The History of Potato and its Emerging Issues in India

Amith H H, ** Dr. K.B. Dhanajaya

**Research scholar, Department of Economics, Kuvempu University.*

*** Professor and Principal, Sahyadri Arts College, Shivamogga.*

hhamith22@gmail.com

Abstract:

In India, potatoes were first introduced during the British colonial era. Early in the 17th century, the British introduced potatoes to India, where they were first planted in the southern Nilgiri Hills. Due to the crop's resilience to diverse soil types and temperatures, it eventually expanded to other parts of the nation. challenges require a multi-faceted strategy incorporating government policies, research and extension services, investment in infrastructure, promotion of sustainable agriculture methods, and support for farmer cooperatives and groups. The development and sustainability of the potato business in India can be aided by initiatives to enhance seed quality, create disease-resistant varieties, set up effective post-harvest management systems, and encourage value addition.

Keywords: *potato, British, infrastructure, sustainable*

Introduction:

More than 100 countries worldwide grow the important food crop known as the potato. More than a billion people use potatoes worldwide, according to FAO (2008). It is a premium vegetable crop that is used in more than 100 different sorts of cuisines. Potato protein is thought to have a higher biological value than that of cereals and to be superior to milk. So, by lowering energy intake and also by cutting food costs, potatoes are a substitute to meat and dairy products. After rice, wheat, and maize, the potato (Solanum tuberosum L.), also referred to as "The king of vegetables," has risen to become India's fourth-most significant food crop. Without potatoes, an Indian vegetable basket would be lacking. Due to its edible energy and edible protein, potatoes are an excellent vegetable in terms of nutrition. In the eyes of the greater community, it has evolved into a necessary component of breakfast, lunch, and dinner. It yields more dry matter, edible energy, and edible protein in a shorter amount of time than cereals like rice and wheat since it is a short-duration crop. Therefore, it is believed that potatoes are a crucial crop for ensuring the country's nutritional security.

Origin of Potato:

Potato is reportedly a native of South America. In one of the Andean settlements in 1537, the Spaniards had their first encounter with potatoes. Between 1580 and 1585, the potato was first grown in Europe in Spain, Portugal, Italy, France, Belgium, and Germany. It was brought to India by Portuguese sailors in the early 17th century, and during the British era, cultivation extended throughout North India.

Potato Market Size in India:

The Indian potato market had a dramatic downturn in 2021, when its value fell by -6.8% to $X, after three years of growth. From 2012 to 2021, the market value expanded at an average yearly rate of +3.5%; nevertheless, the trend pattern showed that there were some noteworthy swings during the examined period. Consumption increased until it peaked at $X. The market continued to develop at a somewhat slower rate from 2015 to 2021.

Potato Production in India:

In terms of value, potato production decreased to $X in 2021, according to the expected export price. However, manufacturing expanded strongly overall. The manufacturing volume climbed by 81% in 2014, which was the year with the highest growth rate. Production eventually reached its peak level of $X as a result. Production growth stayed at a somewhat lower rate from 2015 to 2021. In India, the average production of potatoes per hectare decreased to X tonnes in 2021 while being constant from 2020 levels. However, the yield displayed a rather flat trend pattern for the time period under examination. The yield climbed by 8.8% in 2017, which was the year with the fastest growth. The yield of potatoes reached its peak in 2018 at X tonnes per ha, but from 2019 through 2021 it lost steam. Negative weather conditions may still have an impact on yield estimates in the future despite the greater usage of sophisticated agricultural techniques and practises. The area of potatoes harvested in India in 2021 was X acres, remaining steady from the year before. From 2012 to 2021, the harvested area grew at an average yearly rate of 1.4%; the trend pattern remained stable, with some discernible changes being recorded throughout the course of the study period. With an increase of 4.5% in 2013, the growth rate seemed to be at its fastest. The area used to harvest potatoes reached a maximum of X hectares in 2017 before levelling off until 2021.

Potato Exports:

Exports from India:

Potato exports from India soared to X tonnes in 2021, an increase of 18% above 2020 levels. Exports rose significantly overall. With a 140% increase over the prior year, 2014 seems to have the fastest growth rate. The exports during the period under review reached record highs of X tonnes in 2019, however they stayed at a lower level from 2020 to 2021. Potato exports decreased slightly in value to $X in 2021. Exports had a steady increase during the time under study. When exports climbed by 219% over the prior year in 2014, the growth rate seemed to be at its fastest. As a result, exports reached their highest level of $X. The growth of exports stayed at a somewhat lower level from 2015 to 2021.

Exports by Country:

The average annual growth rate of volume to Nepal from 2012 to 2021 was +11.0%. The average yearly growth rates of exports to the other major destinations were as follows: Oman (+56.9% per year) and Indonesia (+117.0% per year). With 44% of all exports, Nepal ($X) continues to be India's top export destination for potatoes. Oman ($X), which accounted for 16% of all exports, came in second place in the ranking. Indonesia came in second with a 7.6% market share. The average annual growth rate in terms of value to Nepal from 2012 to 2021 was +11.4%. The average annual growth rates of exports to the other major destinations were as follows: Oman (+60.2% per year) and Indonesia (+107.1% per year).

Export Prices by Country:

In 2021, the average price of potatoes exported per tonne was $X, a decline of -15.8% from the previous year. In general, export prices showed strong rise from 2012 to 2021: over the past nine years, they climbed at an average annual rate of +2.1%. However, the trend pattern showed that there were some observable changes during the studied time. Based on 2021 data, the price of potato exports grew above 2018 index by 19.1%. The average export price climbed by 33% in 2014, the year with the fastest growth. Thus, the export price rose to its highest point of $X per tonne. The average export prices did not pick up steam from 2015 to 2021. The country with the highest price was Oman ($X per tonne), while the average price for shipments to Nepal ($X per tonne) was among the lowest. Prices varied substantially by country of destination. Oman (+2.1%) witnessed the highest rate of price growth between 2012 and 2021, while the growth rates for the prices of the other major destinations were more moderate.

Potato Imports:

Imports into India:

After two years of decline, potato exports grew by 3,580% to X tonnes in 2021, growing for the second year in a row. Imports experienced a notable increase throughout the time period under consideration. As a result, imports have peaked and are likely to keep growing in the near future. The value of imported potatoes increased to $X in 2021. Imports showed a considerable increase overall. As a result, imports have peaked and are likely to keep growing in the near future.

Imports by Country:

Bhutan (X tonnes) supplied the majority (almost 99.9%) of India's total imports of potatoes in 2021. The volume from Bhutan increased at an average yearly rate of +4,138.2% from 2015 to 2021. Bhutan ($X) was India's leading potato supplier in terms of value. The average annual growth rate of value from Bhutan from 2015 to 2021 was +3,712.0%.

Import Prices by Country

The average price of imported potatoes in 2021 was $X per tonne, down 38% from the previous year. The import price had a sudden decrease throughout the time period under examination. The average import price rose by 714% in 2018, which was the year with the highest growth rate. As a result, the import price rose to its highest point of $X per tonne. The average import prices stayed around a lower number from 2019 to 2021. Prices for Bhutan are used to establish the average price level because there is just one major supplier country. Bhutan saw price rise at a rate of -10.2% year from 2015 to 2021.

Emerging problems and challenges:

Lower potential yield

In India, between the months of October and March—when the days are shorter in the northern hemisphere—more than 90% of the potato crop is produced. The physiological potential of potato productivity in the tropics and sub-tropics substantially decreases when compared to temperate nations due to the crop life cycle being shortened under short day circumstances and the lower availability of sunshine hours. The agencies involved in potato research and development face a significant challenge in improving the achievable yield given the lower potential yield.

Early harvesting

Potato crops are frequently planted in between paddy and wheat crops by small and marginal farmers. Due to wheat and paddy crops' lower production risks and lack of market risk as a result of being covered by India's support price system, small and marginal farmers choose to harvest potatoes early, 60 to 70 days after planting, with a yield compromise of 30 to 40% of the regular one. The early harvest of a sizable section of the potato crop has a negative impact on the country's overall potato yield. Another significant difficulty in this scenario is raising national potato productivity to 34.5 tonne/ha by 2050. Finding the gene(s) responsible for tuberization will enable the development of kinds of potatoes that mature earlier.

Uneconomic land holdings:

In India, a disproportionately large number of potato growers produce potatoes on tiny, unprofitable plots of land. Most of these growers depend on remittances from one or more family members who work in cities because farming is a way of life for them rather than a business. The majority of the time, those in charge of raising potatoes are elderly or less capable individuals who don't adhere to the most recent crop husbandry practises. It is a difficult issue to communicate technical knowledge to this less receptive farming community and ensure proper adoption of the newest scientific potato technology.

Wrong doses of fertilizers:

Almost all farmers, including those who grow potatoes, use chemical fertilisers according to their own judgement and experience. Complex fertilisers are being used more frequently these days, and without accurate soil test results, farmers frequently do so. As a result, the soils' nutritional balance is disturbed, the ecosystem is degraded, and farm productivity is decreased. Some nutrients are oversupplied, while others are undersupplied. Agencies responsible for agricultural development throughout the nation must set up dependable and adequate soil testing equipment as soon as practicable.

Inadequate and inefficient transport infrastructure:

Potato farmers and consumers nationwide suffer from a lack of modern transportation infrastructure because of the crop's bulky nature, short growing season, and regional production dominance. High post-harvest losses are caused by this deprivation as well as greater price disparities in this agricultural commodity among the regions. The supply of less expensive, higher-

quality potatoes across the nation will be ensured by the policy makers and development organisations acting quickly to address this limitation.

Enhanced pest resistance:

Another significant issue that potato research and development organisations employing conventional as well as contemporary molecular techniques must be tackled with a very high priority is the demonstration of enhanced pest resistance (both diseases and insects). In the future, using molecular methods to diagnose potato pests more accurately and comprehend their genetic makeup is likely to produce successful outcomes.

Capital intensive crop:

Due to the high input and capital requirements of the potato crop, small and impoverished farmers sometimes lack the necessary capital, which causes the crop to be grown with insufficient amounts of various inputs. Many times, potatoes are grown on unfavourable or even problematic soils. Furthermore, the issue has been worse recently due to the extremely rapid increase in the cost of agricultural inputs like fertilisers and plant protection chemicals. In addition to using subpar inputs, a very high percentage of potato growers utilise subpar inputs, particularly the seed potato because they cannot afford to buy the better one. This is more of a policy issue that must be resolved as soon as possible to improve profitability of potato farmers.

Shortage of farm labour:

Farm employment has been transferred to other developmental tasks by government rural development programmes, particularly the Mahatama Gandhi National Rural Employment Guarantee Scheme. As a result, one of the crops in India that has recently suffered the most harm is the labor-intensive potato production. Future potato research should prioritise the creation of efficient potato machinery for small and marginal growers. On fields with machinery, collecting potato tubers currently accounts for more than half of the manpower. We need to create a combine potato harvester that can do digging and lifting tasks for tubers all at once for huge growers.

Global warming:

Due to fewer sunshine hours and shorter crop duration, rising average night temperatures in some potato-growing regions of the nation are reducing the already constricted potential yield of the

Indian potato. The creation of potato types resistant to high temperatures will aid in the solution of this new issue. In order to combat the issue of heat stress, CPRI is expected to release more heat tolerant potato cultivars after the successful release of Kufri Surya.

Climate change impact:

Using the INFOCROP Potato model, the effect of climate change on potatoes in various places was evaluated. According to estimates, due to milder winters, the yield will be significantly decreased in southern and peninsular India (9–47%), somewhat reduced in the Indo Gangetic plains (3–13%), and slightly raised (3–7%) in the northwestern Indo Gangetic plains. In the years 2020 and 2050, the production of potatoes in India may decrease by 2.61 and 15.32%, respectively. The North-Western Plains (Punjab, Haryana, and parts of Western UP and Northern Rajasthan) will be the least vulnerable region, and West Bengal, Plateau Regions, and Other Areas in South India will be the most vulnerable, with a potential productivity decrease of 9 to 55%. To mitigate the impact of climate change on future potato productivity, we need to implement alternative strategies, which are covered under other headings.

Scarcity of water:

Unpredictable precipitation and a lack of irrigation water are two significant future trends that are anticipated to provide difficult obstacles for potato agriculture in India. The development of micro-irrigation technologies for potatoes and their greater diffusion in areas with a lack of irrigation water will require more focused research. To address this looming issue, biotechnological methods must be used to create potato cultivars that can withstand drought.

Varieties for processing:

The CPRI has generated six different potato cultivars for processing, and as a result, India is currently processing 3.2 million tonne of potatoes. However, our current 375 million urban population will grow to around 465 million by the year 2050, creating a large demand for processed potato goods. If the industry is to increase potato processing up to 25 million t by the year 2050, it needs to be backed by the necessary technology, including enhanced processing varieties. To address this rapid improvement of processed potato products in India, which is rapidly increasing, we need a broader variety of processed potato types with superior processing properties.

Inefficient cold storage:

Because of the unreliable electrical supply in many sections of the country, cold storage facilities are lacking, which has an adverse effect on the growth of potatoes there. Other regions of the nation's cold storage facilities use antiquated equipment, which contributes to higher post-harvest losses of potatoes. The National Horticulture Board has been assisting cold storage modernization with significant programmes; however, the desired outcomes have still not been attained. Having a consistent electrical supply throughout the nation will facilitate the construction of cold storage in other places where it is necessary.

New pests:

Newer pathogen loads have entered the Indian potato environment as a result of climate change and the import of potatoes under Open General Licence in the 1990s. After the import of potatoes under OGL, a number of new viruses surfaced. Making the potato crop free from these pests is one of the most critical and difficult tasks facing Indian potato research specialists. Modern diagnostics utilising a transmission electron microscope, molecular methods, and a dip-stick are required to improve the quality of seed potatoes. Then, utilising aeroponics and other biotechnological methods, planting material must be rapidly multiplied in vitro.

Conclusion:

Indian agricultural authorities, research facilities, and farmers' organisations are working to implement sustainable agricultural practises, create disease-resistant potato varieties, encourage proper post-harvest management, and promote value addition through processing in order to address these new issues. The objective is to make potato farming more resistant to numerous difficulties while ensuring food security for India's expanding population.

Reference:

1. GOP, 2013. Agriculture: Economic Survey of Pakistan, 2013, Ministry of Food and Agriculture, Government of Pakistan, Islamabad.
2. Government of Sindh, 2012, Sindh Development Statistics, Bureau of Statistics, Government of the Sindh , Karachi.

3. Harbans lal and k. d. Sharma, 2006, the potato crop was found to be the most capital and labour intensive due to substantial cost incurred on seed, fertilizer and human labour, potato journal, 33(3- 4): 139-143.
4. Jame, Kamal., Kumar, Dinesh and Ezekiel, r., 2001, market status of different processed potato products in Meerut, Ghaziabad and Delhi. Journal of the Indian potato association, 28 (1): 169- 171.
5. Kumar, Raj., Pandey, s.k. and Khurana, 2005, keeping quality of potato processing cultivars during room temperature storage. Potato journal, 32 (1/2): 55-59.
6. Khalafallah, A. M. 2001. Effect of plant density and seed size on growth and yield of potato in Khartoum state, Sudan. African Crop Sci. J., 9 (1): 77-82. Pak. J. Agri., Agril. Engg., Vet. Sci., 2012, 28 (1)
7. Kumar, Parveen., Pandey and S.k., 2008, evaluation of nutrient management options for potato processing
8. cultivars. Potato journal. 35 (1/2): 46-52.
9. Manivel, p., Pandey and Kumar, 2003, performance of processing potato varieties in northern hills. Journal of the Indian potato association, 30 (1/2): 17-18.
10. Kumar, R., Bishnoi, D.K., Rathi, A., & Prakash, S. (2016). Marketing and price behaviors of onion in Haryana. Indian Journal of Economics and Development, 12(1a), 7-11.
11. Malik, D.P., Kumar, D.K., Kumar, N., & Sumit (2019). A study into the economics of vegetable cultivation in Haryana. Indian Journal of Economics and Development, 15(2), 317-321.
12. Nandal, R.S., & Punia, D. (2003). A study on the economics of major vegetable and fruit crops in Haryana state. Research Bulletin No. 50. Department of Agricultural Economics, CCS Haryana Agricultural University, Hisar
13. National Horticulture Board. (2021). Indian horticulture database. Gurugram: National Horticulture Board, Ministry of Agriculture and Farmer's Welfare, Government of India. Retrieved from http://www.nhb.gov.in