Agri Articles
(e-Magazine for Agricultural Articles)
Volume: 02, Issue: 06 (NOV-DEC, 2022)
Available online at http://www.agriarticles.com
©Agri Articles, ISSN: 2582-9882

Pulses: Production, Importance, Challenges and Strategies

(*Pankaj[1], K.K. Bhardwaj[1] and Dheeraj[2])
[1]Department of Soil Science, CCS Haryana Agricultural University, Hisar, Haryana
[2]Department of Vegetable Science, Indian Agricultural Research Institute, New Delhi
*Corresponding Author's email: pankajsingroha95@gmail.com

Pulses are cultivated throughout the world, over half of the world's production of pulses is produced in Asia, especially India. Pulses are nutrient-rich foods containing a variety of secondary metabolites, dietary fibre, and proteins. The amount of protein in pulses is over two times that of grains. Legumes and pulses are regarded as functional foods because of their advantageous nutritional characteristics. Abiotic stressors, rapid climatic changes, the advent of novel species/strains of insect-pests and illnesses, and the lack of high yielding cultivars are all severe production restrictions for pulses. This article discusses the productivity and significance of pulses today, as well as future problems and potential intervention.

Introduction

"Orphan crops" are what people refer to as pulses. This is due to a combination of factors, including the fact that farmers frequently move to more high-yielding crops when they have access to irrigation or even if the rains are good, as well as the fact that they are typically produced in marginal lands vulnerable to moisture stress. For billions of people worldwide, pulses represent a significant source of nutrition. Because all pulses are regarded as legumes but not all legumes are regarded as pulses, the terms "legumes" and "pulses" are interchangeable. Groundnut (*Arachis hypogaea*) and soybean (*Glycine max*), which are primarily cultivated for edible oil, are not considered to be pulses because they are not members of the leguminoseae family and are not typically ingested by humans or domestic animals in the form of dry grains. Due to their high nutritional value and protein content, pulses have been grown for millennia in India and are a staple food. In addition to protein, there are a number of other nutrients that highlight the use of pulses as food. Pulses are used in both traditional and modern diets for a variety of purposes since they are readily available and inexpensive. The traditional methods for using pulses in meals include soaking, germination, and fermentation, which not only make them more palatable but are also known to lower anti-nutritional factors and increase digestibility.

Pulses production in India

Pulses are mostly produced, consumed, and imported in India. The nutritional security of India's big population's vegetarian diet, which is centered on cereal, depends on pulses. The demand for pulses is still growing at a 2.8% annual rate due to factors such as an ever-increasing population, rising incomes, and the fact that pulses are the main source of protein in the Indian diet. Pulses are used in a variety of ways in both traditional and modern diets because they are readily available and inexpensive. Indians generate 25% of the world's pulses, consume 27% of the world's pulses, and import 14% of the world's pulses. Around 20% of the land is planted with food grains, while 7–10% of the nation's total grain

production comes from pulses. Both the Kharif and Rabi seasons are used to grow pulses. However, more than 60% of the entire yield comes from rabi pulses. With a share of almost 40% in overall production, gram is the most prevalent pulse, followed by tur/arhar and urd/black matpe. In 2020–2021, India would import over three million tonnes of pulses, which might drive down the price of locally cultivated pulses and raise losses for farmers throughout the nation. The predicted total output of pulses in 2019–20 will be 23.15 million tonnes, up 2.33 million tonnes from the five-year average production of 20.82 million tonnes. The predicted production for 2021–22 will be 26.96 million tonnes, up 3.14 million tonnes from the average production over the previous five years of 23.82 million tonnes. In India, the index number of pulses production was about 164 in fiscal year 2020. This showed a 64% rise over the fiscal year 2008 baseline. In that year, the overall agricultural production index was 141. Pigeon pea, urd bean and lentil cpntributed 10.3%, 9.3% and 4.9%, , and other pulses made up the remainder of the pulses. Mung bean production has increased by 178% over the previous 15 years, outpacing that of chick pea (125%), urd bean (90%), pigeon pea (51%) and lentil (34%). India has made a significant step in the direction of achieving pulse self-sufficiency. This has been made possible by the nation's recent adoption of a mission mode strategy to increase pulse generation. The contributing factors to this success include (1) availability of high yielding cultivars well adapted to different environments and growing conditions, (2) improved crop production technologies, (3) enhanced uptake of improved cultivars and production technologies through knowledge empowerment of farmers and by ensuring supply of quality seed and other inputs (establishing 15 seed hubs, conducting large number of demonstrations on improved cultivars and best production technologies, etc.), (4) expansion of the area of pulses in rice-fallows, spring/summer season and other non-traditional areas, and (5) government policies in favor of pulses.

Reasons for lower pulse production

- **Production Related challenges**: Switching from pulse to other crops to increase productivity and profitability for farmers. Pulses are susceptible to a wide range of biotic and abiotic stresses. Among the abiotic causes, low soil moisture content and a quicker rate of soil moisture loss usually push dry conditions into the flowering and harvest stages.
- **Agro-ecological related challenges**: The soil fertility and moisture retention capacity of the rainfed regions where pulse crops are often grown are poor. Because of this, crops frequently experience moisture stress at different growth stages. Crop failure can be caused by unstable monsoon patterns and moisture stress, among other things.
- **Inputs related challenges**: for instance, the inflow of spurious and inferior seeds, the lack of location-specific/recommended HYVs quality certified seeds at all levels. Farmers have a restricted selection of short-duration pulse variants.
- **Credit and technology related challenges**: Farmers are unable to obtain institutional funding are less likely to invest in high-quality inputs and adopt new technology.

Importance of pulses

Nutrirional benefits: Phytochemicals, vitamins, minerals, dietary fibre, protein, and carbs are all abundant in pulse grains. The two main proteins present in pulse are globulins and albumin. The three main polysaccharides found in the cell walls of pulses are cellulose, hemicellulose, and pectins (dicotyledonous plants). The cell wall of plants is what is referred to as "dietary fibre" because it contains a complex mixture of polysaccharides (oligosaccharides, hemi-celluloses, cellulose, gums, and pectins), lignins, and waxes. Pulses are ideal for creating composite flours with cereals because of their high lysine and folate levels. The total carbohydrate, fat, niacin, riboflavin, thiamine, and vitamin B6 levels of

pulses and cereal grains are comparable. However, compared to cereals, pulses include higher levels of protein, folate, iron, magnesium, potassium, and zinc. Protein in faba beans ranges from 27 to 32% and includes albumins (20%) and globulins (60%) among other proteins. With less than 1% saturated fatty acids, chickpeas have a comparatively high fat content that is primarily made up of polyunsaturated fatty acids.

Improves soil fertility: An important ingredient for boosting plant output is nitrogen. Currently, the reactive nitrogen needed for agricultural fertilisers is provided through the energy-intensive Haber-Bosch process. There are environmental risks related with the misuse of fertiliser in addition to the generation of greenhouse gases (GHG), since only about 50% of the applied nitrogen fertilisers are absorbed by the plants and the remainder is lost to the environment, altering the terrestrial nitrogen cycle. The ability of pulses and some other legumes to consume atmospheric nitrogen through a symbiotic relationship with certain bacteria (such as Rhizobium and Bradyrhizobium), which gives them the potential to improve the cycling of nitrogen, is their most significant advantage. On the other hand, some pulses have the ability to release phosphorus that has been bonded to the soil, increasing the biological cycle of phosphorus. Including phosphorus-efficient pulses in agricultural systems is a crucial step in raising their resilience and sustainability. The benefit of integrating pulses in various cropping systems, such as agroforestry, crop rotations, and intercropping, is that they offer many ecological services, such as boosting soil biodiversity and enhancing nutrient cycling, which strengthen agro-ecosystems and increase their sustainability.

Mitigating climate change: Global agriculture is suffering as a result of the changing climate, which is being caused by a rise in anthropogenic greenhouse gas emissions. Pulses have the potential to aid in both reducing and adapting to climate change. Because some of the nitrogen absorbed by pulses remains in the soil, succeeding or companion crops require less nitrogen fertiliser, which helps to mitigate climate change by reducing GHGs and reducing reliance on synthetic nitrogen fertiliser. In comparison to cereals and grasses, many pulses may encourage higher rates of soil carbon storage, and deep-rooted pulses are particularly good in sequestering carbon. As a result, pulses can be regarded as climate-smart crops that significantly reduce climate change. Pulses, in contrast, help coping with and adapting to climate change. The genetic diversity of pulse crops is well recognised, and this is a crucial quality since it can serve as the foundation for the creation of more climate-resilient types that can be adjusted to potential scenarios of climate change.

Strategies for increasing the pulses production

By 2050, production of pulses must increase to 26.5 million tonnes in order to become self-sufficient. In order to attain sufficiency, research efforts, quick and simple access to essential inputs, and the development of a seed village will be beneficial. The following actions should be made to raise productivity and awareness for cultivating pulses:

- Increase government spending on fundamental and applied research to raise and maintain pulse yields. Research and development should, however, focus on particular species and agro-ecological circumstances.
- The availability of seed drills, zero-till machinery, rotavators, reapers, threshers, graders, and other equipment would encourage pulse growers.
- It is necessary to offer an appealing Minimum Support Price (MSP) with guaranteed procurement following harvest through procurement centres at the village or block level. Support prices must also be declared at the time of sowing.
- Encourage the study of understudied pulse species. For the pulse seed system to be strengthened, efforts must be made to infuse seeds of improved varieties.

- For increased crop production levels, it's crucial to guarantee the availability and accessibility of essential inputs including bio-fertilizers, sulphur, zinc, micronutrients, and pesticides.
- Appropriate provisions should be made to help small farm owners access financial options and connect them with producer organisations.
- Establishing seed hubs, performing Cluster Frontline Demonstrations (CFLD) on improved production technologies, including recently released varieties, and promoting vital inputs like bio-fertilizers, biopesticides, and micro irrigation systems in the "National Food Security Missionpulse "'s component.
- Farmers should expect better agricultural income if innovative institutional marketing methods are developed.
- Through nutrition education, school nutrition/feeding programmes, public procurement initiatives, and pulses food labelling, consumers' awareness and knowledge of pulses will be increased.
- Include pulses in programmes and policies related to nutrition.

Conclusion

Pulses have long been a crucial part of sustainable crop production systems because of their special capability for biological nitrogen fixation, carbon sequestration, soil improvement, low water requirement, and resistance to harsh climate. The main causes of the shortage of pulses are the geographic shift, sudden weather changes, complex disease-pest syndrome, socioeconomic circumstances, and limited marketing prospects. Higher pulse production can be attained with the help of favourable policy contexts and appropriate technological interventions, which will also improve the production system's sustainability. Higher farm income for farmers can be attained by investments in research, the availability of high yielding varieties, an improved minimum support price, and the creation of cutting-edge institutional marketing structures.