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Strengthening Pulse Cultivation in North India- Challenges and Strategies

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Abstract

Pulses are chief source of protein and plays a prominent role in Indian agriculture. The excess reliance on pulse imports by India even after being the largest pulse producer globally is because of the erratic production scenario. This article explores into the prevailing situation of pulse production, the challenges encountered, and practical approaches backed by evidence to increase production in India. The foremost takeaways indicate that adoption of crop diversification, good irrigation management, soil conservation, climate resilient varieties, market support, extension services, pulse production in rice fallow areas, biofertilizers and mechanization could really promote pulse production in India.

1. Introduction

Pulses are an essential part of Indian agriculture and cuisine, providing vital protein to millions of people. India is the largest producer and also the major consumer of pulses, contributing more than 25 percentage of global pulse production (FAO, 2020). Despite this, India still finds itself greatly dependent on imports to satisfy national needs. In the 2019-20 period, India produced 23.01 million tons of pulses while importing several million tons to meet the growing demand. The northern states of India which are major pulse hubs are facing unpredictability in pulse production has raised major concerns among farmers, policymakers and consumers equally (Srivastava et al., 2013).

2. Trend in Pulse Production in India

Over the past decade, the pulse production scenario in India has been quite variable. The pulse production has ranged from 19.2 million tons in 2012-13 to 25.2 million tons in 2017-18. Out of all states, the North Indian states such as Madhya Pradesh, Maharashtra, Uttar Pradesh, Gujarat and Rajasthan are leading in both area (>70 percentage) and production (>73 percent) of pulses

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like lentil, arhar, Bengal gram, field pea. However, even in these major producing states, production levels have been inconsistent, contributing to the overall fluctuations in national output (Kumar et al., 2018).

3. Several Factors are Resulting in the Reduction in Area Under Pulses are Mentioned Below:

- Extensive rice-wheat cropping system replacing pulses.
- Farmers choice towards more remunerative crops
- Over-use of groundwater enhancing salinity
- Increased incidence of ascochyta blight aggravated with low temperature.
- Excessive fertilizers, pesticides and irrigation deteriorated soil quality
- Fast depletion of micronutrients (Zinc, Sulphur and boron)
- Cereal based cropping system has little scope to break the disease cycle.
- Inadequate or deficient rainfall amount during monsoon season

- Asymmetric pattern of temperature increase i.e. night minimums is increasing more rapidly than day time maximums.

- High yielding long duration pulses varieties bred for northern conditions are no longer suitable under changing scenario of climate change

4. Strategies to Increase Pulse Production in North India:

- Awareness on crop diversification and intensification can really boost pulse production. For example, Rotating pulse crops with other crops enhances soil fertility and also reduces pest and disease load in the field (Kumar et al., 2018).
- Bringing an additional area under short duration high yielding varieties to fit in multiple cropping programmes to be grown as catch crop.
- Adoption of efficient plant protection measures.
- Adoption of smarter irrigation management practices combined with water harvesting methods can alleviate water stress and eventually rise pulse yields (Gupta et al., 2020).

Table 1: Area and production of pulses by major North India states

State	Total pulses			Kharif pulses			Rabi pulses		
	Area contribution (%)	Production contribution (%)	Yield (kg ha ⁻¹)	Area contribution (%)	Production contribution (%)	Yield (kg ha ⁻¹)	Area contribution (%)	Production contribution (%)	Yield (kg ha ⁻¹)
Madhya Pradesh	21	25	983	22.32	16	609	26	30	1200
Rajasthan	20	16	659	28	20	455	13	14	1072
Maharashtra	15	15	839	21.54	18	738	14	13	942
Uttar Pradesh	8	10	992	8.78	7	688	10	12	1171
Gujarat	3	4	1099	5.16	5	869	3	4	1366
Total /Average	67	70	938.66	85.8	66	671.8	66	73	1150.20

Table 2: Area and production of pulses in major pulse producing North India states

State	2015–16		2016–17		2017–18		2018–19		2019–20	
	Area	Production	Area	Production	Area	Production	Area	Production	Area	Production
Madhya Pradesh	58.75	53.02	56.64	62.91	81.12	66.00	66.00	60.45	47.57	41.08
Rajasthan	38.67	19.90	52.71	31.81	34.05	59.08	59.08	37.59	63.40	44.97
Maharashtra	35.44	15.45	43.58	37.68	33.48	40.02	40.02	26.83	41.92	37.36
Uttar Pradesh	18.82	11.65	25.09	21.84	2.00	22.91	22.91	24.08	23.70	24.47
Gujarat	5.84	5.44	9.42	8.18	9.23	6.62	6.62	6.81	9.02	10.57

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- Implementation of Soil Conservation and Nutrient Management techniques like mulching, contour farming and integrated nutrient management reduce soil erosion, improves soil health and increases nutrient use efficiency (Sharma et al., 2019).
- Developing new cropping systems like companion cropping, mixed cropping (or) intercropping for growing pulses between widely spaced crops such as sugarcane, maize, potato, cotton, arhar, groundnut, bajra and jowar etc. both under irrigated and rainfed conditions.
- Developing and encouraging pulse varieties that can withstand extreme weather situations will help farmers adapt and minimize yield losses (Kumar et al., 2020). Around 12 million hectares of rice fallow land in India is suitable to grow pulse crops like green gram, lentils, chickpeas, and black gram and also can offer farmers an additional source of income. Several pulse varieties customised for rice fallow regions by the Indian Institute of Pulses Research (IIPR) can significantly boost pulse production (IIPR, 2020).
- Promotion of use of various Biofertilizers can boost soil fertility (either by fixing or solubilising the nutrients), decreases the farmers dependence on excess fertilizers, enhances soil health, help prevent soil erosion, and support plant growth (Sharma et al., 2019).
- Promotion of Mechanization like Seed drills, power tillers and threshers can cut down labour cost, fuel cost increases harvesting efficiency and also improves the quality of grains in Pulse Production (Kumar et al., 2019).
- Price Stabilization and Market Support can encourage farmers to cultivate more pulses (Kumar et al., 2020).
- Reinforcement of extension services by providing education for farmers can create awareness about better pulse production practices (Kumar et al., 2018).
- Several policy measures were initiated by India to enhance pulse production which include National Pulse Development Program to boost pulse production through improved crop management, National Biofertiliser Development to encourage the use of biofertilizers, Biofertiliser subsidy scheme to make biofertilizers more accessible and also to offer subsidies and incentivize

their use in pulse cultivation, Price Support Scheme to support farmers by ensuring a more consistent income and Pradhan Mantri Fasal Bima Yojana (PMFBY) to provide crop insurance to farmers and also to reduce the risk of crop failure.

5. Conclusion

Enhancing pulse production in India demands for a inclusive plan that tackles the hurdles farmers and the farming segment face. By executing the approaches cited earlier like crop diversification, effective irrigation management, soil conservation measures, developing climate resilient varieties, providing market support, and enhancing extension services, India can reduce its dependence on imports, strengthen food security, and nurture sustainable agricultural practices.

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