Exploring the Preference for Rice and Wheat

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Introduction

In recent decades, there has been a marked increase in the cultivation of **rice and wheat** in India. These two crops have become dominant in the country's agricultural landscape, especially in states like Punjab, Haryana, and Uttar Pradesh. This shift can be attributed to several factors ranging from **government policies**, **irrigation support**, and **technological advancements**. This preference for rice and wheat has implications for food security, ecological sustainability, and long-term agricultural planning in India.

Reasons Behind the Preference for Rice and Wheat

1. **Government Support via Minimum Support Prices (MSP)**:
    - One of the primary reasons for the expansion of rice and wheat acreage is the **government's guaranteed procurement** of these crops at **Minimum Support Prices (MSP)**.
    - This **price assurance** makes rice and wheat a safer financial choice for farmers compared to other crops like pulses, oilseeds, and cotton, which do not have similar procurement mechanisms.
    - In contrast, **other crops** often face price volatility, lack of guaranteed market access, and the absence of **price stabilization measures**.
2. **Substantial Irrigation Support**:
    - Rice and wheat are primarily grown in **irrigated areas**, providing a significant advantage in terms of **water availability**, which stabilizes production.

- With irrigation, farmers can avoid the risks associated with **rain-dependent crops** (like pulses and oilseeds), making rice and wheat more reliable.

3. **Research and Breeding Focus**:

   - Rice and wheat receive **priority in public research and breeding**. There have been consistent breakthroughs in breeding high-yielding varieties with better **resilience to pests, diseases, and climate stress**.

   - Example: The **first-generation Green Revolution wheat varieties** such as **Kalyan Sona** and **Sonalika** were designed to resist **rust diseases** and offer higher yields.

   - The **Indian Council of Agricultural Research (ICAR)** has also been developing **genome-edited rice and wheat varieties**, which are more responsive to fertilizers and water applications, thus further boosting yield.

4. **Stable Yields and Lower Risk**:

   - Rice and wheat are **highly stable crops** in terms of yield. Compared to other crops like oilseeds and pulses, rice and wheat show **relatively lesser yield risk**.

   - This **predictability** in yields encourages farmers to opt for them, as there is less uncertainty about returns.

The Legacy of the Green Revolution

- The **Green Revolution** of the 1960s significantly transformed Indian agriculture, particularly in the case of wheat and rice.

  - High-yielding varieties (HYVs) of wheat and rice, along with the introduction of **chemical fertilizers**, **pesticides**, and **irrigation technologies**, helped India move from food scarcity to self-sufficiency.

- **Wheat Varieties**:

  - **Kalyan Sona** and **Sonalika** varieties of wheat, released in the late 1960s, had an average yield of **3.8 tonnes/hectare** under normal growing conditions.

  - These varieties were bred not only for higher yields but also for **disease resistance**

(such as **rust diseases**) and **climate-smart traits**, making them adaptable to a variety of growing conditions.

- **Recent Wheat Innovations**:
  - The **HD-3385 variety of wheat**, released in 2023, can yield an average of **6 tonnes/hectare** with a potential of **over 7.3 tonnes/hectare**.
  - It is resistant to all major **rust diseases** (yellow, black, and brown rusts), providing higher yields with lower vulnerability to diseases.

Technological Advances: Genome-Edited Rice and Wheat

Recent developments in **genome editing** have further improved the prospects for rice and wheat cultivation:

Genome Edited Rice

- **Pusa DST Rice 1** (Genome-Edited Rice):
  - **Parent Line**: Cottondora Sannalu (MTU-1010)
  - **Edited Gene**: **DST (drought and salt tolerance)** gene, which reduces its expression.
  - **Effect**: This rice variety is more resilient to **drought, salinity**, and **alkalinity stress**, making it viable in regions with water scarcity and poor soil conditions.

Genome Edited Wheat

- **Kamala Wheat** (Genome-Edited Wheat):
  - **Parent Line**: Samba Mahsuri
  - **Edited Gene**: **Gn1a gene**, which is responsible for regulating **grain number**.
  - **Effect**: This wheat variety promotes **cytokinin accumulation**, leading to **higher grain numbers** per ear, and thus improving the overall yield.

Challenges to Crop Diversification

While rice and wheat remain the preferred crops for Indian farmers, this preference has led to several challenges:

1. **Neglect of Other Crops**:
    - **Pulses, oilseeds, and cotton**, which are also crucial for **nutritional diversity** and **agricultural sustainability**, have been pushed to the margins.
    - **Cotton acreage** in states like Punjab has fallen significantly, from **3.4 lakh hectares** in 2015-16 to just **1 lakh hectares** in 2024-25.
2. **Ecological Imbalance**:
    - A focus on monoculture cropping (mainly rice and wheat) has led to **soil degradation**, depletion of water resources, and **reduced biodiversity**.
    - For instance, the **over-exploitation of groundwater** for rice cultivation in Punjab has raised concerns about long-term water scarcity.
3. **Economic Implications**:
    - While rice and wheat are profitable in the short term, the **long-term economic sustainability** of such cropping patterns is questionable.
    - This has led to a need for **crop diversification** and a better focus on improving the productivity of **neglected crops** like pulses, oilseeds, and cotton.

Conclusion

The preference for **rice and wheat** among Indian farmers is driven by several interrelated factors:

- **Government support** (MSP)
- **Irrigation availability**

- **Research-backed yield stability**

However, this dominance has led to several challenges, including **ecological imbalances** and the **marginalization of other crops**. Addressing these issues requires:

- **Policy reforms** that incentivize crop diversification.
- **Increased research** and development support for pulses, oilseeds, and cotton.
- Sustainable water management practices to ensure that the focus on rice and wheat does not lead to environmental degradation.