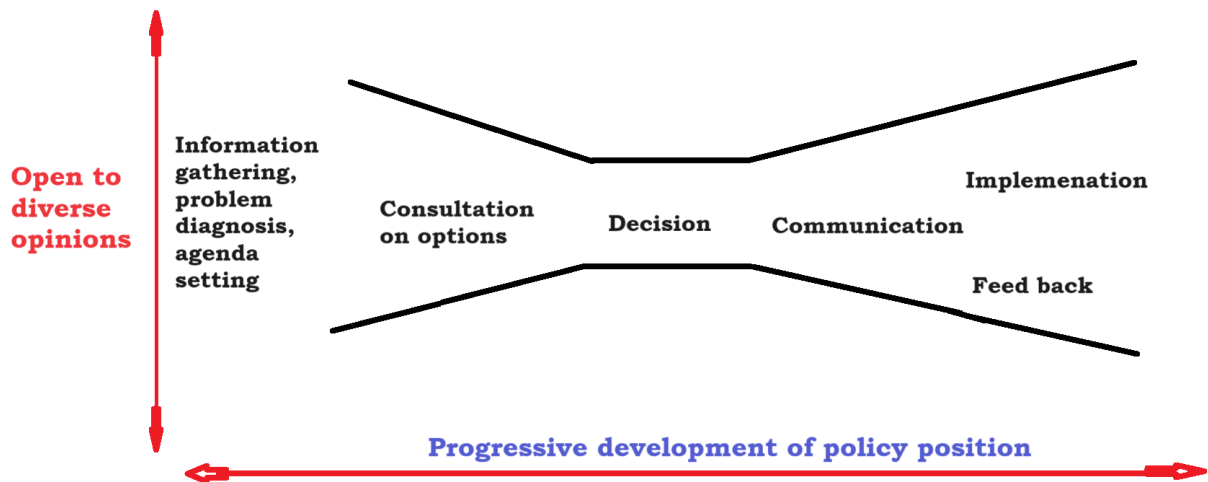


School of Crop Health Policy Support Research

Considering the intricate and swiftly evolving nature of scientific advancements in biotic stress management, it is imperative to establish appropriate policies to regulate and facilitate the adoption of science-based products. This is essential for boosting farmers' incomes while concurrently upholding biosafety and security standards. In light of these necessities, the School for Crop Health Policy Support Research is dedicated to actively exploring the intersections of science, economics, society, and policy. The school is actively involved in gathering evidence, agenda setting for intensive consultation, support policy makers with rigorous research on various policy options and their probable outcomes in terms of farmers incomes, biosafety and security and also help in design of good policies for their better implementation at farmers' level. The school work on entire policy cycle as shown in the below policy process.



Thrust areas for research: To conduct cutting-edge policy research in the domain of biotic stress management in agriculture, with a focus on

- 1) Pest monitoring, surveillance and forecasting systems related to invasive species, emerging and reemerging pests and diseases.
- 2) Biosecurity, biosafety, quarantine and SPS measures and trade.
- 3) Pesticide and biopesticides use, regulation and sustainable management.
- 4) Integrated Pest Management (IPM) policies.
- 5) Climate change and pest dynamics
- 6) Policy research for upscaling of science-based innovations (drones).
- 7) Interface between technology, society and environment like CRISPER and GMOs related policy and regulation issues and their impacts.

Capacity Building: To enhance scientific temper among the stakeholders, to nurture and develop a cohort of policy researchers specializing in biotic stress management, thus contributing to human resource development in this vital field.

Research Programmes

1. Establishment of National Strategic Crop Health Monitoring Network (NSCHMN): Monitoring and surveillance of invasive pests and diseases
2. Regulations, policies related to pesticides, bio-pesticides, bio-stimulants.
3. Climate change and biotic stress: effects of elevated temperature and CO₂ on pests and diseases, their distribution and losses.
4. Policy analysis of biosafety and biosecurity (including GMOs), plant quarantine regulations, sanitary, phytosanitary regulations; food safety and pesticide residues regulations.
5. Policy framework for science led innovations and scaling up (drones etc.)

Methodology:

The school will employ a multidisciplinary approach, combining data analysis, field research, and stakeholder engagement to analyse the existing policies and to suggest future policy options. The collaborations research with institutions like NIAP, New Delhi, IIFT, New Delhi and IIM Ahmadabad are in the process.

Expected Outputs:

The school will focus on tangible outputs in biotic stress management in the following areas:

1. **Crop Protection Policies:** Analyzing and recommending policies to mitigate the impact of pests and diseases on crop yields.
2. **Biosecurity policies:** Evaluating and proposing measures to safeguard agricultural ecosystems against invasive species.
3. **Sustainable Pest Management:** Researching sustainable pest management strategies and advocating for their adoption.
4. **Regulatory Frameworks:** Assessing existing regulatory frameworks and proposing improvements to enhance their effectiveness.

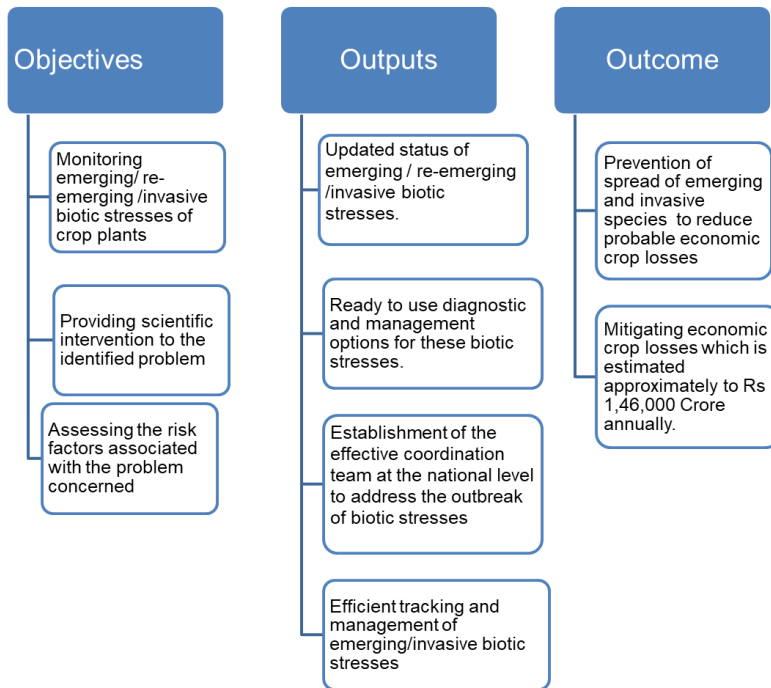
The outcomes are organized in to two streams:

- **Evidence-Based Policy Recommendations:** The School will produce research outputs that inform evidence-based policies, enhancing agricultural resilience and sustainability.
- **Capacity Building:** Through training programs, workshops, and internships, the School will contribute to increased awareness and development of a skilled workforce in the area of biotic stress management policy.

Annexure -1 Details of the projects/programmes

1. Programme: Establishment of National Strategic Crop Health Monitoring Network (NSCHMN)

1. Monitoring of emerging/ re-emerging /invasive biotic stresses of crop plants
 - i. Monitoring of biotic stresses of emerging/ re-emerging /invasive nature.
 - ii. Geo-tagging of the affected areas /regions.
 - iii. Deployment of the quick response team to visit the affected areas / collect background information and samples.
 - iv. Provide immediate attention followed by suitable management options.
2. Providing scientific intervention to the identified problem
 - i. Getting done the systematic investigation on the problem to identify the real cause of the biotic stresses from the concerned commodity-based Institutions.
 - ii. Getting detailed profile (phenotype/genotype) of the causal agent (biotype/races/strains) for devising diagnostics and management strategies.
3. Assessing the risk factors associated with the problem concerned
 - i. Undertaking pest-risk analysis and economic loss of the identified biotic stresses
 - ii. Taking appropriate dissemination to the concerned department/agency/ministry for quarantine and associated regulatory measures.
 - iii. Capacity building programme for various stakeholders with respect to novel stresses.



2. Project: Pest risk analysis of agriculturally important potential invasive pests and diseases in India (pests by Dr.KC Sharma)

Activities

1. To understand existing regulation on transboundary/invasive pests in India and abroad. (1 & 2 year)
2. To analyse and identify the policy intervention needed to strengthen for the existing policy for transboundary/invasive pests in India. (3rd year)

Output

1. 2023-24 - Research paper / policy paper on status of potential invasive pests.
2. 2023-24 - Policy paper on pesticide use and pesticide residues of export-oriented crops.
3. 2024-25 - Policy paper on avoidable yield losses due to pests.
4. 2025-26 - Atlas of invasive species (pests).

3. Project: Pest risk analysis of agriculturally important potential invasive pests and diseases in India (diseases by Dr.Jain)

Completed activity

1. Completed listing of the pests which are not present in India and have the potential to be Invasive.

Planned activities

2. Finding out the possible pathways of introduction of these diseases.
3. Find out the risk factors of these pathogens if introduced.
4. Identification of areas based on climatic zones / climate parameters where these pathogens can cause high losses.
5. To suggest management strategies to avoid yield losses due to selected potential pathogens if introduced.

Output: Possible publication

1. 2023-24 - Research paper / policy paper on potential invasive pathogen.
2. 2023-24 - Policy paper on SPS measures and barriers in rice and grapes.
3. 2024-25 - Policy paper on avoidable yield losses due to diseases.
4. 2025-26 - Atlas of invasive species (diseases).

4. Project: Studies on bio-pesticide policies and regulations in India for eco-friendly biotic stress management (Dr.KC Sharma)

Activities

- 1) Studying the regulation/govt policies for bio-pesticides product development, registration and popularization in India and abroad. (1st year).
- 2) Interaction with different stakeholder (farmers-industry-scientists –policy planner) and organizing workshops before formulation of guidelines. (2nd year)
- 3) Analysing and formulation of guidelines to support bio-pesticide policies/regulations in India. (2nd & 3rd year).

Outcome:

- 1) Policy support for bio-pesticide regulation in India for promoting environment friendly biotic stress management in agriculture.
- 2) Policy dialogue in association with NAAS.(1st year)
- 3) Policy paper on biopesticides. (2nd year)

5. Project: Study on barriers related to Sanitary and Phytosanitary (SPS) issues with regards to export of Rice and Grapes to major countries (Dr.Jain).

Objectives

- 1) To study the SPS related barriers / issues for rice and grapes exported to the major countries.
- 2) To identify the reasons for rejection of consignments due to SPS related issues with reference to biotic stress and pesticide residues.
- 3) To make suggestions based on the scientific information available for policy updates.
- 4) To study the state of SPS legislation and enforcement to draw conclusions.

Methodology

- 1) Literature review, Secondary data analysis and Case studies of specific SPS issues.
- 2) Collection of information from the agencies involved such as APEDA, Export Inspection Council of India (ECI); other export promotion and regulating agencies etc.
- 3) Contacts will be made to marketing boards, exporters (who have faced these issues) and industries etc. for collection of information, views and requirements.
- 4) SPS issues which came up during the last five years will be taken up (since 2018) for studies.

Expected outcome

- 1) List and detailed documentation of all the constraints arose due to SPS issues where exports were most significantly affected due to biotic stresses / pesticide residues. (1st year)
- 2) Identification of the facts where SPS barriers could be breached in the exporting country and the necessary steps to be taken for correction. (2nd year)
- 3) Policy paper with recommendation of strategies to avoid SPS restrictions (e.g. risk assessment, certification, official representations in the importing country). (3rd year)

6. Project: Use of drones, guidelines, modalities and scaling up (Dr.Mooventhan)

Objectives

- 1) Existing guidelines will be examined for different crops and pesticides
- 2) Examination of different countries guidelines and modalities.
- 3) Collate data from the field experiments and also secondary data on best practices
- 4) Formulate updated guidelines and dissemination to stakeholders.

Output

1. Socio-techno-economic analysis of adoption of drones. (1st year)
2. Updated guidelines for drones.(2nd year)
3. Policy paper on drones' upscaling.(3rd year)

Project Title:

“Evaluating the Effectiveness of Drone Spraying in Controlling Pests of Tomato”

Research objectives:

1. To assess the efficacy of drone-based spraying in reducing the population of Tomato pests.
2. To evaluate the impact of drone spray applications on the overall health and yield of Tomato crop.
3. Investigate the cost-effectiveness of utilizing drone technology for pest management in Tomato crops.

Team:

1. Dr. P. Mooventhan, Dr. S. K. Jain, Dr. K. C. Sharma, and Dr. Shravani Sanyal

7. Climate Change and Pest Dynamics project (Dr.Sanyal)

ICAR-National Institute of Biotic Stress Management, Baronda



Interactive Effect of Elevated Carbon Dioxide and Temperature on pests and natural enemies in Chilli Project duration: 2023-2026



1. To study the interactive effect of elevated CO₂ and temperature on crop phenology.
2. To study the interactive effect of elevated CO₂ and temperature on pests and natural enemies population dynamics.
3. Prediction of crop performance and pest incidence using quantified relationships and various models (Info-Crop and Max ent model) under RCP based emission scenario data.

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