

"CULTIVATING A SUSTAINABLE FUTURE: LEVERAGING SEED PRODUCTION FOR ENVIRONMENTAL, SOCIAL, AND ECONOMIC DEVELOPMENT"

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ABSTRACT:

Sustainable development in agriculture is paramount for ensuring food security, environmental conservation, and economic stability. Seed production stands as a critical component within this framework, serving as the foundation for agricultural productivity and resilience. This abstract explores the intersection of sustainable development and seed production, elucidating innovative approaches to address contemporary challenges.

Seed production plays a critical role in ensuring global food security, mitigating climate change, and promoting sustainable development. This paper explores the intersection of seed production and sustainable development, highlighting the potential of sustainable seed systems to drive positive environmental, social, and economic outcomes. By adopting innovative approaches to seed production, such as agroecology, conservation agriculture, and participatory plant breeding, we can enhance biodiversity, improve crop resilience, and support small-scale farmers. This, in turn, can contribute to achieving the United Nations' Sustainable Development Goals (SDGs), particularly SDG 2 (Zero Hunger), SDG 12 (Responsible Consumption and Production), and SDG 13 (Climate Action). By prioritizing sustainable seed production, we can cultivate a more equitable, resilient, and food-secure future for all.

Keywords: Seed production, Sustainable development, Climate change.

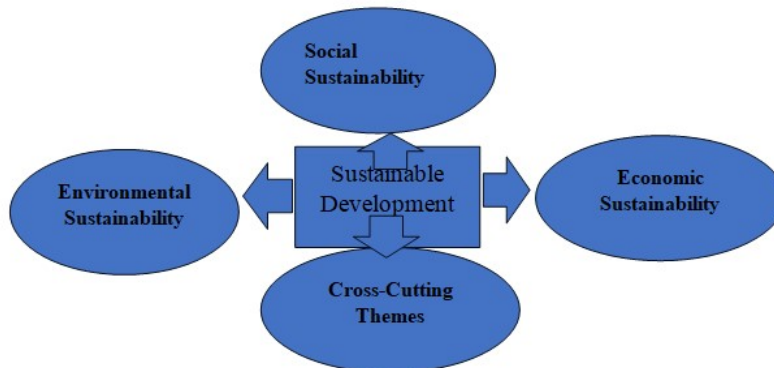
INTRODUCTION:

In the face of global challenges like climate change, food insecurity, and social inequality, sustainable development has become a pressing imperative. Seed production, a critical component of agricultural systems, offers a unique opportunity to drive environmental, social, and economic progress. By leveraging sustainable seed production practices, we can enhance biodiversity, improve livelihoods, and promote eco-friendly agriculture. This paper explores the interlinkages between seed production and sustainable development, highlighting best practices, challenges, and opportunities for cultivating a more sustainable future.

Seed is the first and the most stylish stopgap a planter has and it's the foundation of "Socio-Economic Commission and Development". Over the last decade, the Indian seed assiduity has expanded both in size and performance, involving both private and public sector realities. In 2022, the Indian seed request was valued at 6.3 billion, projected to reach 12.7 billion by 2028, with a CAGR of 12.43 percent. Thanks to several farsighted and visionary enterprises by the Government of India, the country has witnessed an increased seed relief rate, for illustration, in rice, rising from 40 percent in 2011 to 64 percent in 2017. The seed assiduity's foundation was established in the 1960s and posterior programs in the late 1980s, including the New Seed Development Policy(1988- 1989), converted the assiduity and handed Indian growers access to superior seed and planting accouterments.

METHODOLOGY:

The study is analytical in nature and based on secondary data. The secondary data was collected from various journals, research articles, periodicals, newspapers, and agriculture department websites. The interlinkage between seed production and sustainable development is multifaceted and can be understood through the following connections:



ENVIRONMENTAL SUSTAINABILITY:

1. Biodiversity conservation: Seed production helps maintain crop diversity, reducing reliance on a few dominant varieties.
2. Climate change mitigation: Climate-resilient seed varieties can reduce greenhouse gas emissions and adapt to changing weather patterns.
3. Soil health: Sustainable seed production practices like agroecology promote soil fertility and structure.

SOCIAL SUSTAINABILITY:

1. Food security: Access to quality seeds enhances crop yields, improving food availability and nutrition.
2. Livelihoods and income: Seed production generates employment and income opportunities for farmers, processors, and traders.
3. Social equity: Access to seeds and seed production opportunities can empower marginalized groups.

ECONOMIC SUSTAINABILITY:

1. Economic growth: Seed production contributes to local and national economic growth, poverty reduction, and development.
2. Market access: Sustainable seed production can increase market access and competitiveness for farmers.
3. Innovation and Technology: Research and development in seed production drive innovation and technology adoption.

CROSS-CUTTING THEMES:

1. **Capacity building:** Training and capacity building for farmers, processors, and traders enhance seed production and sustainable development.
2. **Policy and regulation:** Supportive policies and regulations enable sustainable seed production and trade.
3. **Partnerships and collaboration:** Collaboration among stakeholders fosters knowledge sharing, innovation, and collective action.
4. Employment generated from the adoption of specific activity Unlike regular crop production, seed production includes special operations such as emasculation, hybridization, harvesting, and cleaning of seed, which require additional labor. Since most of these operations are performed mainly by farm women, seed production not only generates additional employment opportunities but also provides employment security to the women.

5.Farmers' perception of welfare accrued to the farm family The impact on family welfare has been assessed through the farmers' perception of the income enhancement, increased socio-economic status, and family welfare

Group of Selected Farmers: The impact of technology adoption has been assessed on enhancing the economic stability and improving the equity in income distribution at the group level and the impact on the environment.

Methods of Analysis Besides simple tabular analysis and percentages involving the cost of cultivation, profitability, and benefit-cost ratios,

ECONOMIC IMPACT OF COMMERCIAL HYBRID SEED PRODUCTION:

The Impact of CSP on Income, costs, returns, and profits from hybrid seed production

FAMILY WELFARE:

The farmers who were involved in seed production opined that the technology had provided them income as well as employment security. Most of the growers were involved in the program for more than ten years with one company or the other. The impact of the seed production on the welfare of the growers included:

- (i) Reinvestment into agriculture, such as the purchase of additional land,
- (ii) Procurement/acquisition or construction of dwelling house,
- (iii) Higher education for children,
- (iv) Better health facilities for the family and a better standard of living for their children.

By recognizing these interlinkages, we can leverage seed production as a catalyst for sustainable development, addressing environmental, social, and economic challenges while promoting a more equitable and resilient food system.

CHALLENGES AND OPPORTUNITIES IN SEED FARMING FOR SUSTAINABLE AGRICULTURE:

- Seed farming for sustainable agriculture is a complex area with many obstacles and opportunities, particularly in the economy, logistics, and environment.
- Economic challenges within the seed business align with access to superior-quality early-generation seed (EGS) for smallholder farmers, which hampers their production capacity.
- The operational inefficiencies in the marketing system for vegetable seeds are also responsible for lower gains and marketing margins.
- Climatic change is the worst enemy for seed cultivation, affecting crop yield, water resources, and pest control.
- Modifying our farming seed practices to become climate-smart is critical for keeping food security and agricultural sustainability on the table.
- Given those constraints, nevertheless, many situations arise for innovation and advancements in seeds and agriculture techniques.
- Improved seed varieties have been promoted in the production, availability, and accessibility levels of developing regions like sub-Saharan Africa and South Asia by creating public-private partnerships. Informal seed producers can switch to formal private seed enterprises and supply inputs to farmers and markets.
- To use these opportunities, policymakers should be provided with information about the merits and shortfalls of seed industry establishment. Besides, metrics should be adjusted to reflect intratester competition among seed industries.

Therefore, solving these obstacles and exploiting emerging opportunities can reinforce seed business development and result in global sustainable agriculture and food security.

CONCLUSION

Agroforestry is essential in promoting sustainable agriculture by providing the basis for crop production and food security. High-quality seeds are the basis for good flowering, withstanding climate pressure, and ultimately farming in harmony with nature in the long term.

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