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"Agriculture: Environment & Other Issues in North India"

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ABSTRACT:

The main metric used to assess a nation's position in agriculture is how much GDP and employment are generated by that country. The majority of people in India depend on agriculture and allied industries for their livelihood, although these industries make up a smaller portion of India's GDP than the manufacturing and service sectors. There has been an effort to identify the major problems and difficulties facing the Indian agricultural sector including environmental affects, to analyze the need for attention to agriculture, and to review the fundamentals of agriculture. This is a conceptual &review research paper wherein secondary data has been used. Qualitative research design has been used and data from 10 subject experts have been taken to conclude. The selection of experts has been made using snow ball sampling. The challenges and future of the Indian agriculture sector have been explained by the factors found in research, which include: environmental effects in the form of natural calamities; ineffective supply chain management; the influence of unorganized money lenders; ineffective price control by the government; use of agricultural land for non-agricultural purposes; biotechnology; exports; the food processing industry; and crop destruction by stray animals. When formulating any policies for the agriculture industry in India, the government should keep these factors in consideration.
Keywords: *Indian agriculture, Main problems, Environmental aspect, future orientation, GM crops etc.*

1. INTRODUCTION:

The agricultural sector is important in India. India's nominal GDP in 2018 was $2,690 billion at current prices, according to the International Monetary Fund World Economic Outlook (October 2018), making it crucial to the nation's economic survival and growth. India contributes 3.17 percent of the world's GDP, 17.5 percent of its people, and 2.4 percent of its land area, according to currency rates. The seventh-largest economy in the world right now is India. India is an agriculturally-prime country since more than 55% of the population works in agriculture and associated fields. India has achieved considerable strides in the manufacturing and service sectors since gaining independence (1947), but the country's agriculture sector has not expanded as much as would have been ideal. The establishment of a formal structure to oversee global food security is currently a top priority for the international community. India faces the burden of providing food for almost 1.25 billion people. Despite economic progress and self-sufficiency in food grain production, India still has high rates of poverty, food insecurity, and malnutrition (WFP 2015).

Table:1.1 Contribution of three sectors in GDP at constant price-

Sector	**1950-60**	**1961-70**	**1971-80**	**1981-90**	**1991-2000**	**2001-10**	**Year- 2020**

Industries (Manufacturing)	14.8	19.6	21.3	22.3	23.3	24.5	25.92
Services	29.8	32.8	35.9	40.3	45.7	53.7	53.89
Agriculture	55.3	47.6	42.8	37.3	30.9	21.8	20.19

Source: EconomicsurveyofIndia2011-12,20120-21and CSO,MOSPI

According to economic survey Table1.1, the agriculture sector's contribution actually fell from 55.3% in 1950 to 15.87% in 2018. According to CSO's report, Table 1.2, 56.1% of individuals are still employed in agriculture. Agriculture continues to play a significant role in India's overall socioeconomic structure despite being the country's largest economic sector in terms of employment.

Table1.2: Employment share for different sectors-

Sr. No.	**Sectors**	**Employment share of major sectors(yr:2004)**	**Employment share of major sectors (yr: 2022)**
1	Agriculture	56.1	42.6
2	Manufacturing	18.8	25.12
3	Service	25.1	32.28

Source: Central statistical organization, CRISIL&Statista,2004&2022

India is a major supplier of a variety of agricultural products to the international market in the current situation, including tea, coffee, oil meals, rice, spices, fresh fruits, fresh vegetables, meat, and marine products. India is a major producer of several agricultural products. India is the top producer of milk, wheat, and other crops in the world. Farmers and end consumers may be impacted by risks related to agricultural production. In order to enhance investment and achieve a sustained expansion in production, coherent and integrated long-term plans and strategies are required to encourage flexibility among Indian rural producers and reduce risk aversion. India is ranked well for producing fruits and vegetables) and is self-sufficient in terms of other agrarian products, such as pulses. Fruits and vegetables make up roughly 92 5 of all horticultural production in India. 2013 (ASSOCHAM). A robust growth trend in the agriculture sector has been encouraged by the F&V segment. It plays a unique function in the Indian economy by increasing the incomes of rural communities. Since these crops need a lot of labour to grow, they offer many opportunities for employment to the rural population. The F&V sector is undoubtedly the most profitable farming activity because of the wide variety of employment opportunities and the ability to boost the earnings of the agricultural community. It also has a high chance of accelerating the growth of all of agriculture. India is the best country to grow a variety of F&V because to its unique geographic and climatic circumstances. More than 100 nations import Indian agricultural, horticultural, and processed foods, primarily from the Middle East, Southeast Asia, SAARC states, the EU, and the US. According to Sengupta & Mukhopadhyay(2016) absolute poverty has declined to some extent but income inequality became alarming making other targets of MDG less accessible. Over the past two decades, India's per capita income has more than tripled; nevertheless, at the same time, the minimum dietary intake has decreased. The income disparity between the rich and the poor has widened over the period of rapid economic expansion. The bottom 10% of the population only accounts for 3.6% of total consumer expenditures, while the top 10% accounts for 31%.

2.OBJECTIVES OF RESEARCH PAPER:

1. To determine the key elements needed to comprehend the problems and obstacles facing the North Indian agricultural sector
2. To review some basic facts on agriculture and environment
3. To examine the need for focus on agriculture
4. To look at policy challenges and examine some good practices

3.METHODOLOGY:

This is a conceptual & review research paper wherein secondary data has been used. Qualitative research design has been used and data from 10 subject experts have been taken to conclude. The selection of experts has been made using snow ball sampling. The study has been done for North India only as there has been many instances of farmers protest in this region.

Limitations – Results are based on fresh observations and a review of the literature. The research's scope is restricted to North India's agriculture industry. There has been no discussion of horticulture or floriculture which is a research gap to be addressed by future researchers.

4.REVIEW OF LITERATURE:

Agriculture research has direct applications to practice and policy, offering a conceptual foundation for creating fair and sustainable reform approaches. In particular, this essay combines theory and writing that are based on ideas from Indian agriculture. The researcher has identified following factors and issues to be addressed for improvement in the agriculture sector.

- **Environmental affects in form of Natural Calamities**

The production of agricultural goods is impacted by natural disasters including floods, droughts, and heavy rains, in addition to other difficulties like disease, pests, and bugs. These factors ultimately result in the eviction of farmers. Over 10,000 different insect species, 30,000 different weed species, 100,000 different diseases (caused by bacteria, viruses, fungus, and other microbes), and 1,000 different nematode species damage the world's food plants (Hall, 1995; Dhaliwal et al., 2007). Crop losses have been continuously increasing even with the use of several insect management strategies (Dhaliwal and Koul, 2010). The severity of bug problems is significantly impacted by climate change (Ramamurthy et al., 2009). Farmers in Rajasthan, Bihar, and a small portion of UP face difficulties due to these issues with their agriculture. Rivers like Ganga, Yamuna flood nearby areas in some part of country due to which huge losses are borne by farmers.

- **Access to Water and Irrigation**

India's agriculture is still largely dependent on the weather, and irrigation is a problem. However, irrigation is now more accessible to all types of farmers.According to Bardhan (2000), marginal farmers have the highest level of it, followed by small farmers. Compared to 1980–81, small farmers irrigated 40 percent of the land; today, they irrigate 51 percent more. But over that period, it rose from 16 to 31 percent for large farms. Since the introduction of pumps in the early 1960s, groundwater irrigation has increased in popularity reported by Sivsubramaniyan (1997). Nearly 50% of India's irrigated land is currently supplied with water via groundwater resources. The decrease in groundwater level, water logging, and lack of payment for services, particularly the subsidy on pumping expenses, have significantly reduced the advantage of groundwater irrigation. Tank irrigation systems and other surface irrigation methods have become less successful as a result of the development of groundwater irrigation. However, it should be noted that although large farms benefit from less expensive sources like canals, small farmers must rent water. For major farmers, canal irrigation accounts for about 40% of their irrigation needs, compared to less than 25% for small and marginal farmers (NCEUS, 2008). According to Bansal (1994), crops are typically cultivated in combinations or through intercropping in unirrigated areas with limited rainfall (<400mm). The primary goal of these mixes, which range from two to seven crops, is to protect against total crop failure. Few crops need more water than rice, which also has long-term consequences on the amount of groundwater accessible. To regulate and maintain the level of ground water, the government has limited the seeding of this crop to just once per year in various States. But as a result of this decision, farmers must suffer. Future study on rice crops can help solve this issue by identifying GMOs (Genetically Modified Organisms) that need less water. Natural canals in certain North Indian States use evaporating water to run on available rainwater. Canals can be cemented to correct this. The government has already begun to move quickly on these initiatives. In the future, all States ought to carry it out.

- **Ineffective Supply Chain Management**

The agriculture supply chain in India is impacted by a number of problems, including the predominance of small farmers, farmer illiteracy, supply chain fragmentation, a lack of scale economies, a low degree of processing and value addition, limited marketing infrastructure, etc. The objective has always been to increase output, but up until recently, there was a lot of disregard for minimizing losses in the food supply chain. Due to poor infrastructure, it is difficult to estimate the amount of food that is lost or wasted in India today. However, a UN assessment indicated that fruit and vegetable waste for developing Asian countries like India can reach 45% of produce (post-harvest to distribution). (Indian Agri-Logistics:

Difficulties and Developing Solutions). Other difficulties that fall within the supply chain management category are:

a. **Cold store Chain issues-**India can only store 10% of its fruit and vegetable produce in cold storage with its current 25 MT capacity (North India has access to 60% of the nation's total storage infrastructure). The private sector currently has a storage capacity of about 25 million MT, while public sector organizations like the FCI, Central Warehousing Corporations (CWC), and different State Warehousing Corporations (SWC) have a storage capacity of 71 million MT. The FCI annual report 2018, which puts the scarcity in perspective, states that the government held 80 million MT of food grain at its peak last year. Parwez (2013) asserts that factors like the cold chain should be taken into account since they may be able to reduce losses and maintain the quality of horticultural produce.
b. **Linkage and Integration issues-** Agriculture's expansion is restricted by the mandi's limited range. The procurement mechanism does not fairly disperse the entire population of the nation. In contrast to the typical farmer's journey of 12 km or more to the closest mandi and more than 50 km in Northeast India, markets should be reachable within a 5-kilometer radius, according to the National Farmers Commission's standards.
c. **Many intermediaries and information asymmetry-** The situation for producers of perishable agricultural items has gotten worse as a result of the emergence of protracted distribution channels in agriculture as a result of several middlemen. The information asymmetries already prevalent in agriculture, notably for non-MSP crops, have been made worse by these middlemen, who have raised prices by around 250 percent (over the cost of production).
d. **Infrastructural issues-** The development of the agricultural sector has been hampered by the inadequate road and rail infrastructure in rural areas. Due to inadequate rail and road infrastructure, farmers find it difficult to transport their agricultural products, including vegetables and fruits, to metro centres. Another problem with this problem is the rising cost of road transport due to higher fuel and toll rates.

- **Diversion of Agricultural Land for Nonagricultural Purposes**

The number of families in rural areas is growing along with the population, which reduces the size of farms as land is divided among family members, leaving less room for farming and agriculture. Farmers are losing interest in agriculture as a result of having less land available, and instead are settling on fertile land. Communities expanded as a result of the conversion of agricultural land to non-agricultural uses, which was sparked by the need of rural dwellers for small, large, and farm structures. The nation's 120 million land households included 98 million small and marginal holdings, according to the Agricultural Census 2010-2011. The Indian National Policy for Farmers of 2007 states that, absent extraordinary circumstances, prime lands must be kept for agriculture. Construction, industrial parks, and other commercial development should be allowed on land with low agricultural yields or that cannot be used for farming. The typical holding size in India shrunk from 2.3 hectares in 1970-1971 to 1.33 ha in 2000-2001. It should be noted that 63% of landholdings are held by marginal farmers with less than 1 hectare of land. The average size of marginal holdings across the entire nation is just 0.24. To limit commercial and non-agricultural usage of fertile land in villages, government should consider vertical expansion in rural regions as well. Villagers should be given legal rights to sell first floors where there are enough 20-meter roads in rural areas. This will stop people from using fresh land to build homes for their extended families. Additionally, this programme will grant two owners the identical properties.

- **Influence of Unorganized Money Lenders**

Local money lenders in rural India, where the majority of the population works in agriculture, entice them with the promise of quick funding while charging them double or, in some cases, four or five times the market rate of the current interest rate because they lack the necessary documentation to demonstrate their creditworthiness to organized financial institutions. Villagers and farmers engage local money lenders for financing for a variety of reasons. The need for financial assistance for their daughter's wedding, student loans, and the lack of land titles—that is, ownership by actual cultivators, unregistered growers, tenants, and tribal cultivators—are a few of the causes (Mahendra, S. Dev 2008). Farmers and villages are left with no choice but to sell their land to moneylenders when they are unable to pay back the high interest rates. Although the government is working to strengthen the network of organized financial systems, the existence of unorganized money lenders in rural India continues to generate problems for underprivileged farmers or locals. The Indian government has introduced a number of financial programmes for farmers, including crop loans, the Kisan Credit Card, loans for post-harvest storage, low-cost agriculture insurance, etc. However, there should still be some legal restrictions on unorganized money lenders' ability to charge exorbitant interest rates on loans they provide.

- **Inefficient Price Control by Government**

Twenty crops, including Rabi (sown in the winter) and Khar if (sown during the monsoon season), were not subject to the government's price regulation as of 2018. For the time leading up to planting season, the Department of Agriculture and Cooperation of the Government of India issues MSP based on the recommendations of the Commission for Agricultural Costs and Prices (CACP). The government buys almost a third of the rice and wheat produced in India through the PDS system, but it has less purchasing power when it comes to other grains, fruits, and vegetables (both of which are highly perishable). As a result, MSPs become ineffective for the larger agricultural population. (2014) Christopher B. and Emelly.(Christopher B. and Emelly, (2014). Regarding government pricing control, there are two elements. One is to stop price hikes and make sure everyone has access to food. Farmers are paid MSP (minimum price support) by the government in order for it to purchase the necessary food commodities from them through its agencies like FCI (Food Corporation of India), but it does not provide them with an adequate return. Because the government must ensure that everyone has access to food, farmers are not permitted to keep and sell a few essential commodities like wheat and other items. The government made the appropriate choice in this. The second point is why farmers don't have the same freedom that business owners do to sell their products at any price they choose. If they cannot be allowed to sell their commodities and agricultural produce, they should be given reasonable price by the Government through subsidies. Mishra (2013) made an effort to analyze the bill's financial effects. According to him Food Security Act's (FSA) supposed financial effects should be substantial. For the fiscal year 2013–14, it was estimated that the FSA's implementation had cost Rs. 1245.02 billion in food subsidies.

- **Exports Challenges**

Some commercial crops' expansion has the potential to dramatically increase agricultural exports and speed up the creation of agro-based businesses. Agriculture is one of the most inclusive growth sectors in the Indian economy since it ensures food security and employment for the vast majority of the population. This helps the economy grow overall and eradicate poverty. The Five Year Plans also demonstrate that a focus on agricultural development is a key component of a plan for quicker, more inclusive sustainable growth. Indian farmers must concentrate on producing high-quality crops and utilize pesticides in accordance with international standards if they want to increase agricultural exports, yet productivity suffers when pesticides aren't used. Because of this, farmers are reluctant to stop using pesticides, urea, and other chemicals in excess. Other difficulties include rivalry from nearby nations and the appreciation of foreign currencies, specifically the dollar in comparison to the rupee, which is hurting India's agricultural exports. International buyers travel to nearby nations to purchase agricultural products.

- **Future of GM Crops through Biotechnologies**

The future of agriculture is with GM crops. The term "biotechnology" refers to a wide range of scientific products and techniques that can be used in many contexts to boost and maintain the productivity of forestry, fisheries, livestock, and agricultural crops.(Rao and Dev, 2010). The application of biotechnology has advanced conventional farming practices. People have been using their knowledge of plants to boost the production of agro-food for the past 10,000 years. Biotechnology, sometimes known as genetic modification (GM), is the most recent advancement in agricultural practices. Plant breeding was the only method employed by farmers in the past to enhance or change particular genetic features of a plant. Throughout many generations, people with positive features are preferred. The animals and crops of today are the products of traditional processing. For example, maize now is different from maize a century ago due to plant breeding. Still, it often required multiple growing seasons to yield a plant with the perfect traits. Farmers eventually succeeded in growing drought-resistant crops. It is impossible to rule out the possibility that additional features could transfer during conventional processing. (Kamma and Chopra, 2016)

- **Food Processing Industries**

If India hopes to become a global leader in this area or raise the GDP contribution of its agricultural produce, it must grow its food processing sector. 70% of sales in India's food and grocery sector come from retail, making it the sixth-largest in the world. Among the major sectors of India's retail industry, which was valued at USD 490 billion in 2013, is the food industry. Food processing ranks fifth in terms of production, consumption, exports, and predicted growth, making it one of India's biggest industries, contributing 32% of the nation's total food market. It makes up more than 14% of India's manufacturing GDP, 13% of its exports, and 6% of all industrial investment. By 2018, it is anticipated that the food service sector in India would generate US$ 78 billion. The gourmet food market in India is now expanding at a compound annual growth rate (CAGR) of 20%. According to Kumar & Basu (2008), a low rate of technological innovation and growing business inefficiencies are the reasons why the Indian food processing industry is not growing to its full potential. Imports must be promoted alongside R&D if the Indian food industry is to progress technologically

more swiftly. Technical potential, however, is influenced by the organizational structure as well as several institutional and economic considerations. In order to considerably reduce inefficiencies, considerable institutional reforms must be done side by side. The online meal ordering market in India is growing rapidly, despite the fact that it is still in its infancy. The organized food market in India is valued 48 billion dollars, 15 billion of which are spent on food delivery. The organized food industry has a lot of potential and a bright future thanks to the online meal delivery companies Food Panda, Zomato, Tiny Owl, and Swiggy, who are growing their operations through partnerships. The Ministry of Food Processing Industries has created the Vision Document-2012 in an effort to boost the sector, enhance processing, and take advantage of prospective domestic and global markets for processed food products. According to the report, by 2020, investment in the processed food sector would have tripled, with perishables processed rising from 6% to 20%, value addition rising from 20% to 35%, and the industry's part of the global food trade rising from 1.5% to 3%. The Ministry estimates that in order to accomplish these goals by 2020, an investment of Rs 100,000 crore (US$ 14.67 billion) will be needed.

- **Destroying of Crops by Stray Animals**

The destruction of crops by stray animals and birds, such as pigs, donkeys, buffalo, monkeys, and eagles in the neighborhood, affects the production of agricultural goods and causes farmers to lose their livelihoods. Farmers are required to solve these issues on their own. Farmers haven't received much assistance from the government. To combat these issues, farmers must invest a lot on their own farm fencing

- **Rising labour cost**

Farmers in India are struggling as a result of the increase in workforce costs in the agricultural sector. Workers from states like Bihar and eastern UP travel to Haryana, Punjab, and western UP for short-term employment. There are numerous government programmes, such as the MNREGA programme, that give workers in rural areas employment for at least 90 days and raise their income levels, encouraging them to look for job in their home states rather than travel.

CONCLUSION:

The research findings have concluded that following are the major problems of agriculture in North India, these are Environmental effects in the form of natural disasters, access to water and irrigation, Inefficient government price controls, the influence of unorganized money lenders, ineffective supply chain management, rising labour cost, Farmland conversion to non-agricultural uses, Destroying of Crops by Stray Animals. There is a potential of growth in exports and food processing industry in agriculture. New horizons of growth opportunities can be explored through biotechnology i.e looking for GM crops. India must come up with the best and most efficient remedies for these important research-discovered elements before it can take the lead in the world's agricultural sector. The agriculture and food industries greatly rely on research for which, laboratories that analyze soil, water, and commodities needs to be set up by Government which focus on sustainable environmental agricultural growth. The problem of warehousing and cold storage needs to be addressed. When the government formulates policy for the agriculture sector, it should keep all of these factors in mind. To address the issues facing Indian farmers, the central government has introduced a programme that will give Rs 6,000 annually to farmers with less than 5 acres of land as well as subsidized neem-coated urea. A portion of these sources for public investment would be generated by rationalizing subsidies and improving their targeting. The yields in different states vary greatly. Even the best states produce a wide range of crops at much lower yields when compared to the top in the globe. The yield gap might be closed as much as is practicable within the climate zone, which offers a lot of possibilities to increase production. Since a sizable amount of agricultural land is currently unirrigated, adding irrigation can greatly boost output. In order to create a national single market for agricultural products, state collaboration should be sought. Contract farming has evolved into a new means of supporting state-supported rural economic growth with the help of the private sector as evocated by Sreymom Pirom Cook & Shepherd (2001). The government should investigate why the agriculture sector is being prioritized in light of the aforementioned issues.

RESEARCH GAP:

Results are based on fresh observations and a review of the literature. The research's scope is restricted to North India's agriculture industry. There has been no discussion of horticulture or floriculture which is a research gap to be addressed by future researchers.

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