

The Role of Pulses in Building a Suitable & Sustainable Future

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How to cite this article:

Madhu/The Role of Pulses in Building a Suitable & Sustainable Future/Int J Food Nutr Diet. 2023;11(2):67–72.

Abstract

Pulses are a major source of protein requirement in the human diet. Fortunately, today in the race for modernity, the use of pulses in food is decreasing due to the trend of fast food, which is affecting the health of people, especially children and young people. The objective of the study is to study the available literature regarding pulses and their importance and justified their role in the sustainable future of the population. This article is a review based and reviewed literature was collected from different electronic data based. In this study, the importance of pulses has been highlighted whose availability and use will be helpful in good future. The most important feature of pulses is that their nutritional elements are preserved even after being cooked on heat.

Keywords: Pulses; Sustainable future; Sustainable future; Nutrition; Human health; Food security.

INTRODUCTION

Pulses are annual leguminous crops that yield up to 12 grains or seeds of variable size, shape, and color within a pod, which are used for both food and feed. The term "pulses" is restricted to crops harvested for dry grain only, thereby

excluding crops harvested green for food, which is classified as vegetable crops, as well as crops harvested primarily for oil. Used for extraction and leguminous crops that are specially used for sowing.

The year 2016 was celebrated as the International Year of Pulses. The Food and Agriculture Organization played a leading role in this. After the success of this campaign, in the 73rd session of the United Nations General Assembly held in December 2018, a request was made to celebrate February 10 every year as World Pulses Day.¹ The General Assembly accepted the request made by the Government of Burkina Faso. The theme of World Pulses Day, 2023 was "Pulses for a sustainable future". This underscores the importance of pulses in ensuring equity and creating livelihood opportunities, both of which are essential elements of sustainable agri-food systems.²

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Received on: 13.03.2023

Accepted on: 05.04.2023

In the cultivation of pulses, less irrigation is required as compared to other crops. They can better deal with drought conditions and climate related disasters. Therefore, they become an important tool for adapting to climate change and mitigating such changes. Pulses also prove to help provide a better quality of life to farmers in water-scarce areas.³ Pulses can help increase productivity and improve the resilience of farm based livelihoods in a range of farming practices, including agroforestry, intercropping, and integrated farming systems. From an economic perspective, the global pulses industry (which produces and trades pulses) also demonstrates its beneficial power in ensuring the stability of regional and global supply chains. It promotes the sustainable use of natural resources while enabling consumers to have access to whole foods.⁴

METHODS AND MATERIALS

Research papers showing data related to pulses and their importance are reviewed in this article. In this study, papers published in the last 10 years were collected from electronic data based sources: Pub Med, Springer Nature, Research Gate, and Google Scholar and synthesized by the traditional literature review method.

RESULTS AND DISCUSSION

Environment and Pulses

In addition to serving as an important source of protein for a large portion of the global population, pulses contribute to healthy soil and climate change mitigation through their nitrogen fixing properties. Bengal gram, red gram, green gram, black gram, rajma, cowpea, lentils, white peas, and horse gram are the major pulses grown and consumed in India. Furthermore, one kilogram of legumes emits 0.5 kg in CO₂ equivalent while one kilogram of meat produces 9.5 kg in CO₂ equivalent. According to estimates, the water footprint for the production of one kilogram of meat is five times higher than that of pulses. Farmers have a wide range of options to choose from when incorporating pulses into their cropping systems. With this, the ill effects of pests, diseases, and weeds can be reduced in the crop.

Offering a new source of income, pulses can also prove to help deal with climate related extreme events. Pulses also provide many other resources in the fight against climate change.⁶

Pulses reduce the need for fertilizers throughout the crop cycle. At the same time, by "fixing" the nitrogen present in the atmosphere, they also reduce the emission of greenhouse gases.⁷ A major advantage in a changing climate is that many pulse crops have adapted to thrive in arid environments, and can withstand drought better than most other crops. Thus, the cultivation of pulses meets Sustainable Development Goals 2, 3, and 13, which cover issues such as improving human health, sustainable agriculture, food security, and climate action.⁸

Nitrogen fixation: The quantity of nitrogen in the crops is supplied by the molecular nitrogen present in the atmosphere. Rhizobium bacteria found in the root nodules (nodules) of pulse crops fix the free nitrogen of the atmosphere and make it available to the plants. Because of this, these crops do not require much nitrogen. But it takes 20 to 30 days for rhizobium bacteria present in the soil to form glands on the roots of plants. Therefore, at this time it is beneficial to use fertilizer nitrogen for the growth of plants and the development of root glands. Therefore, at the time of sowing, nitrogen should be used at the rate of 20 kg per hectare in irrigated areas and 10 kg in non-irrigated areas.

Availability and Consumptions

The per capita monthly consumption of pulses in rural and urban India was 0.81 kg and 0.96 kg respectively in 1999–2000; Which decreased to 0.74 kg and 0.86 kg respectively in 2011–12.⁹ Presently India is the largest producer and consumer of pulses in world. Since the level of production is insufficient to meet the demand, the import of pulses becomes necessary.¹⁰ In recent years, there has been a steady increase in the demand for pulses in India. The government is taking various steps to expand the production of pulses in the country to meet the domestic demand for pulses. As such, there has been a steady decline in the quantity of pulses imports since 2014–15 (Fig. 1 below). According to statistics, 26.7 million tonnes of pulses are produced in India.¹¹

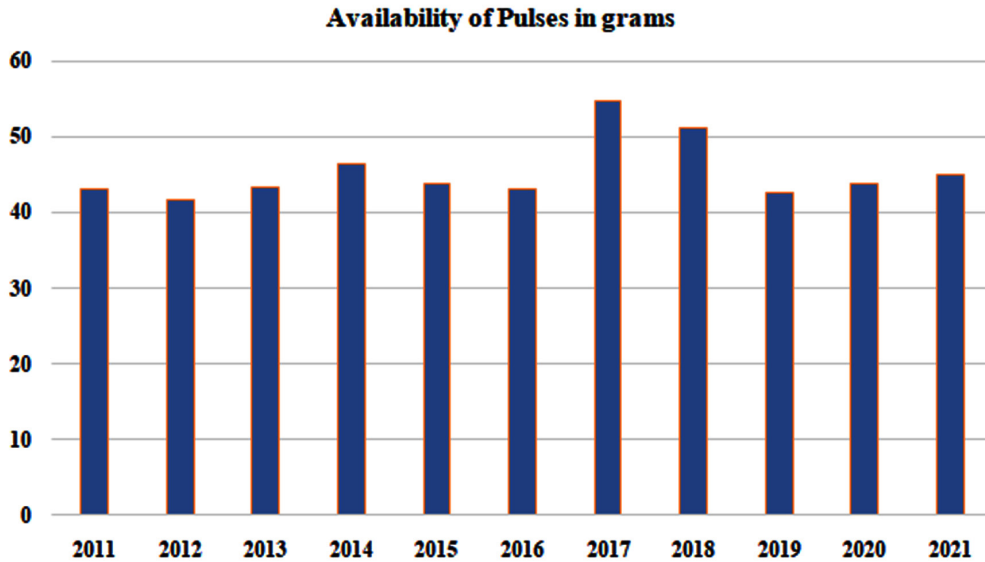


Fig. 1: Per capita availability of pulses for Indians.

Details of pulse demand production, import dependence, and future projections are given. This gives a glimpse of the reduction in the imports of pulses. The import dependency of pulses was 9 percent in 2021-22, which is expected to increase to 3.6 percent by 2030-31.¹²

There has been a dramatic increase not only in production but also in the area and yield of pulses. In 2015-16, pulses were cultivated on 25 million hectares of land. At that time, on average, 656 kg pulses were produced per hectare.¹³ In 2021-22, cultivation of pulses started on 3.04 crore hectares of land and the yield level increased to an average of 888 kg per hectare. Reached up to To increase the production of pulses, the Government of India has launched the National Food Security Mission Pulses program in 644 districts of 28 states and union territories (Jammu & Kashmir and Ladakh).¹⁴

On the production front, although India ranks first globally in terms of the area under pulses and the production of pulses, it is not yet self-sufficient and remains a net importer of pulses. In 2013-14, the total area under pulses was 25 million hectares and production was about 19 million tonnes, and demand was about 24 million tonnes (Directorate of Economics & Statistics 2015). After accounting for seed, feed, and wastage, the per capita availability of pulses in 2014 was around 38 gm per day, which is less than the recommended daily requirement of 40 grams per day. It was only after including imports of 3.5 million tonnes that net availability reached a level of 44 grams, which is above the recommended daily requirement.

Data from the consumer expenditure surveys of the National Sample Survey (NSS) indicate that the average consumption of pulses increased in rural India from 22 gm in 2004-05 to 26 gm in 2011-12. This is less than 70 percent of the requirement of 40 gm per day. Further, there were large differences in consumption across expenditure classes. In the lowest decile of monthly per capita expenditure, the deficit in the consumption of pulses per day was 25 gm in 2004-05, an amount that came down to 22 gm in 2011-12. In 2011-12, only persons in the top three deciles consumed more than 70 percent of the Recommended Dietary Allowance for pulses.

ROLE OF PULSES IN THE DIET

Pulses provide 10 percent of dietary protein, with a marginal increase in monthly per capita consumption. Pulses can be included in cereal based diets to fight malnutrition. There is evidence to support the fact that people who regularly consume pulses have higher levels of nutritional security.¹⁵ A study on the factors influencing the consumption of pulses in Indian households suggests ways to increase market access and make pulses cheaper than other food items. Pulses are an important source of protein in the Indian diet. Children, adolescent girls, and pregnant and lactating mothers meet half of the recommended dietary requirements of protein through food security programs of the Government of India.¹⁶

During the pandemic, 5 kg of rice/wheat and 1 kg of selected pulses were provided to the poor

under the Pradhan Mantri Garib Kalyan Yojana.¹⁷ States like Andhra Pradesh, Telangana, Haryana, and Himachal Pradesh have managed to distribute pulses under the Public Distribution System (PDS). As a policy, pulses should be provided to the weaker sections of the population at subsidized rates under the PDS. This will increase the reach of pulses and they will be available at low prices.¹⁸

Apart from preventing obesity, pulses have been identified as having “a valuable role” in reducing chronic diseases such as diabetes and heart disease. It also has an important role in promoting a diverse microbiome in children at risk of stunting or stunting during the first 1000 days of life.^{4,5} The amount of protein in pulses is 2 to 3 times more than that of cereals, so it is an excellent option for the population facing protein deficiency.

HEALTH BENEFITS OF PULSES

As mentioned above, pulses, beans, and lentils act as antioxidants and anti-inflammatory agents, reducing cancer risk. Lentils also contain an element known as selenium, which decreases the rate at which a tumor grows. They also boost immunity and stimulate T cells' production, which helps in fighting diseases.

Pulses are an important part of a vegetarian diet, containing a treasure trove of protein. Apart from being delicious, they are also very beneficial from the point of view of digestion. Apart from protein, and carbohydrates, many types of vitamins, phosphorus, and minerals are found in them, which keep the body healthy as well as keep away many types of diseases. There are many types of pulses and the methods of cooking them are also different. Today we will learn about these pulses and their benefits.

Arhar: It is also called Tuvar. Minerals, carbohydrates, iron, calcium, etc. are found in sufficient quantity in it. It is an easily digestible pulse. Therefore, it can be given to the patient as well, but patients with gas, constipation, and shortness of breath should consume it less.¹⁹

Moong: Moong whether whole or washed, is full of nutrients. After sprouting, the amount of nutrients calcium, iron, protein, carbohydrate, and vitamins found in it doubles. Moong is powerful. Its use is beneficial for patients with fever and constipation.²⁰

Gram: Gram and gram dal are not only beneficial in physical health and beauty but are also helpful in treating many diseases. Carbohydrates, protein,

moisture, smoothness, fiber, calcium, iron, and vitamins are found in them. The use of gram is beneficial in diseases like anemia, constipation, diabetes, and jaundice. The use of gram flour is beneficial for the beauty of hair and skin.^{21,12}

Urad: The effect of Urad is cold, so while consuming it, a paste of asafoetida should be applied in pure ghee. Carbohydrates, vitamins, calcium, and proteins are also found in sufficient quantity in this. Patients with piles, arthritis, asthma, and paralysis should reduce their intake.^{21,24}

Moth: Moth pulse containing calcium, phosphorus, carbohydrates, and vitamins is anti-worm and anti-fever.^{22,24}

Lentils: Its nature is hot, dry, blood enhancing, and thickening in the blood. Consuming lentils is beneficial for diarrhea, polyuria, leucorrhoea, constipation, and irregular digestion.

Kulthi: This is also a type of pulse. Its use helps in getting rid of arthritis, fever, leucorrhoea, and obesity.²³

CONCLUSION

Pulses have a lower water footprint than other food crops and are better able to withstand drought and climate related calamities, making them a crucial tool for adjusting to and reducing climate change. Furthermore, one kilogram of legumes emits 0.5 kg in CO₂ equivalent while one kilogram of meat produces 9.5 kg in CO₂ equivalent. They also help farmers in water scarce regions have a better quality of life. With the continuous efforts of the government, India is moving towards “self-sufficiency” in pulses. Pulses, rich in macronutrients, meet the needs related to sustainable development and diet, so it becomes very important to raise awareness of the benefits associated with their consumption. As a policy, pulses should be provided to the weaker sections of the population at subsidized rates under the PDS. This will increase the reach of pulses and they will be available at low prices.

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