An Overview On Emerging Technologies For Smart & Climate-resilient Agriculture & Animal Husbandry: CSIR Perspectives

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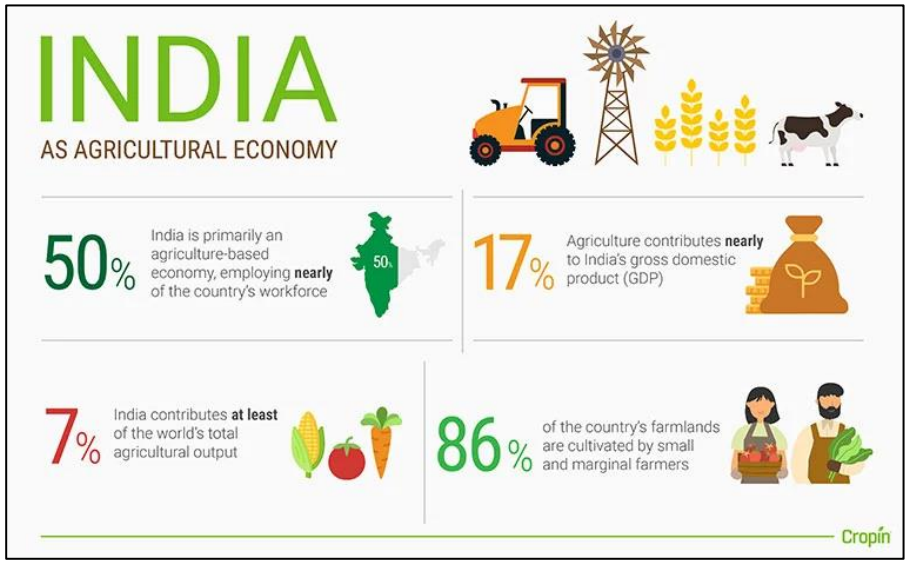
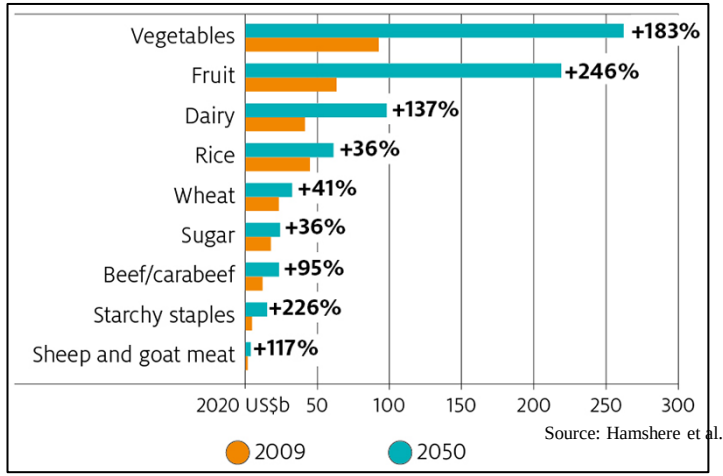
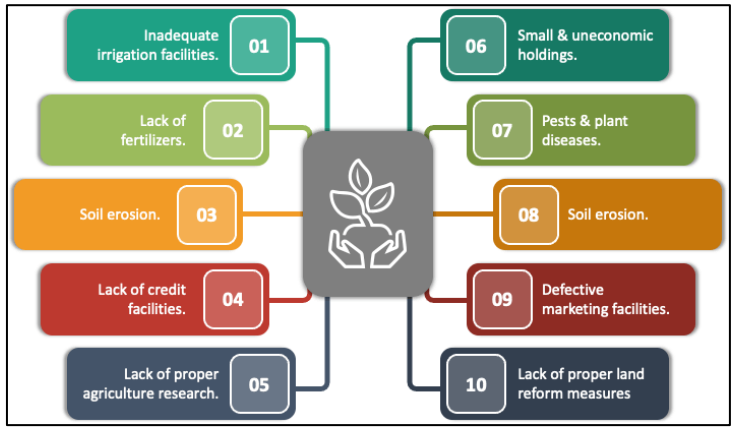
Why Smart & Climate-resilient Agriculture is needed ??



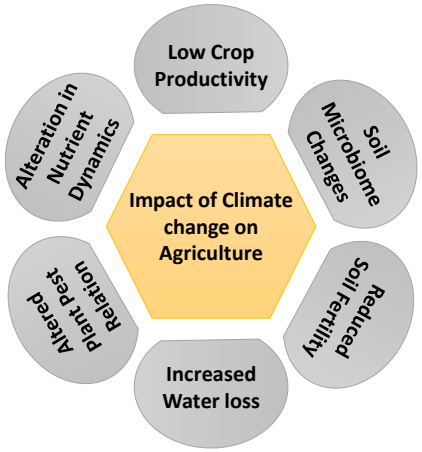
India's consumption of agri-foods is projected to grow

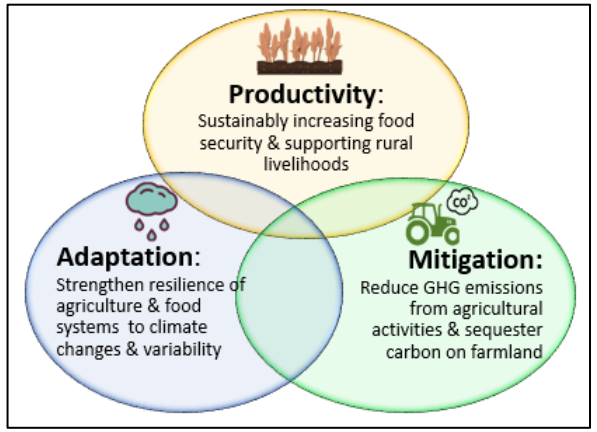


Source: Hamshere et al. (2014)



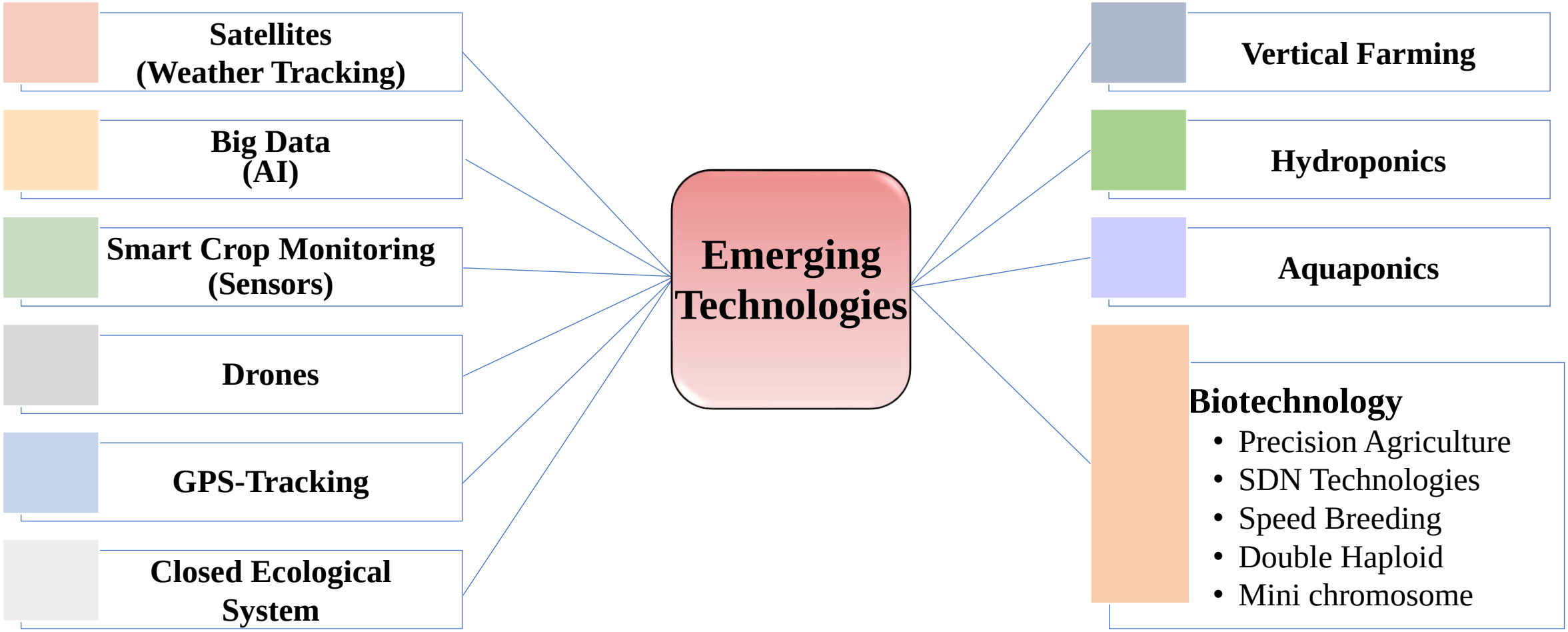
Challenges in INDIAN Agriculture





Climate Smart Agriculture

Emerging Technologies



Government Initiatives

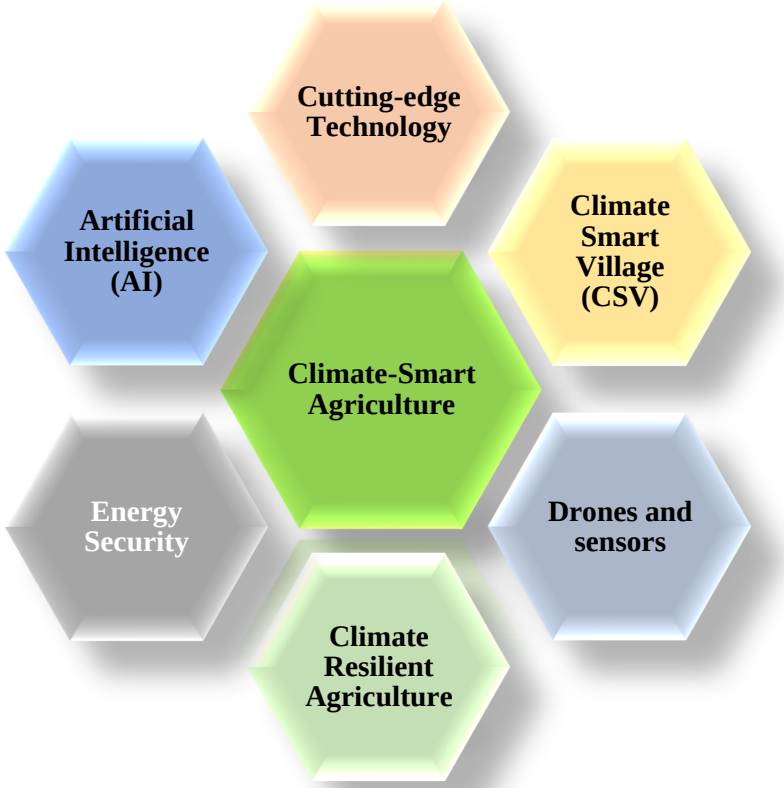
NITI Aayog

IBM

• NITI Aayog and International Business Machines Corporation (IBM) signed a Statement of Intent (SoI) to develop a crop yield prediction model using Artificial Intelligence (AI).

•Cutting-edge technological support in

1) Crop monitoring.
2) Early warning on pest/disease outbreak based on advanced AI innovations.
3) Rich satellite and enhanced weather forecast information along with IT & mobile applications.
4) Better farm management for improved crop yield and cost savings.



Climate Smart Village (CSV)

•Consultative Group for International Agricultural Research (CGIAR) research program on Climate Change, Agriculture and Food Security (CCAFS) in collaboration with national programmes and rural communities.

• The idea is to mainstream climate-smart interventions into village development plans.

•Development of water, weather, nutrient, carbon, energy, and knowledge smart villages.

•Main focus

1) Improved food production (quality, quantity and diversity).
2) Adaptation to climate change.
3) Mitigating greenhouse gases emissions.

•Scheme is aimed to ensure energy security for farmers in India.

•To increase the share of installed capacity of electric power from non-fossil-fuel sources to 40% by 2030.

NICRA
National Innovations in Climate Resilient Agriculture

•Indian Council of Agricultural Research (ICAR) launched a flagship network project 'National Innovations in Climate Resilient Agriculture' (NICRA) in 2011.

• NICRA aims to enhance resilience of Indian agriculture to climate change and climate vulnerability through strategic research and technology demonstration.

Punjab Agri Export Corporation Limited (PAGREXCO)

•Established by the Government of Punjab in the year 1997.

• The company works for export of fresh and processed agricultural produce, infrastructural development and policy implementation in the state.

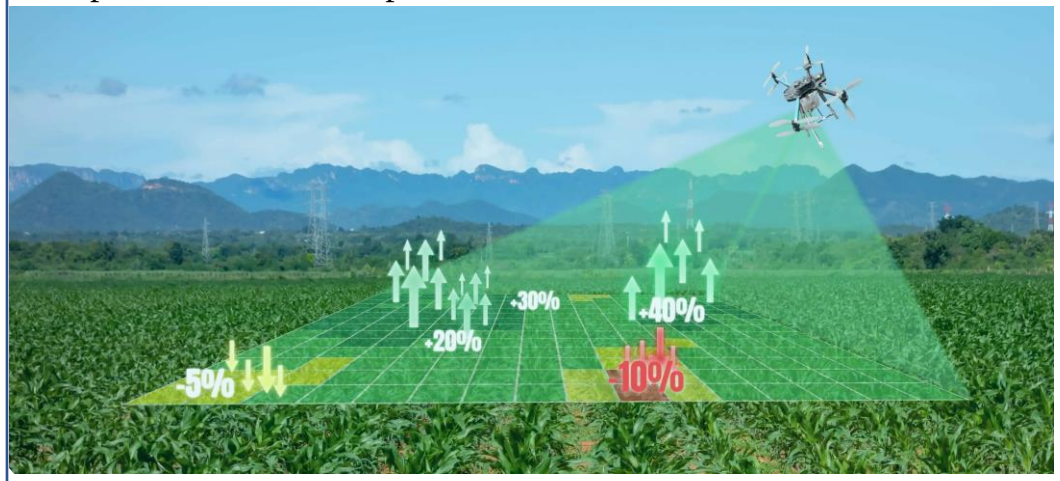
•PAGREXCO scales up partnership with Cropin (a leading AI and data-led agri-tech organization) to ensure the traceability and transparency of its agriculture produces.

SENSAGRI: Sensor-based smart agriculture

•A collaborative research project formulated by the Indian Council of Agricultural Research (ICAR).

• Involving six partner Institutes (Agriculture & IT) to be funded by Information Technology Research Academy (ITRA), Department of Electronics and Information Technology (DEITY), Ministry of Communication and Information Technology (MCIT), Govt. of India and ICAR.

•SENSAGRI aims to use the capability of **drones and sensors** for the benefit of farming sector at regional/local scale for assessing land and crop health; extent, type and severity of damage besides issuing forewarning, post-event management and settlement of compensation under crop insurance schemes.



Drone-based agricultural technology

Microsoft

FarmBeats: AI, Edge & IoT for Agriculture

•FarmBeats is a data-driven farming project designed to help increase farm productivity and reduce costs.

•Informing what, when, and where to plant in order to drive the highest-possible yields and reduce costs.

AI-based agricultural technology

Agriculture Policies

राष्ट्रीय कृषि विकास योजना (रफ़्तार)
RASHTRIYA KRISHI VIKAS YOJANA (RKVY)
REMUNERATIVE APPROACHES FOR AGRICULTURE AND ALLIED SECTOR REJUVENATION (RAFTAAR)

- Holistic development of agriculture and allied sectors.
- To make farming a remunerative economic activity.
- Risk mitigation.
- Promoting agri-business entrepreneurship.

National Mission for Sustainable Agriculture
Department of Agriculture & Farmers Welfare
Ministry of Agriculture & Farmers Welfare, Government of India

- Rainfed area development.
- Soil & water conservation.
- Water use efficiency.
- Soil health management.
- Paramparagat Krishi Vikas Yojana (PKVY).

Pradhan Mantri Krishi Sinchayee Yojana
Department of Agriculture and Farmers Welfare
Ministry of Agriculture & Farmers Welfare, Government of India

- Precision-irrigation and other water saving technologies (**More crop per drop**).
- To expand cultivable area under assured irrigation.
- Improve on-farm water use efficiency to reduce wastage of water.
- Adoption of sustainable water conservation practices.

NFSM
National Food Security Mission

- Major focus on rice, wheat and pulses.
- The mission achieved the targeted additional production of rice, wheat and pulses.

Pradhan Mantri Fasal Bima Yojana
MINISTRY OF AGRICULTURE & FARMERS WELFARE

- Provides financial support to farmers suffering crop loss/damage arising out of unforeseen events.
- Stabilizing the income of farmers.
- Encouraging farmers to adopt innovative and modern agricultural practices.
- Ensuring credit worthiness of the farmers, crop diversification and enhanced growth.

National Mission on Agricultural Extension and Technology (NMAET)

National Mission on Agricultural Extension and Technology **(NMAET)** consists of 4 Sub Missions:

- Sub Mission on Agricultural Extension **(SMAE)**
  Focus on awareness creation and enhanced use of appropriate technologies in agriculture & allied sectors.

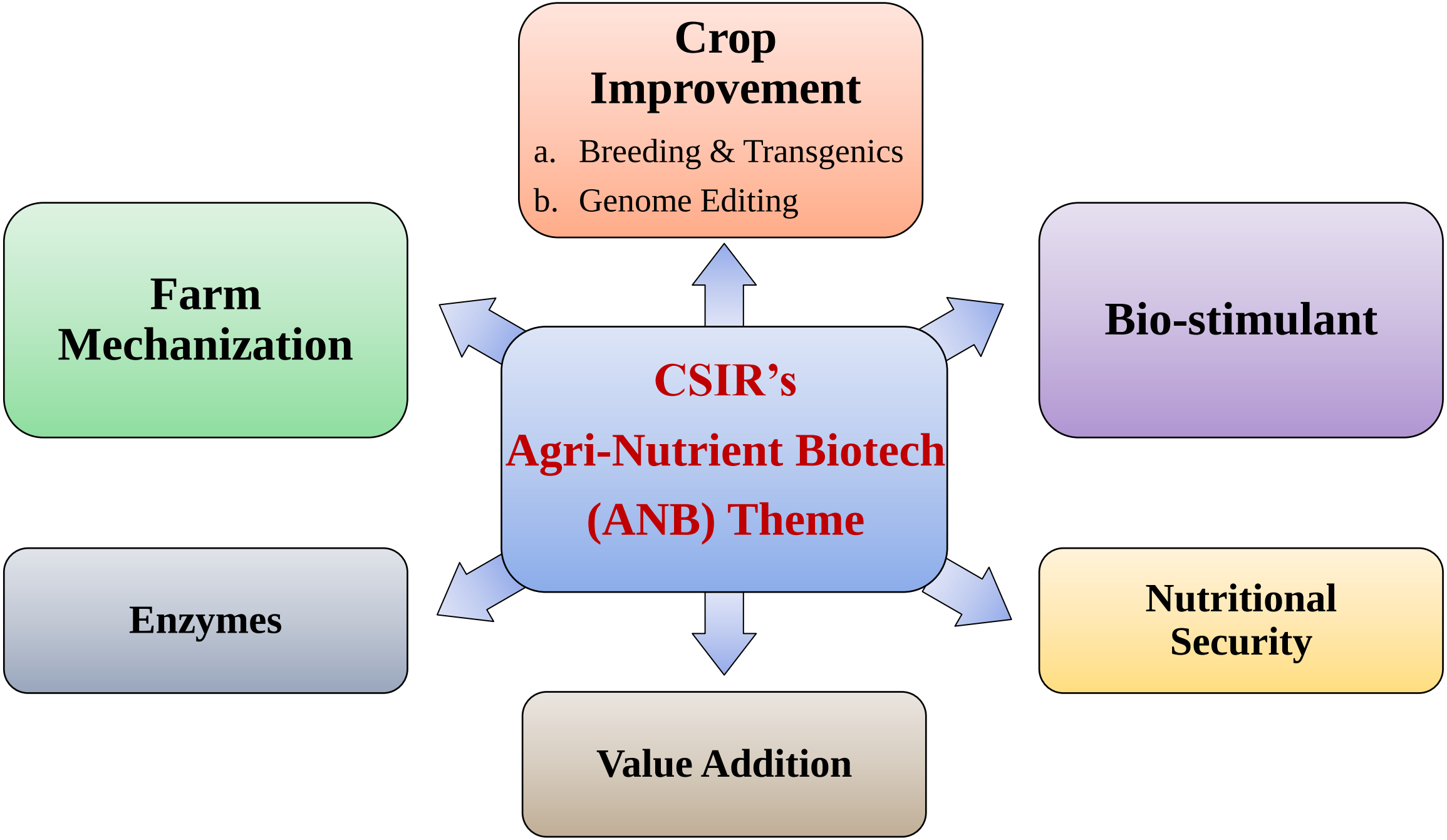
- Sub-Mission on Seed and Planting Material **(SMSP)**
  The adoption of quality seeds is the most cost-effective means for increasing agricultural production and productivity.

- Sub Mission on Agricultural Mechanization **(SMAM)**
  Focus on farm mechanization

- Sub Mission on Plant Protection and Plant Quarantine **(SMPP)**
  Disease-free crops using scientific and environment-friendly techniques through the promotion of Integrated Pest Management.

Weather Based Crop Insurance Scheme (WBCIS)

- Aims to mitigate the hardship of the insured farmers against the likelihood of financial loss on account of anticipated crop loss resulting from adverse weather conditions.
- Coverage of crops
  1) Food crops (Cereals, Millets and Pulses)
  2) Oilseeds
  3) Commercial / Horticultural crops.


Crop Improvement
a. Breeding & Transgenics
b. Genome Editing
Farm Mechanization
Bio-stimulant
CSIR's Agri-Nutrient Biotech (ANB) Theme
Enzymes
Nutritional Security
Value Addition