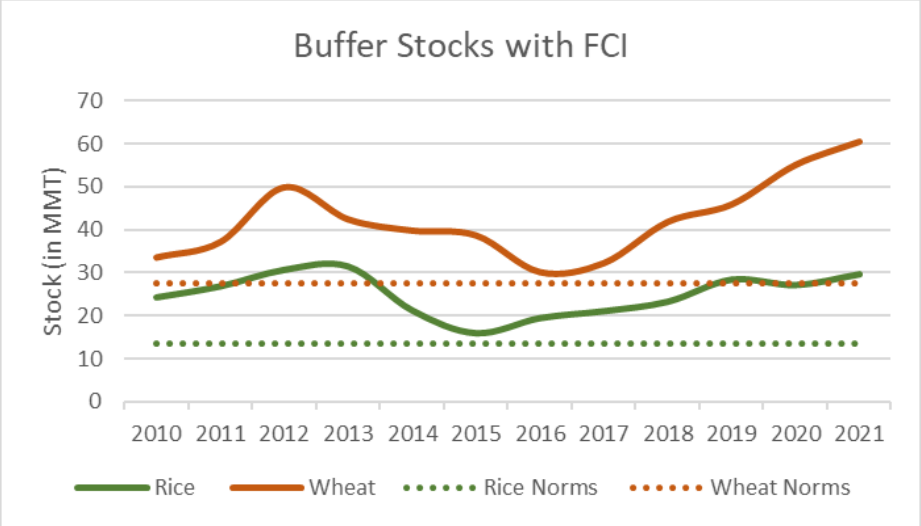

Figure 3: Foodgrain Stocks with FCI as measured on 1st July (Source: FCI, Ministry of Agriculture & Farmers Welfare, GOI)

The extensive presence of the government in food grain markets and growing buffer stocks have imposed fiscal pressures on the public exchequer. The cost of food subsidy includes the cost incurred to provide consumer subsidy, the carrying cost of buffer stock over and above stocking norms and transfers to the state governments for decentralised procurement. As shown in Figure 4, there is a sudden spike in the total food subsidy observed in 2020-21, indicating a growing concern. The constant increase in the per quintal consumer subsidy also goes to highlight the potential inefficiency associated with the system of procurement and public distribution. While these buffer stocks are maintained to stabilise prices in response to production shortfalls, there is also evidence to note that these stocks continue to co-exist with widespread hunger, raising questions on the effectiveness of these costs (Kajale & Shroff, 2012).

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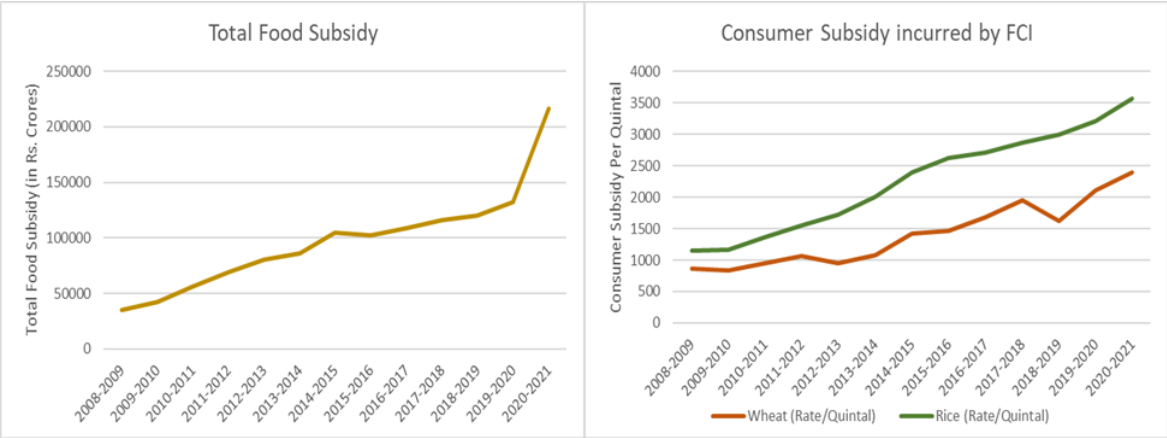

Figure 4: Position for Food Subsidy Incurred by FCI (*Source*: Compiled from FCI Annual Reports)

While the food subsidy cost appears to be inefficient, it also has other implications for the agriculture sector in the long-term. The expansion of the food subsidy bill is creating a trade-off between allocation of money for procurement and agricultural investment (Economic Survey, 2020). Figure 5 shows the trade-off with increasing food subsidy negatively affecting public investments in capital formation in agriculture. It can be inferred that increases in food subsidy costs are accompanied with falling GCF in agriculture by the government sector.

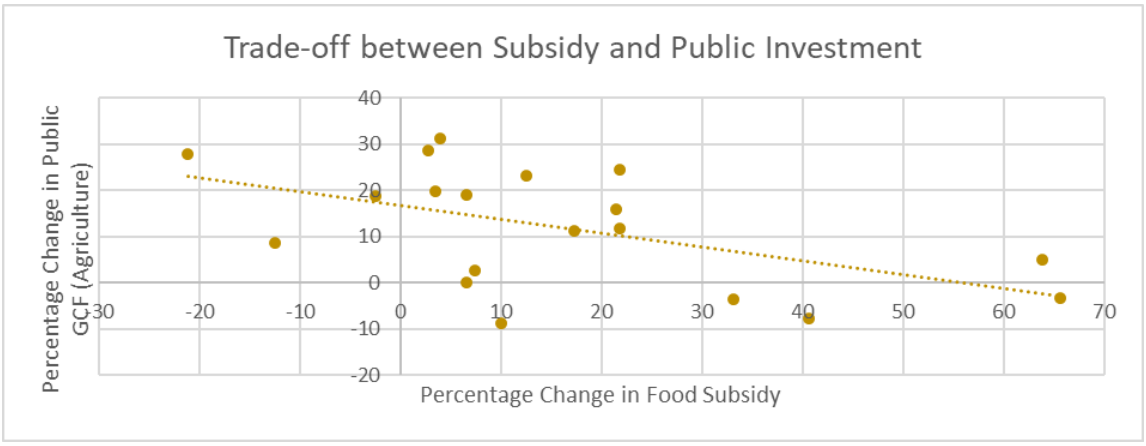

Figure 5: Trade-off between Food Subsidy and Public Gross Capital Formation in Agriculture (Source: Compiled from FCI Annual Reports and Agriculture at A Glance Reports)

The existing cropping pattern has been skewed in favour of cultivation of wheat, paddy and sugarcane as a consequence of policy-induced market distortions. The regions predominantly cultivating these crops are also experiencing high levels of water-stress in the country (Economic Survey, 2021). Production decisions appear to be influenced by the existing public procurement system. The Ministry of Agriculture and Farmers Welfare reports that only 27.4 percent of land under oilseed cultivation received irrigation in 2013-14 while the figure was as high as 60.1 percent for rice and 93.6 percent for wheat.

Table 1 shows that the level of ground water extraction has reached levels of over-exploitation status in a majority of taluks in the following states. These states are often associated with the success of the Green Revolution and are the significant producers of foodgrains in India. The ground water resource extraction continues to be within safe limits in other major producers such as Uttar Pradesh, Bihar and West Bengal owing to the reliance on Himalayan rivers. Limited investment in irrigation has led to a tendency of

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dependence on ground water resources based on individual production decisions, resulting in unchecked exploitation of water resources. Over-exploitation of water resources is also associated with the increased energy subsidies (Shah, Giordano & Mukherji, 2012). Such a relationship can also potentially exist with regard to foodgrain bias induced by procurement policies.

Table 1: Exploitation Status of Ground Water in Foodgrain Intensive States, 2020

States	*Percentage of Taluks/Blocks with Critical Status*	*Percentage of Taluks/Blocks with Over-Exploited Status*
Haryana	8.51%	60.28%
Punjab	4.00%	78.00%
Rajasthan	7.80%	68.81%
Tamil Nadu	5.41%	37.71%

(*Source*: National Compilation of Ground Water Resources of India, 2020, Central Ground Water Board)

Supply-Demand Imbalance

Agricultural production in the country is not "synchronised" with the demand, as foodgrain procurement policies have replaced demand as signals for production decisions (Economic Survey, 2020). The production and consumption trends given in Figure 6 indicate that while production is increasing, the share of consumer expenditure on food grains has declined consistently since 1987-98. This trend of declining consumer expenditure on cereals can be explained through two potential pathways. Firstly, we can apply Engel's law to say that with an increase in income, the expenditure on food has come. Chopra and Toor (2016) confirm this in the context of NSS surveys on consumer expenditure by observing that cereals are being replaced with other high value food. Secondly, MSP has acted as a price signal distorting production decisions in favour of foodgrains. Projections of demand and supply for foodgrains in India have shown that India is likely to be left with a surplus of 98.37 million tonnes which is equivalent to 40 percent of the total demand (Barman & Toor, 2017).

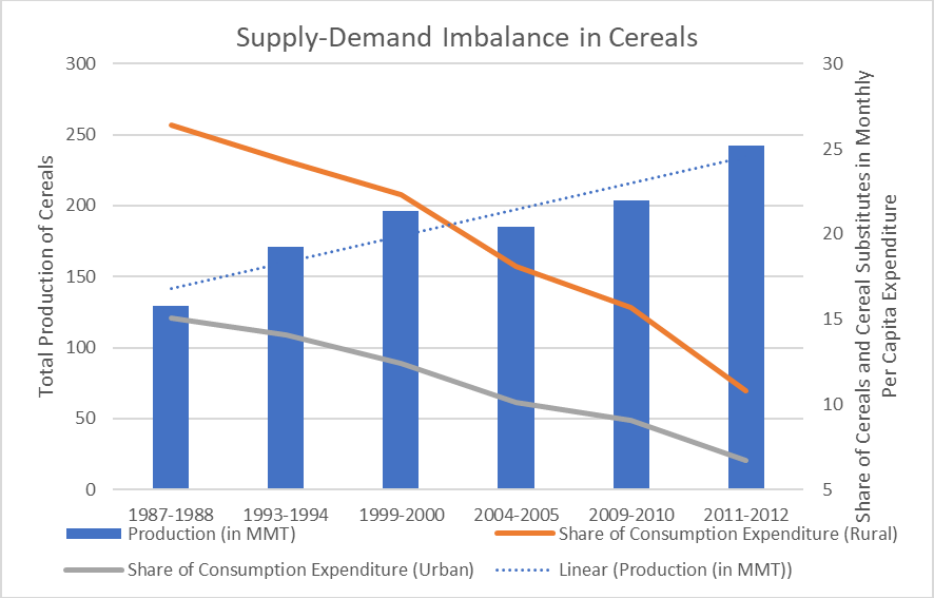

Figure 6: Production and Consumption trends for Cereals in India (Source: PIB, NSS 68th Round, Ministry of Agriculture & Farmers Welfare, GOI)

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India continues to be one of the prominent importers of edible oil in the world, particularly because of the changing consumption patterns and urbanisation (Economic Survey, 2021). Figure 7 presents the net availability of edible oils in India from domestic production and import. The annual growth in domestic demand stands at 6 percent while domestic production is expanding only at 2 percent (Jha et.al., 2012). While the production and area under cultivation of oilseeds have increased, the growth constitutes a small fraction compared to the growth in production and area under cultivation for cereals (Reddy & Immanuelraj, 2017). Further, the yield of oilseeds varies across states with some states having significant yield gaps. This has created significant reliance on imports to meet the domestic demand requirements for edible oils.

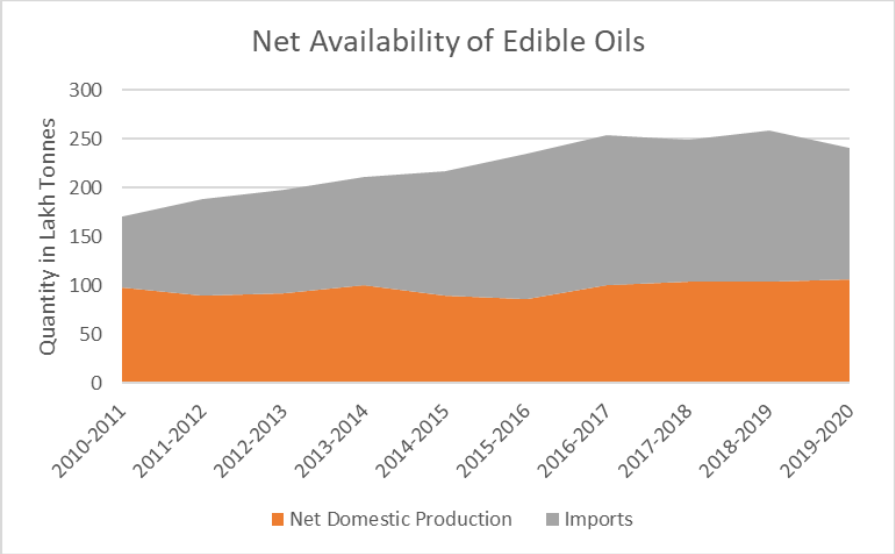

Figure 7: Trends in Source of Edible Oil in India (Source: Oil Division, Department of Food and Public Distribution, GoI)

India is having to spend an increasing amount of foreign exchange on the import of edible oil as shown in Figure 8. The top three edible oils imported are palm oil, soybean oil and sunflower oil. The Department of Food and Public Distribution reports that over 56 percent of domestic demand for edible oils are fulfilled by imports and 54 percent of these imports is refined palm oil. Further, the impact of the global pandemic, climate change induced events and increasing global demand in recent times is evident from the sudden spike observed in 2021. A recent export ban on palm oil by Indonesia has spiked prices and the Indian government has responded by extending free import of refined palm oil without tariff and regulated stocking norms to prevent hoarding for 2022. This has aided in controlling the increase in edible oil prices nation-wide (PIB, 2022).

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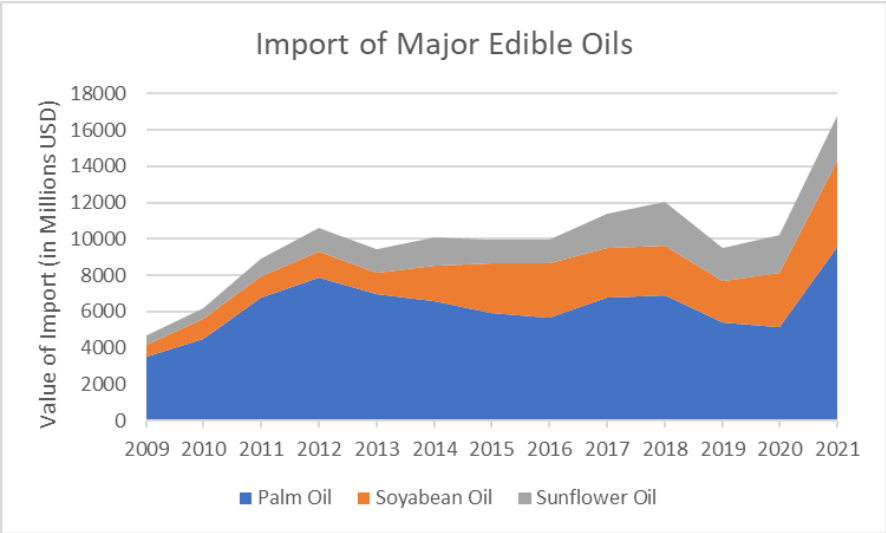

Figure 8: Value of Import of Major Edible Oils

(*Source*: World Integrated Trade Solutions)

Crop Diversification: Impact of Food Grain Bias

The extent of crop diversification in Indian districts is shown by Figure 9. This study uses data from International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) corresponding to the year 2016 to calculate the Simpson's Index of crop diversification which measures diversity of species in a given geographical area. This year was selected because of it being the latest year available covering 20 states in ICRISAT's district-level database. It can be observed that districts in most states have a high crop diversification Index above 0.73 as shown by the legend. Despite the Simpson's Index being a comprehensive index of crop diversity, it only showcases the extent of crop diversity in the sample region and does not provide information regarding the direction of crop diversification (Negi et.al., 2020). Therefore, a high crop diversification index does not imply a shift away from food grain intensive cultivation towards pulses, oilseeds and horticultural crops.

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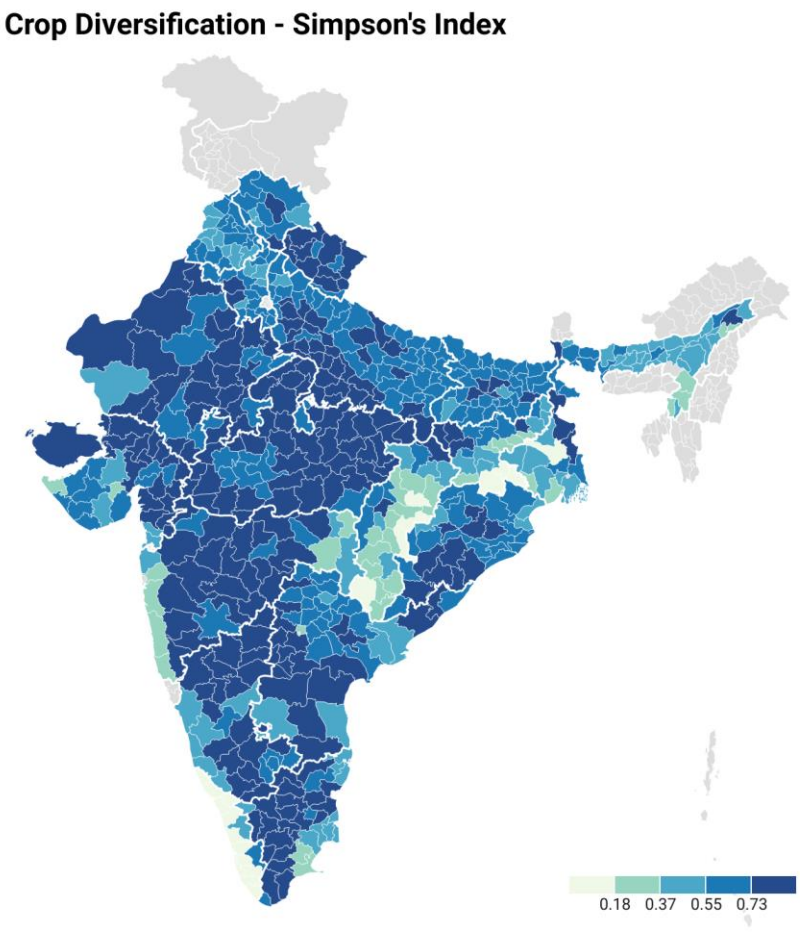

Figure 9: Extent of Crop Diversification in Indian Districts

(*Source*: Own Construction)

To disaggregate this data, Figure 10 maps the extent to which the gross cultivated area has been allocated to the cultivation of food grains. There is evidence to argue that there is a shift towards the cultivation of high-value crops yet this has been highly region specific and disaggregated (Kumar & Gupta, 2015). For instance, it can be observed that some green revolution states such as Punjab and Haryana continue to cultivate food grains predominantly while states like Tamil Nadu have lesser dominance of food grains. This necessitates disaggregated spatial and temporal analysis to identify antecedents and precipitating factors that enhance crop diversification along with its implications for outcomes. As discussed earlier, crop diversification in itself isn't sufficient if not designed properly. Therefore, this is a starting point to understanding the dominance of food grain dominance and its implications for crop diversification and ultimately the redressal of market distortions in agriculture.

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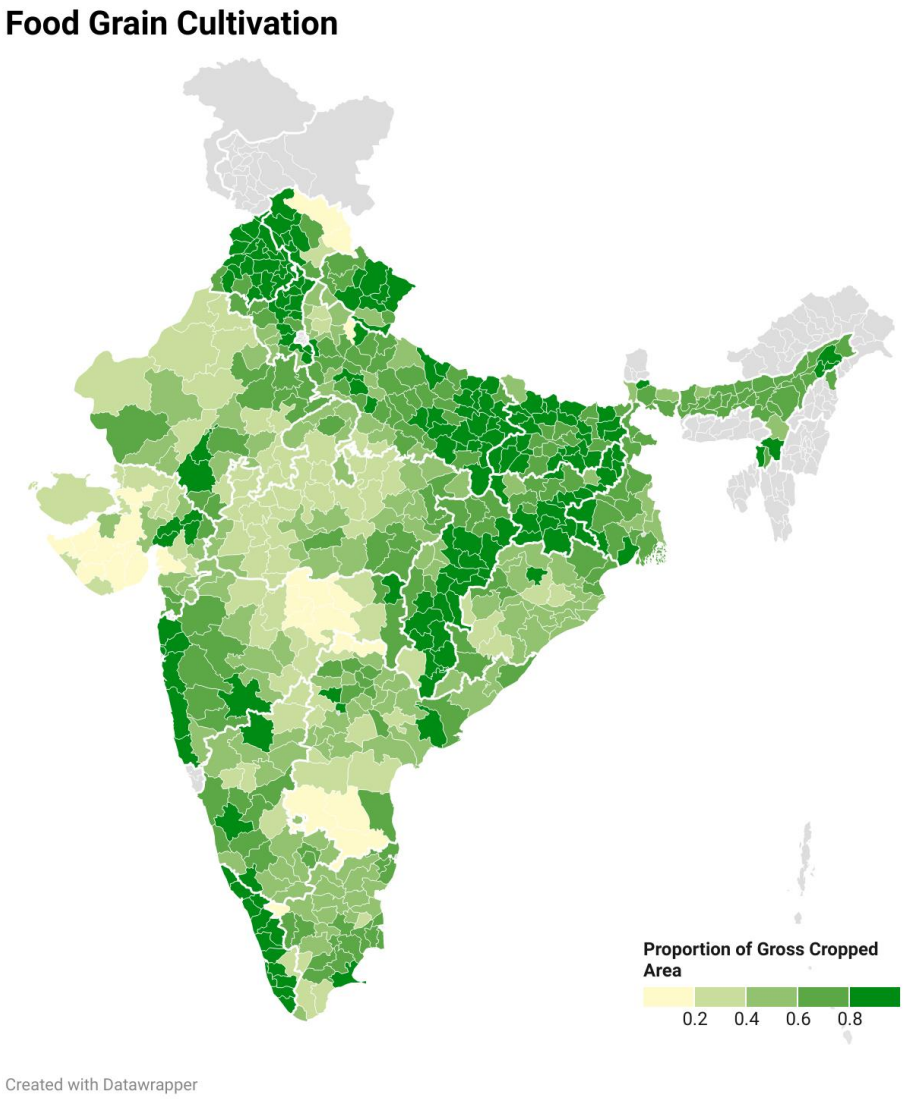

Figure 10: Proportion of gross cultivated area under food grains in Indian Districts

(*Source*: Own Construction)

Conclusion and Policy Suggestions

India's national priorities have changed substantially since the 1960s – food security to nutritional security, increasing production to crop diversification. However, the remnants of past concerns linger in our present policy. Intensifying agrarian distress coupled with the fiscal and environmental stress present the right circumstances for a policy overhaul. The effects of the food security focus continue to have implications for the present and future of agricultural policy in India. As India seeks to transform towards a path of sustainable development while doubling farm incomes, this paper asserts that identification and addressing of policy induced market distortions and crop diversification are mandatory components. While transitioning to such a policy framework, this section looks into some of the possible policy options.

A modification in MSP is the adoption of the price deficiency scheme whereby farmers are compensated for the difference between support price and market price, reducing fiscal costs and need for procurement

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by the government. However, this scheme appears to face the potential for "supply glut and price crash" (Narayanan & Tomar, 2022). China has achieved some success through the "agricultural support and protection subsidy" system adopted by China which provides acreage based support to farmers to cover for price differences and input subsidy while keeping only two crops under MSP (Gulati et.al., 2018). Alternatively, Economic Survey 2019-20 recommends the adoption of crop neutral investment subsidies that would break the chain of continued reliance on subsidies while expanding productivity of land and efficiency in resource utilisation. Technology based management of stocks and distribution are also viable options and have been adopted by states such as Chhattisgarh to prevent wastage and reduce inefficiencies (Banerjee et.al., 2014). Similarly, a shift from public distribution to conditional cash transfers that target the poor can provide a sustainable option on the distribution side (Economic Survey, 2020). With the focus moving towards nutritional security, conditional cash transfers enable enhanced targeting and permits targeting individuals rather than entire households. This has been observed in an analysis of the Mamata Scheme introduced in Odisha (Raghunathan et.al., 2017).

Though crop diversification is a pertinent component of agricultural policy, there are some limitations associated with its widespread adoption. With a large proportion of small cultivators, it needs to be kept into consideration that small farmers need to allocate at least half of their land area for high value crops for it to prevent poverty (Birthal, Roy & Negi, 2015). This becomes even more important to consider in the context of agrarian credit crisis and rural indebtedness. Examination of diversification and its types showed that there was "great heterogeneity in terms of typology of diversification among states" and that shift towards high value crops is not solely sufficient to increase output (Mehta, 2009). This raises the need for continued and disaggregated examination of cropping systems in India which incorporate the unique situation of small and marginal farmers in India and their interaction with the limited agrarian infrastructure and credit markets. Some areas for reconsideration include food subsidy-investment nexus, MSP-crop diversification relationship and role of MSP in determining cropping patterns and import dependence. While this paper has initiated a discussion on exploring this nexus, this requires further disaggregated analysis

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