

UPSC Syllabus Topic : GS paper 3– Environment – climate change.

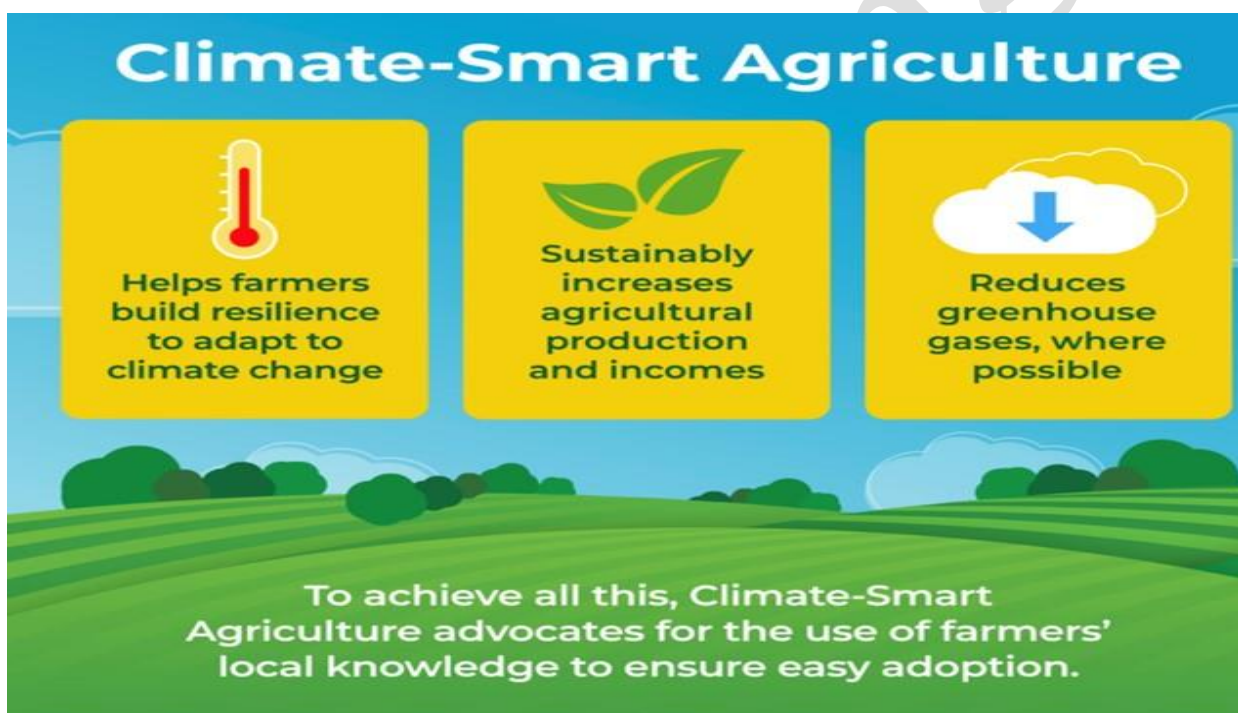
Climate-Smart Agriculture (CSA) Imperative: Necessity for Adopting Climate-Smart Farming Practices in India

Climate-Smart Agriculture (CSA) is an approach, as defined by the Food and Agriculture Organization (FAO), aimed at transforming and reorienting agricultural systems to promote sustainable development and ensure food security in the face of climate change.

The key objectives of CSA are to:

1. Increase agricultural productivity and incomes,
2. Adapt to and build resilience against the impacts of climate change, and
3. Reduce or remove greenhouse gas emissions.

CSA encompasses a range of practices, including water-smart techniques (efficient water use), weather-smart strategies (responding to changes in weather patterns), energy-smart methods (using energy efficiently), and carbon-smart approaches (reducing the carbon footprint of agriculture).



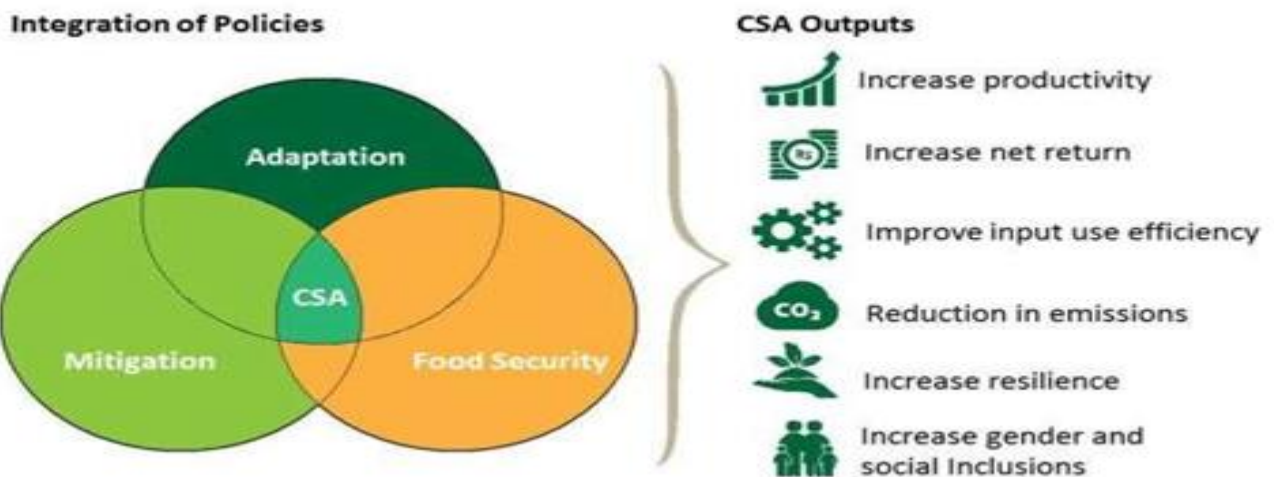
Source: FAO

Benefits of Climate-Smart Agriculture (CSA) include:

1. **Increased Agricultural Productivity:** CSA promotes sustainable practices that enhance farm productivity, a crucial aspect as global food demand is projected to increase significantly by 2050.
2. **Enhanced Adaptation to Climate Change:** By encouraging crop diversification and integrating drought-resistant crops, CSA improves the resilience of agricultural systems to the impacts of climate change, leading to increased water efficiency.
3. **Greenhouse Gas Reduction:** CSA plays a vital role in mitigating climate change by actively contributing to the reduction of greenhouse gas emissions. This is particularly important as

agriculture accounted for 17% of global emissions in 2018.

4. **Sustainable Food Security:** CSA contributes to long-term food security, addressing the challenges posed by a growing global population and changing dietary patterns.
5. **Environmental Protection:** The ecosystem-based approach of CSA allows croplands to coexist harmoniously with natural areas, contributing to the protection of native species and pollinators.
6. **Flexibility and Broad Application:** CSA is not a rigid set of rules but a flexible approach with a wide range of applications. This adaptability enables its effective implementation in diverse agricultural contexts and regions.
7. **Socio-Economic Transformation:** CSA provides farmers, especially those in disadvantaged positions, with access to climate-resilient methods and information, leading to positive socio-economic transformations in agricultural communities.



Challenges of Climate-Smart Agriculture (CSA) include:

1. **Novelty and Limited Scope:** CSA is a relatively new concept, particularly in countries like India, and certain initiatives such as precision farming have limited implementation.
2. **Localizing Responses:** Tailoring CSA approaches to the unique climatic and agricultural conditions of each region is essential, requiring localized responses.
3. **Balancing Economic and Environmental Goals:** Achieving a balance between the economic needs of farmers and environmental sustainability is a complex challenge that demands careful planning and support.

Initiatives for CSA implementation:

Global Initiatives for CSA:

1. **Sustainable Development Goals (SDGs):** CSA aligns with the United Nations' SDGs, particularly in addressing hunger and improving environmental management through sustainable agriculture.
2. **Paris Agreement:** CSA practices like agroforestry and carbon sequestration support the Paris Agreement's objective to reduce greenhouse gas emissions.

Initiatives in India:

1. **National Action Plan on Climate Change:** This plan emphasizes the role of climate-resilient agriculture in India's adaptation strategies.
2. **Government Programs:** Includes initiatives such as the National Adaptation Fund for Climate Change, National Innovation on Climate Resilient Agriculture, and Soil Health Mission, all focused on promoting sustainable farming practices.
3. **Private Sector Involvement:** Private companies and farmer-producer organizations are actively engaged in promoting CSA adoption in India.

Recommendations for further action:

1. **Increase Education Efforts:** Enhance efforts to educate farmers, particularly in regions like India where awareness and adoption of CSA practices are still emerging.
2. **Strengthen Capacity-Building Programs:** Support the widespread adoption of CSA through strengthened capacity-building programs, including comprehensive training and resource allocation.
3. **Enhance Collaboration:** Strengthen collaboration between government initiatives and private sector efforts to ensure a cohesive and coordinated approach towards CSA adoption and practice.

UPSC Syllabus Topic : GS Paper 3 Indian Economy – Infrastructure: Railways.

Assessing the Financial Landscape of Indian Railways: Towards a Strategic Railway Business Plan

The distribution of Indian Railways' revenue in the financial year 2022-23 is as follows:

1. **Earnings from goods traffic:** Out of the total revenue of ₹2.4 lakh crore, freight revenue constituted ₹1.62 lakh crore, approximately 67.5% of the total.
2. **Earnings from passenger traffic:** The revenue generated from passenger traffic amounted to ₹63,300 crore, constituting around 26% of the total revenue.
3. **Other earnings:** This category includes revenue from various sources such as charges from retiring rooms and rest houses, rent from land leasing, bridge tolls, receipts from the catering department, etc.

To increase revenue from the passenger segment, Indian Railways employs strategies such as:

1. **Reclassifying trains:** By reclassifying a train from express to superfast, the fare can be increased as superfast trains generally have higher fares.
2. **Adjusting coach composition:** Reducing the number of coaches for cheaper classes of travel while providing more coaches for higher categories helps maximize revenue from premium services.

The outcomes of poor revenue from the passenger segment include:

1. **Increase in Freight Charges:** To compensate for losses in passenger services, Indian Railways raises freight rates for goods transport through a Cross-Subsidization Policy. This has led to a decline in the competitiveness of railways in goods traffic compared to roadways.
2. **Investment Fueled by Debt:** With expenditures nearly equal to annual revenue, the substantial investments made by Indian Railways are often financed through borrowings and support from the budget. This places a burden on the government's fiscal position and, ultimately, the public.
3. **Lack of Passenger Segment Expansion:** Due to financial losses in the passenger segment, there is little incentive for Indian Railways to focus on expanding passenger transport. As a result, while freight traffic has grown by 40% in a decade, passenger traffic has remained static.
4. **Growing Pension Bill:** With revenues not keeping pace with requirements, the increasing pension bill (resulting from periodic Pay Commissions) consumes 23% of Indian Railways' revenue, adding to its financial challenges.

This scenario necessitates the development of a new business plan for Indian Railways, including a revised pricing strategy to address the financial constraints and ensure sustainable growth.

UPSC Syllabus Topic : GS GS paper 3- Science and technology– new technology.

Casgevy Gene-Editing Therapy: A Promising Cure for Sickle Cell Anemia

Gene Editing Overview: Genome editing, or gene editing, involves technologies allowing precise modification of an organism's DNA, including additions, removals, or alterations at specific genome locations. Various techniques, such as CRISPR-Cas9, zinc finger nucleases, and TALENs, facilitate this process.

Casgevy - A Gene-Editing Breakthrough for Sickle Cell Disease: Casgevy is an innovative gene-editing therapy designed to address sickle cell anaemia using the CRISPR-Cas9 tool. By reactivating fetal haemoglobin, Casgevy mitigates the impact of defective haemoglobin, substantially reducing severe symptoms. Clinical trials demonstrated over 90% effectiveness in eliminating painful inflammatory attacks, offering a more potent alternative to existing treatments. However, its accessibility is challenged by a high estimated cost of \$2 million per patient.

Understanding Sickle Cell Disease (SCD): SCD is a genetic disorder affecting haemoglobin, leading to abnormal red blood cell shapes. These crescent-shaped cells can block blood vessels, causing painful crises and severe complications due to reduced oxygen flow.

Implications of Casgevy for India:

1. **High Prevalence of SCD:** With 30,000 to 40,000 children born with SCD annually, mainly in tribal areas, Casgevy could significantly impact India where the disease is prevalent.
2. **National Health Initiative Support:** Casgevy aligns with the National Sickle Cell Anaemia Elimination Programme, supporting India's goal to eradicate the disease by 2047.
3. **Cost Barrier:** The substantial cost of Casgevy poses a challenge for widespread adoption in the Indian healthcare system.

Government Initiatives to Eliminate SCA:

1. **Outreach Programmes:** ICMR and NRHM conduct outreach programs for improved disease management and control.
2. **Data Collation Portal:** The Ministry of Tribal Affairs launched a portal for SCA individuals to register, facilitating disease-related data collation.
3. **2047 Elimination Mission:** Introduced in the FY 2023-24 budget, this mission aims for universal screening, awareness, and counselling in tribal areas, funded under the National Health Mission.
4. **National Health Mission Guidelines:** Guidelines include community-level services for pre-marital and pre-conception screening, supported by genetic counselling.
5. **Integrated Centers:** 22 tribal districts have established integrated centers for SCA treatment and diagnosis.

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