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Wheat Research in the Peninsular Zone of India: Present Status, Opportunities and Future Directions

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ABSTRACT

The Peninsular Zone characteristically has varied agro-climatic conditions. Growing wheat in this zone presents some unique challenges and characteristics. The crop suffers due to heat stress, temperature fluctuations, and variable rainfall. Typically, the tropical climate makes this region different from other wheat-growing regions in India. The soils of this zone are lateritic, red and black. Black soils (Regur soils) are moisture-retentive and fertile. Considering these constraints development of heat tolerant, disease resistant, high yielding and drought tolerant varieties have been bred to address the challenges. The discussion aims to inform policymakers, researchers, and farmers about strategic

priorities and potential interventions to achieve long-term improvements in wheat farming in the Peninsular Zone.

INTRODUCTION

Wheat, a fundamental staple food of 55 per cent world population and supplying 20 per cent food calories. It is one of the important food grain crop and staple food of North India. Diverse climatic conditions and food habits across the country support three types of wheat cultivation. Among these bread wheat contributing 95per cent, durum on 5 per cent and *dicoccum* on one per cent area. Therefore, it has been a focal point of agricultural research aimed at improving productivity and resilience. India's wheat research is driven by the need to ensure food security for a growing population, adapt to changing climatic conditions, and enhance sustainability. Since the 1960s, wheat research in India has played a crucial role in the country's Green Revolution, significantly boosting wheat yields and contributing to self-sufficiency. The introduction of high-yielding varieties, such as "Sonara" and "Kalyansona," transformed wheat cultivation, making India one of the world's largest producers of the crop. Wheat research in India involves collaboration between government agencies, such as the Indian Council of Agricultural Research (ICAR), state agricultural universities, and international research organizations (CIMMYT). These partnerships facilitate the sharing of knowledge, resources, and technology, driving progress in wheat cultivation. Programs such as the All India Coordinated Wheat Improvement Project (AICWIP) play a crucial role in this collaboration, facilitating the exchange of knowledge and resources at national and international levels among the different stake holders. The diverse climatic conditions, soil types, and geographical features create distinct wheat-growing zones, each with unique characteristics and requirements. Understanding these zones helps in optimizing wheat production through region-specific practices. Here's an overview of the key wheat-growing zones in India:

STATUS OF WHEAT RESEARCH IN THE PENINSULAR ZONE

Peninsular India, a region characterized by its diverse climates and soils, has traditionally been less prominent in wheat cultivation (1.8 m ha) compared to the northern plains (24.3 m ha) and central zones (5 m ha) of the country. However, recent advancements in wheat research in this region are setting the stage for significant agricultural improvements, addressing both local and global food and nutritional security concerns. In the peninsular zone, wheat is grown under three different conditions *viz;* 1) **Timely sown** - irrigated with high fertility soils having productivity of 40-45 q/ha, 2) **Late sown** -irrigated with medium fertility having productivity of 33-38 q/ha and 3) **Timely sown**- rainfed/restricted irrigation with low fertility soils having very low productivity of about 20-27 q/ha.

REGIONAL CHALLENGES AND OPPORTUNITIES

The primary challenge for wheat cultivation in Peninsular India lies in its varied climatic conditions, which include hot and humid environments that are less ideal for traditional wheat varieties. Moreover, the region's soil types and water availability further complicate/discourage wheat farming. Historically, the focus has been on crops better suited to these conditions, such as rice and millet. However, with the rising demand for wheat and its potential benefits, researchers have intensified efforts to adapt and improve wheat varieties for this region. All

three types of wheat (bread, durum and dicoccum) is being cultivated and utilized for various purposes. Dicoccum cultivation is mostly falls under this zone which is having very low yield potential. Rainfed and restricted irrigation is being practiced in some parts of the Peninsular Zone.

KEY RESEARCH DEVELOPMENTS

Development of Heat-Tolerant Varieties: Researchers have been focusing on breeding wheat varieties that can withstand higher temperatures and variable climatic conditions. Varieties such as 'DBW 303' and 'HD 3086' have shown promise in trials, exhibiting better heat tolerance and resilience.

Soil and Water Management: Innovative practices in soil management and irrigation techniques are being explored to enhance wheat cultivation. Methods such as drip and sprinkler irrigation and the use of organic soil amendments are being tested to improve water use efficiency and soil fertility. Varieties developed and being cultivated under restricted irrigation conditions such as Netravali and Phule Anupam.

Disease Resistance: Peninsular India faces specific pest and disease challenges, including rusts and blights. Research initiatives are working on developing disease-resistant wheat varieties through genetic improvement and biotechnological approaches.

Local Adaptation Strategies: Collaborative efforts between agricultural research institutions and local farmers have led to the development of region-specific cultivation practices. These include tailored sowing schedules, pest management strategies, and crop rotation systems that integrate wheat more effectively into local farming systems.

Agronomic practices: In addition to improved varieties, adoption of appropriate crop management practices like proper time of seeding, seed rate, crop geometry, nutrient management, irrigation management, integrated weed management, and crop residue management in wheat based cropping sequences in various wheat growing zones have significantly contributed in harnessing the yield potential of new varieties.

COLLABORATIVE EFFORTS AND FUTURE DIRECTIONS

Looking ahead, the focus will likely expand to include climate change adaptation strategies, precision agriculture technologies, and further genetic improvements. By continuing to address the unique challenges of the region through targeted research and development, Peninsular India has the potential to significantly boost its wheat production and contribute to national food and nutritional security. For optimum utilization of resources: use of RCT, residue management, minimum tillage, zero tillage, rotary tillage, laser land leveling, bed planting, planting on FIRBS etc. can enhance the yield of wheat. Besides, all available package of practices it needs to minimize the cost on inputs and maximizing yields. In addition, the planners, managers and carriers of technology (extension workers) can also update themselves with the latest technology which help in enhancing wheat production in the country.

CONCLUSION

Wheat research in Peninsular India represents a critical step towards diversifying and strengthening the country's agricultural base. With ongoing advancements and collaborative efforts, the region is poised to overcome its traditional limitations and achieve substantial progress in wheat cultivation. This will not only enhance local food security but also contribute to broader agricultural sustainability and resilience.

REFERENCES

Kumar, A., Poswal, R. S., Singh, G., Sharma, R. K., Saharan, M. S., Chhokar, R. S., ... & Sharma, I. (2014). Wheat Cultivation in India (Pocket Guide). *Extension Bulletin*, *52*(1), 1-30.

Magar, N., Dodake, S., Umate, S., & Lokhande, R. (2023). Recommended Wheat Varieties for Peninsular Zone of India. *AgroScience Today*, *4*(12), 0723-0726.