



NUTRITIONAL VALUE OF SELECTED WINTER CROPS IN INDIA

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ABSTRACT

The crops that are sown in the winter season are called “Rabi crops” (also known as the “winter crop”). Winter gardening is about harvesting crops all winter that were planted in the summer and fall. This review provides the information of production of winter crops ; they are tobacco, wheat, maize, pea and gram. Tobacco [Nicotina tabacum L.] is an important commercial cash crop grown in India. It contains a chemical called nicotine which is an addictive substance. Wheat and Maize are the two important cereals for all around the world. Cereals are a good source of vitamin A, Vitamin B12, Dietary Fiber, and Calcium. Pea and gram are the two most important pulse crops. They are a good source of amino acids, fiber, vitamins, and minerals. These four crops are therefore, very nutritious and helps in the growth of human beings.

Keywords: Winter crops, Tobacco, Wheat, Maize, Pea, Gram, Nutrition.

INTRODUCTION

Agricultural production in India has shown sizeable growth after the independence [Kandaswamy, 1988]. The existence of diverse agroclimatic conditions is one of the biggest assets of Indian agriculture [Gupta, et.al., 2002]. Wide range of crops are grown throughout the year is because of the variation seen in the climate over the length and breadth of the country. And therefore, all the field crops like wheat, rice, maize, millets, pulses, cotton, tobacco, sugarcane, oilseeds, different types of fruits and vegetables and a large number of spices are been grown here. India ranks second worldwide in farm outputs. As per 2018, agriculture employed more than 50% of the Indian work force and contributed 17.18% to country's GDP.

“The earth, the land and the water are not an inheritance from our forefathers but on loan from are children. So, we have to handover to them at least as it was handed over to us”. ----- Mahatma Gandhi. [Newman, 2011]

Agriculture is said to be the backbone of India, because of its contribution to the country's Gross Domestic Production [GDP] which is huge, and over half of the population of India are depending on agriculture for living.

WINTER CROPS

The crops that are grown in the winter season are known as the “Rabi Crops” [also known as winter crop] in India. The meaning of Rabi is, when the crop is harvested (GURABINI, 1975). The crops growing from November to April comes under winter crops or rabi crops (M. M. Nageswararao et al. 2016). Some of the important rabi crops grown in winter season are maize, cumin, wheat, gram, mustard, fennel, coriander, fenugreek, onion, tomato, potato, etc. Availability of precipitation during winter months due to the western temperate cyclones of these crops. In winters temperatures of the Charotar region fall upto 8-9°C Mild climate during this season causes pleasant weather in this area. Rabi production is more assured, as it has a higher yield and reduces pest and disease related problems. Overtime, with the irrigation development, the kharif is declining and Rabi is increasing.

TOBACCO [NICOTINA TABACUM L.]

Tobacco is an important commercial cash crop grown in our country. Tobacco comes under the family Solanaceae and the general term for any product prepared from the cured leaves of these plants. More than 70 species of tobacco are known, but the chief commercial crop is [Nicotina tabacum L.]. It is consumed by rich and poor people of all nations in one form or the other. Gujarat occupies second position next to Andhra Pradesh in the production of tobacco. Bidi tobacco production is largely concentrated in middle Gujarat, comprising districts of kheda, Vadodara and Panchmahal. Kheda district itself accounts 73% of land area producing 74% of the tobacco in the state. There are different type of tobacco varieties grown in India, and it is broadly classified in to five different types:-

1. Cigarette type,
2. Bidi type,
3. Cigar and Cheroot,
4. Hookah type,



5. Chewing and Snuff.

Of which bidi type and chewing and snuff type of varieties are found in Gujarat state. Bidi tobacco is mainly cultivated in the Charotar region which includes Anand, Borsad, Petlad and Nadiad taluka of Kaira district [Anand and Kheda district].

WHEAT [TRITICUM AESTIVUM L.]

The nutri-rich cereal is grown in diversified environments. Globally wheat occupies around 217 million hectares holding the position of highest average among all the crops and has an annual production of almost 731 million tonnes. Wheat [*Triticum aestivum* L.] is one of the principle cereal crop grown worldwide. It is an important staple food for around 2.5 billion people of the world. The wheat crop is being cultivated in the winter and spring season in the world. In India, wheat crop is cultivated as a Rabi crop sown during November and harvested in between March and April. India, being blessed and enriched with a diverse agroecological condition, it ensures food and nutrition security for the Indian population. India, is the second largest producer of wheat worldwide. Wheat contains 20% of protein and 19% of calorie intake. India has adopted a new strategy, which led to the ‘Green Revolution’, especially for the production in wheat and rice. Under the project [All India Coordinated Wheat Improvement Project – AICWPIP], several high yielding wheat varieties have been developed which became extensively popular and was adopted by the farmer community.

MAIZE [ZEA MAYS L.]

In accordance with maize, India ranks fifth in area, fourth in production and third in the productivity [Badal and Singh, 2001]. During 2018-2019 in India, the maize area reached to 9.2 million ha [DACNET, 2020]. During 1950-51 India used to produce 1.73 million MT maize, which has increased to 27.8 million MT by 2018-2019, recording close to 16 times increase in production. The grains of maize are used as food in the form of sweet corn, baby corn and the grains are milled to flour to make ‘roltas’. Maize is a stable cereal very popular because of its high nutritional significance enriched with abundant amount of macronutrients like starch, fibre, protein and fat along with micronutrients like vitamin B complex, b-carotene and essential minerals, i.e. magnesium, zinc, phosphorus, copper, etc. Maize is also used as fodder to feed the cattles and straws are used for making baskets, boxes, etc. Maize starch is famous in pharmaceutical industries as diluents and also used in cosmetics.

PEAS [PISUM SATIVUM L.]

Pea is belonging to the family Leguminosae. It is an annual plant. It is grown in cool season all around the world. Field pea [*Pisum sativum* L. var. *arvense*], it is used as a vegetable, fresh, frozen or it is also preserved in can for later use in further season. It is also grown to produce dry peas like that split pea. These varieties are all known as field peas or sweet peas. Matured seeds are used as ‘Dal’. It is also used for green manuring. The green seeds are preserved in the can for further use in the off-season [Chaudhary, 1967]. Pea is an important crop in the pulses which is grown in India. In accordance with pea, India is the fifth largest producer, in the world. Among the pulses, pea is one of the most important pulse crop, it contains about 22.5% protein and 60.4% carbohydrates. It is costly because of its very high nutritional value of grains. The rich fodder is used to feed the cattles. The pea plant has the ability to withstand against the drought. It has the high resistance against the pest and diseases because of its hardness. Biofertilizers plays an important role in giving nutrients to the pea plant for its boosting up production.

GRAM [CICER ARIETINUM L.]

It is widely cultivated especially in the developing countries. It has a important source of protein and carbohydrates that are very important for human diets. It is grown in semi-arids and arid regions. Consumption of chickpeas, is been beneficial worldwide because it manages the multiple chronic diseases such as obesity. There are two varieties of chickpeas which includes the Desi and Kabuli. Kabuli chickpeas have a very thin seed coat, which contains 5% of the whole mass and are light brown in colour across genotypes, on the Desi side, Desi chickpeas have a thicker seed coat compared to Kabuli chickpea, which contains 14% of the whole mass and it is tan to black in colour across genotypes [Wood, Knights, & Choct, 2011]. Desi chickpeas are characteristically smaller, browner and more angular in shape the Kabuli chickpeas. Chickpeas are split and dried to form the ‘chana dal’, which is a common form used in Indian cuisine. Dried chickpeas are also milled to a flour, also known as besan all over Indian states. Besan is used to make many varieties of dishes like pakoras, chillas, khaman-dhoklas which is a speciality of gujarati people. Hummus is also made from cooked, mashed and blended with other ingredients. It is a popular food, and can be part of a balanced diet because of its nutritional composition [Wallace, Murray, & Zelman, 2016].



CONCLUSION

Winter cover crops are able to increase infiltration of winter rainfall and assist with water storage for use by the main cash crop the following summer. A crop which will bear the winter, or which may be converted into fodder during the winter is known as “winter crop”. In this paper, the study was recorded of five cultivated cash crops which are grown in the winter season and thus known as winter crops, they are tobacco, wheat, maize, pea and gram. The aim of studying them was, because each crop is having its own value and it is grown in large quantity in India. Tobacco :- It contains the highly addictive stimulant alkaloid nicotine as well as harmful alkaloids. Wheat :- Wheat is one of the oldest and most important of the cereal crops. (*T. aestivum*) is used to make bread, (*T. durum*) is used in making pasta (alimentary pastes) such as spaghetti and macaroni and club wheat (*T. compactum*) a softer type, used for cake, crackers, cookies, pastries and flours. Maize :- It has become a staple food in many parts of the world, with the total production of maize or rice. The grain of maize is used for food, feed, and industrial products including biodegradable foams, plastics, and adhesives. Pea :- (*Pisum sativum*), also called garden pea, herbaceous annual plant in the family Fabaceae, grown virtually worldwide for its edible seeds. Peas can be bought fresh, canned, or frozen, and dried peas are commonly used in soups. Gram :- It is the most important Rabi pulse crop grown in India. They are rich source of protein and form an important part of vegetarian diet. It is important in Indian cuisine used in salads, soup, and stews, and curry, in chana masala and in other meal products like channa.

REFERENCES

1. Aiyer, Y. N., (1986). Field crops of India. BAPCCO Publications..
2. Anantharaman R. (1966). Tobacco Manufactures. Foreign Trade Review, 1(1), 93-103.
3. Badal, P. S., & Singh, R. P. (2001). Technological change in maize production: A case study of Bihar. Indian Journal of Agricultural Economics, 56(2), 211-219.
4. Dhawan, V. (2017). Water and agriculture in India. In Background paper for the South Asia expert panel during the Global Forum for Food and Agriculture (Vol. 28).
5. Grewal, R. K., Lulsdorf, M., Croser, J., Ochatt, S., Vandenberg, A., & Warkentin, T. D. (2009). Doubled-haploid production in chickpea (*Cicer arietinum* L.): role of stress treatments. Plant cell reports, 28(8), 1289-1299.
6. Jayaraman, T. K. (1978). An Analysis of Overdues of Primary Agricultural Co-Operative Societies: A case Study of Mahi-Kadana Project in Gujarat State. Indian Journal of Agricultural Economics, 33(902-2018-1443), 21-30.
7. Kandaswamy, A. (1988). Commercial Crops in India. Indian Journal of Agricultural Economics, 43(902-2018-2648), 444-445.
8. Mehta, D., SHUKLA, S. H., & KALUBARME, M. H. (2021). Winter Crop Growth Monitoring using multi-temporal NDVI Profiles in Kapadvanj Taluka, Gujarat state. International journal of Environment and Geoinformatics, 8(1), 33-38.
9. Mohan, N., Aghora, T. S., Wani, M. A., & Divya, B. (2013). Garden pea improvement in India. Journal of Horticultural Sciences, 8(2), 125-164.
10. Nanavati, M. B. (1947). Food crops of Gujarat, 1939-1946.
11. PANCHAL, J., SHUKLA, S. H., & KALUBARME, M. (2021). Analysis of Optimum Growth Stages for Winter Crop Seperability using Multi-Temporal NDVI Profiles in Vijapur Taluka, Gujarat State. International Journal of Environment and Geoinformatics, 8(2), 135-143.
12. Real Hernandez, L. M., & Gonzalez de Mejia, E. (2019). Enzymatic production, bioactivity, and bitterness of chickpea (*Cicer arietinum* L.) peptides. Comprehensive reviews in food science and food safety, 18(6), 1913-1946.
13. Sambasivam, V. P., Thiyagarajan, G., Kabir, G., Ali, S. M., Khan, S. A. R., & Yu, Z. (2020). Selection of winter season crop pattern for environmental-friendly agricultural practices in India. Sustainability, 12(11), 4562.
14. Wood, J. A., Knights, E. J., & Choct, M. (2011). Morphology of chickpea seeds (*Cicer arietinum* L.): comparison of desi and kabuli types. International Journal of Plant Sciences, 172(5), 632-643.
15. Yadav, O. P., Hossain, F., Karjagi, C. G., Kumar, B., Zaidi, P. H., S. L., ... & Dhillon, B. S. (2015). Genetic improvement of maize in India: retrospect and prospects. Agricultural Research, 4(4), 325-338.

Books

1. R Heredia – 1997 - books.google.com
2. LP Singh – 1992 - books.google.com
3. Encyclopedia of Agricultural Marketing 12, 179, 2005. - books.google.com
4. S Ramadas, TMK Kumar, GP Singh – Recent Advances in Grain Crops, 2019. - books.google.com
5. S SINGH – Encyclopedia of Agricultural Marketing, 2005. - books.google.com



6. Tata McGraw-Hill Education, 1997. – books.google.com
7. W Bushuk, VF Rasper – 1994 - books.google.com

Web links

1. <http://www.gurabini.com/usefulLinks.aspx>
2. <https://agri.gujarat.gov.in>