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# Dependence on Pulses and Their Contribution to Food and Nutritional Security in India

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**ARTICLE ID: 21**

**Abstract**

In the Indian diet, pulses provide a cheap source of protein, vitamins, and minerals. India leads the world in area and production of pulses, accounting for 35% and 25% of global area and production, respectively. Two major pulses, beans and chickpea account for more than half of the worldwide pulse area and production, while pea has the highest productivity in total pulses. Despite a slight increase in pulse cultivation area compared to total food grains over the year due to several causes, the share of pulse production compared to total food grains has decreased over time due to decline in pulse productivity. However, the availability of pulses has increased due to increased imports rather than an increase in production. Furthermore, there is potential for pulse production to meet the demand for a balanced diet of the ever-growing population of India.

**Key words**- food security, India, pulses

## Introduction

Around the world, pulses form a vital component of many people's diets. They have the potential to significantly enhance human health, maintain our soils, save the environment, and support global food security. The United Nations declared 2016 as the

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"International Year of Pulses" (IYP) to raise public awareness of the nutritional benefits of pulses as part of sustainable food production aimed at food security and nutrition, with the United Nations Food and Agriculture Organization coordinating its implementation in collaboration with UN organizations, Governments, civil society organizations, and other relevant stakeholders (UN, 2013). Pulses are grown in 171 countries worldwide, with India being the world's largest producer, consumer, and importer (Singh, 2013). The idea behind the International Year of Pulses was to raise awareness of the importance of pulses in both sustainable agriculture and nutritious diets. The celebration of pulses afforded a special chance for all participants in the global pulse trade to collaborate and raise awareness of the importance of pulses for both human and environmental health. India is essential to the international markets for pulses since it is the largest producer, importer, and consumer of pulses worldwide. Pulses are cheaper than animal protein and may be grown in India with less resource consumption. Compared to other vegetables, pulses are high in protein, less expensive, and can be grown as an intercrop and mixed crop. Pulses usually grow in areas that have been left over following cereals and cash crops have been harvested since they can be produced primarily in rainfed conditions and do not require substantial irrigation. Pulses improve soil fertility and physical structure, perform well in mixed or intercropping systems, crop rotation, and dry farming, and provide green pods for vegetables and healthy cattle fodder. An essential and affordable source of plant-based proteins, vitamins, and minerals, pulses constitute 9–10% of the total food grain basket. Due to their high protein content (20–25%), which is twice that of wheat and three times that of rice and can assist with obesity, diabetes, malnutrition, and other disorders, they are also regarded as smart foods. Food consumption patterns have been significantly influenced by recent changes in consumer taste and preferences, increasing wealth, urbanisation, changes in consumer eating habits, improved awareness of safe and healthy food, and other factors. As a result, diet composition and nutrition intake have shifted intensely.

The production of food necessary for nutrition security makes agriculture critical for achieving appropriate nutrition. Many studies have empirically estimated that agricultural growth has a significant effect on reducing malnutrition with increased food production appearing to be the most crucial link between agricultural growth and nutrition. Pulses

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constitute the main component of a balanced diet, particularly for the rural masses, production of pulses must keep pace with the nation's unrelenting population expansion. Therefore, it is important to investigate the global and national scenario of production and productivity of pulses as well as export and import.

The nutritional status of major pulses, namely chickpea, black gram, green gram, horse gram, lentil, pigeon pea and cowpea is summarized in Table 1. The protein content of various pulses ranges from 20 to 25 percent; however, they have a limited amount of essential amino acids such as methionine, tryptophan and cysteine. Approximately 21-25 percent protein is present in pulses, nearly double the amount found in cereals. Pulses are high in vitamins such as vitamin A, vitamin C, vitamin $B_1$, and vitamin $B_2$, and minerals such as iron, zinc, calcium and magnesium. Lentil has the highest availability of vitamin A (450 IU); followed by chickpea (316 IU), pigeon pea (220 IU), horse gram (119 IU) and cowpea (lowest) (60 IU). As shown in Table 1, pulses contain nearly all the other vitamins.

**Table 1:** Nutritional levels of various pulses (per 100 gm of pulses)

| **Food stuff** | **Chickpea** | **Black gram** | **Green gram** | **Horse gram** | **Lentil** | **Pigeon pea** | **Cowpea** |
|---|---|---|---|---|---|---|---|
| Protein (%) | 20 | 24 | 25 | 22 | 25 | 22 | 23 |
| Vitamin A (IU) | 316 | 64 | 83 | 119 | 450 | 220 | 60 |
| Food stuff | Chickpea | Black gram | Green gram | Horse gram | Lentil | Pigeon pea | Cowpea |
| Vitamin C (IU) | 3.00 | 00 | 00 | 1 | 00 | 00 | 00 |
| Vitamin K (IU) | 0.29 | 0.19 | 00 | 00 | 0.25 | 00 | 00 |
| Vitamin B1 (IU) | 0.30 | 0.41 | 0.72 | 0.42 | 0.45 | 0.45 | 0.50 |
| Vitamin B2 (IU) | 0.51 | 0.37 | 0.15 | 0.20 | 0.49 | 0.51 | 0.48 |

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**Worldwide scenario of pulses**

Pulses were grown on an estimated 851.91 lakh ha of land globally, with 774.73 lakh tonnes produced and a productivity of 909 kg/ha. With a share of the world's acreage and output of 35 and 25 percent, respectively, India is the world leader in both categories. Bahrain, on the other hand, set the bar for productivity with 18485 kg/ha. Thus, it is evident that India's productions, which is 660 kg /ha, is considerably, lower than the 909 kg/ha average for the world.

TABLE 2: area, production and productivity of total pulses

| Country | Area (lakh ha) | Share(%) | Country | Production (lakh tonnes) | Share (%) | Country | Yield (kg/ha) |
|---|---|---|---|---|---|---|---|
| India | 303.09 | 35.58 | India | 199.8 | 25.79 | Bahrain | 18485 |
| Niger | 54.7 | 6.42 | Myanmar | 59.77 | 7.72 | Ireland | 5886 |
| Myanmar | 42.03 | 4.93 | Canada | 58.28 | 7.52 | Israel | 5576 |
| Nigeria | 38.49 | 4.52 | China | 41.13 | 5.31 | Belgium | 4445 |
| Brazil | 32.09 | 3.77 | Brazil | 33.06 | 4.27 | Tajikistan | 3985 |
| Canada | 28.7 | 3.37 | Ethiopia | 26.13 | 3.37 | Denmark | 3952 |
| China | 23.85 | 2.8 | USA | 23.95 | 3.09 | Trinidad | 3919 |
| Tanzania | 20.68 | 2.43 | Russia | 22.94 | 2.96 | UK | 3755 |
| Mexico | 18.35 | 2.15 | Australia | 22.47 | 2.9 | Netherlands | 3639 |
| Kenya | 17.19 | 2.02 | Nigeria | 22.05 | 2.85 | Switzerland | 3638 |
| Others | 272.74 | 32.02 | Others | 265.15 | 34.22 | Others | 1068 |
| World | 851.91 | 100 | World | 774.73 | 100 | World (India) | 909(660) |

*Source*: Annual Report, Directorate of Pulses Development, Ministry of Agriculture & Farmers Welfare.

**Crop-wise worldwide scenario of pulses**

The area, production and productivity of major pulses (beans, chickpea, pigeon pea, pea, lentil, and other pules) is presented in Table 3. The crop with the largest area under cultivation is the bean (35.93%), which accounts for 31.64 percent of global production. The second-largest area under cultivation is the chickpea (139.81 lakh ha),

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which produces 137.31 lakh tonnes. About half of the world's production and area of pulses were made up of these two crops (beans and chickpea). The productivity of all pulses is highest for pea (16.14 qt/ha), next lentil (10.67 qt/ha), and chickpea (9.82 qt/ha).

**TABLE 3:** Area, Production And Productivity Of Major Pulses

| Crop | Area (lakh ha) | Share | Production (lakh tonnes) | Share | Yield (qtl/ha) |
|---|---|---|---|---|---|
| Beans | 306.13 | 36 | 245.16 | 32 | 8.01 |
| Chickpea | 139.81 | 16 | 137.31 | 18 | 9.82 |
| Pigeon pea | 70.33 | 8 | 48.90 | 6 | 6.95 |
| Pea | 69.32 | 8 | 111.86 | 14 | 16.14 |
| Lentil | 45.24 | 5 | 48.27 | 6 | 10.67 |
| Other pulses | 221.08 | 26 | 183.23 | 24 | 8.29 |
| **Total pulses** | **851.91** | **100** | **774.73** | **100** | **9.09** |

***Source*: Annual Report 2017-18, Directorate of Pulses Development, Ministry of Agriculture & Farmers Welfare.**

**Improved availability of pulses in India**

The CAGRs for domestic pulse production, imports, and exports from 2009 to 2018 are displayed in Table 6. From 2009 to 2018, the overall output of pulses climbed by 4.6 percent year, reaching 252.40 lakh tonnes from 145.66 lakh tonnes. When compared to pulse exports, which exhibited no discernible rise, imports of pulses dramatically surged by 12.78 percent. It demonstrates that over the research period, pulse availability grew from 24.74 lakh tonnes to 82.96 lakh tonnes; with the rise being attributed to higher imports rather than a 4.6 percent annually increase in production.

Per capita availability of pulses

By 2017, the availability of pulses per capita per day has decreased to 52.90 gm per day and 19.30 kg per year from 60.70 gm per day and 22.10 kg per year in 1951. It unmistakably demonstrates a 13 percent drop in the availability of pulses per capita per day and per capita per year, as well as a 40 percent discrepancy in availability of pulses in India from 1951 to 2020. It implies that there is plenty of opportunity to increase the

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production of pulses in India in order to give the nation's constantly expanding population a diet that is nutritionally balanced.

Dependence on pulses for food and nutritional security

The production of pulses is growing at a slow rate, while population expansion is ongoing. As a result, there are now much fewer pulses available each person. The production of pulses may depend on initiatives like increasing the area under cultivation while growing high yielding varieties, enhancing soil fertility at the farm level, implementing novel cropping system interventions, and applying rice fellow while intercropping pulses with other crops. Despite the fact that pulses make up 20% of the total food area and are produced in 8.85% of it, we import more than 25% percent of our pulses to satisfy domestic demand.

**Conclusions**

Protein, vitamins, and minerals including iron, zinc, calcium, and magnesium are all found in abundance in pulses. However, they are deficient in important amino acids including cysteine, tryptophan, and methionine. India is the world's top producer of pulses, with 35% and 25% of the worldwide production, respectively. The productivity of pulses is 660 kg/ha, which is much less than the global average of 909 kg/ha. Pea has the highest productivity of any pulse, whereas beans and chickpea make up over half of the world's area and output of pulses. Regarding India, the area planted with pulses expanded by 46.34 percent in 2020–21, and the output of all pulses climbed by 126.83 percent, with a productivity gain of 54.88% over 2002–2003. Although the proportion of land planted with pulses to all other food grains became slightly, the production of pulses as a percentage of total food grains decreased over time due to a fall in pulse productivity. Instead of a little rise in output, the availability of pulses has grown due to increasing imports.

**Suggestions**

Although the area under various pulses has been expanding, there is still potential for increased output. It may be possible to generate high yielding varieties to increase the production of pulses. There is still demand for pulse production to meet India's population's requirement for a balanced diet, as seen by the reduction in the availability of pulses per capita per day and per capita per year. In order to address food security and

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nutritional security, other food grains that are similarly rich in nutrients might be used as a secondary source of nourishment. To meet our demands, imports are frequently used. To fulfil the need of a growing population, the government should thus establish a policy framework to enhance pulse production.

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