Pesticide Risk Reduction

Concept Outline for CABI Regional Consultation Meetings 2025

Context

The world's population is expected to exceed 10 billion during the 2080s. With constraints on available land for cultivation and growing demand for food, there is a need for increased crop production.

Farmers face many challenges in meeting this demand. There are diverse threats to production from pests, diseases and weeds, which cause 20-40% yield losses annually, and these threats are exacerbated by climate change, degraded soils and loss of biodiversity. Plant diseases alone cost the global economy over USD 220 billion annually and invasive alien species over USD 423 billion, a cost that has quadrupled every decade since 1970.

As custodians of the land, farmers not only need to look after the soil and protect their crops to ensure food security and maintain yields and income for their families, but also to do so in a way that does not harm their health or that of consumers, and which causes minimal harm to the surrounding environment and its biodiversity.

Chemical pesticides[1] have been key to improving yields; however, evidence has shown that certain compounds or active ingredients have negative effects on human and animal health, the environment and its biodiversity, trade and agronomy, and that their use may raise other ethical concerns. Global demand for pesticides is rising due to increasing plant health threats and will continue to do so for the foreseeable future. FAO has estimated that pesticide use per hectare of cropland increased by 30% between 2002 and 2018. In many low and lower-middle income countries there have been significant increases in the number of chemical pesticide active ingredients registered, volumes of pesticides imported and produced, and amounts of pesticide used.

Global movement towards pesticide risk reduction

The overarching objectives of pesticide risk reduction are to reduce harm to human health and the environment while ensuring continued production of high quality, safe crops. By adopting Integrated Pest Management (IPM) practices that encompass diverse, safer practices to manage pests alongside judicious and carefully managed use of appropriate chemicals, the risks posed by hazardous chemical pesticides can be reduced. Pesticide risk reduction initiatives can generate billions of dollars of benefits, as demonstrated in published literature. Many of the underlying motivations for implementing pesticide risk reduction, such as maintaining consumer trust in markets and reducing reputational risk, tend to be shared across all stakeholders.

Pesticide risk reduction is high on the agenda at local, national, regional and global levels in both the public and private sector, and in civil society. United in the understanding that global

[1] A chemical that is used to kill or control pests. We define pests following the FAO definition: "Any species, strain or biotype of plant, animal or pathogenic agent injurious to plants and plant products, materials or environments and includes vectors of parasites or pathogens of human and animal disease and animals causing public health nuisance."

efforts are required to reduce reliance on chemical pesticides and achieve a shift to less toxic and more sustainable solutions, many international conventions (e.g. Stockholm, Rotterdam, Basel), frameworks (e.g. Kungming-Montreal Global Biodiversity Framework, Global Framework on Chemicals Management), agendas (e.g. Sustainable Development Goals), policies, guidelines (e.g. International Code of Conduct on Pesticide Management), strategies and goals have been developed with the aim to facilitate this change. Value chain actors in both public and private sectors are key to achieving the targets set under these frameworks. Through corporate sustainability and corporate social responsibility initiatives like the UN Global Compact, as well as voluntary private sector standards (e.g. GlobalGAP, Organic or individual company supply standards), businesses and firms worldwide are adopting sustainable and socially responsible policies that encompass pesticide risk reduction. These include good agriculture practice programmes, sustainable sourcing policies, strategies on regenerative agriculture, implementing the principles of agroecology and climate-smart agriculture approaches.

The World Trade Organization's Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement) recognizes the right of countries to implement SPS measures in trade to protect human, animal and plant life or health, and encourages member states to use internationally agreed standards. The Codex Alimentarius Commission (CAC) sets international food safety standards including maximum residue levels (MRLs) for pesticides, though importing countries and regions may also set their own (lower) MRLs provided there is scientific justification. Exporting countries are required to meet importing countries' MRLs, with non-compliance leading to rejection of consignments or even loss of market access. Pesticide risk reduction is an important strategy for exporting countries, supporting trade and market access by enabling producers and traders to meet market requirements. The use of pesticides, however, may be required to meet international phytosanitary standards set by the International Plant Protection Convention (IPPC) with the purpose of managing the risks from the introduction and spread of plant pests. It is therefore important that pesticide risk reduction considers compliance with phytosanitary requirements of international trade, as well as food safety requirements. At the same time, PRR is an important approach for unregulated local markets, given significant potential for benefits to farmer and consumer health, as well as the environment and its biodiversity.

Various jurisdictions are reforming or updating their regulatory frameworks to encourage registration of lower risk plant protection products, and specifically biological 'bioprotection' products. There is interest in harmonization of regulations across countries and regions, as well as identification of and support for the uptake of relevant guidelines and best practices. Information on the growing number of bioprotection products nationally registered is available through the open-access CABI BioProtection Portal (www.bioprotectionportal.com).

Diverse research efforts are focusing on the development and testing of lower-risk plant protection products that are target specific, degrade rapidly into low-impact metabolites and pose a low risk to humans and the environment. Other important research areas concern biocontrol agents, bioprotection products like biopesticides, and broader strategies in IPM and agroecology that underpin the utilization of these biological approaches and products by farmers. Global movements such as OneHealth are uniting the research community to focus on cross-disciplinary issues relating to human, animal and ecosystem health.

CABI's approach to pesticide risk reduction

CABI's work on pesticide risk reduction is part of the organisation's wider commitment to help improve food safety, food security and the livelihoods of smallholder communities, while also safeguarding biodiversity and supporting the sustainable use of natural resources.

We bring to this challenge our world-leading expertise in nature-based pest management and our extensive experience in working with all functions in the plant health system (farmers, extension, agro-input, regulation, research & education) to address their demands for evidence, information and decision support. We work with stakeholders concerned with human, animal and ecosystem health as well as those involved in plant health.

CABI seeks to shift the way crops are protected, away from high-risk inputs towards approaches that are safer for farmers, consumers and the environment. In particular, we encourage application of IPM as the preferred, ecologically-based approach to producing healthy crops, which allows for pesticide use only as needed, and when adhering to measures that limit the exposure of people and the environment (see FAO, International Code of Conduct on Pesticide Management).

CABI's approach to pesticide risk reduction aligns with the FAO Guidance on Pest and Pesticide Management Policy Development (FAO, 2010), working across three steps:

1. **Reducing reliance on pesticides.** Determine what levels of pesticide use are actually needed. Make optimum use of non-chemical pest management and eliminate unjustified pesticide use**.**
2. **Selecting pesticides with the lowest risk**. If use of pesticides is deemed necessary, select products with the lowest risk to human health and the environment from the available registered products that are effective against the pest or disease.
3. **Ensuring proper use of the selected products** for approved applications and in compliance with international standards.

CABI's expanding offering in pesticide risk reduction

CABI has an extensive track record in delivering programmes and projects with a focus on pesticide risk reduction. As we seek to build on this experience and expand our work, we have formulated a new offering that captures three linked areas of work in which we believe CABI can provide particular added value to Member Countries and other stakeholders as they seek to tackle pesticide risk. These are:

Policy: Support the development and implementation of policies and regulations

CABI engages with policymakers and regulatory authorities, providing evidence and capacity strengthening as well as support in developing and implementing policies and regulations. In line with international standards and guidelines, this work enables governments to make lower risk plant protection products available and to recommend interventions that minimize the misuse of pesticides. CABI assists public and private sector actors in identifying available alternatives during the phasing out of pesticides of concern, in order to comply with statutory and voluntary trade regulations. This work involves multi-disciplinary expertise and cross-sectoral approaches to take account of the social, economic and environmental contexts of pest management and pesticides.

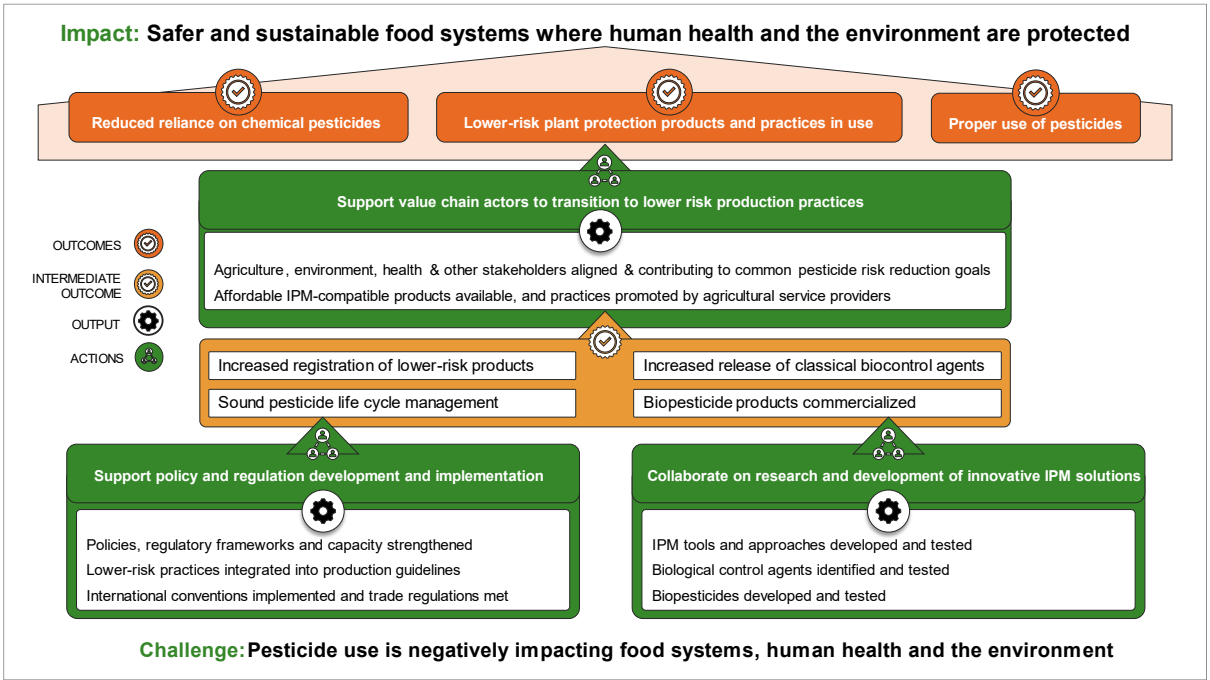
Research: Collaborate on research and development of innovative IPM solutions

CABI carries out innovative research and development (R&D) of new economically viable IPM strategies, including biopesticides, biological control agents, digital tools and application technologies. Partnerships with public and private sector organizations increase the availability and commercialization of these lower-risk pest management options around the world. CABI also implements social science research to understand the enabling environment and the factors that incentivise pesticide risk reduction or present barriers to change.

Production: Support value chain actors to transition to lower-risk production practices

At the farm level, CABI supports a range of value chain actors to prioritize and collaborate on pesticide risk reduction, increasing their agronomic knowledge and guiding their transition to lower risk crop protection practices. CABI's actions to raise awareness and influence change include e-learning, in-person training and social behavioural change campaigns. Our deep technical knowledge around pesticides and specifically Highly Hazardous Pesticides (HHPs) positions CABI to provide trusted, independent, science-based technical support such as exposure assessments, risk evaluations, and classification and validation of the most relevant lower risk alternatives.

The figure below shows how these areas of work link together to support progress towards safer and sustainable food systems. They also link with allied areas of CABI's work, notably our work on SPS capacity and regulations, which is important to realising benefits to trade from pesticide risk reduction initiatives.



Impacts of work across the three areas include:

- **Human health:** Farmers and their families adopting safer products and practices are exposed to lower levels of pesticides, and experience fewer health problems and acute poisonings resulting in improved health and fewer workdays missed.

- **Production:** Improved agronomic practices and use of bioprotection products lead to delivery of safer produce into food systems, as well as fewer plant protection products becoming ineffective through development of resistance in pest populations.
- **Trade:** Where produce is traded regionally or internationally, fewer rejections and increased market share lead to an increase in net income for farmers. More use of low-risk plant protection approaches reduces the frequency of producers exceeding maximum residue levels when trading internationally.
- **Environment:** Greater areas of land being farmed using sustainable practices results in benefits to biodiversity, soil and aquatic health, and lower levels of toxic chemicals circulating in the environment.
- **Ethical concerns:** Farmers having knowledge of and access to viable alternatives to highly hazardous pesticides helps to ensure responsible and sustainable agricultural production with appropriate levels of farmer protection.

Partnerships are instrumental

There have been many global efforts to reduce the adverse impacts of pesticides. However, much still needs to be done to meet the targets outlined in international conventions, frameworks, and guidelines. Complex problems are never solved in isolation; therefore, partnership is essential. Hundreds of organizations worldwide including CABI, are working towards reducing the environmental and health risks associated with pesticides. Collaboration between international and regional public organizations (e.g. FAO, CGIAR), governments (e.g. national mandated regulatory authorities), the private sector (e.g. biocontrol manufacturers, certifiers, global food and beverages companies and their suppliers, retailers), foundations and public donors, and others (e.g. international research organizations, intergovernmental organisations, NGOs, consumer organizations, human, animal and ecosystem health stakeholders) will be key to meeting international targets.

Dialogue with CABI Member Countries

We recognize that the barriers faced, and progress made around pesticide risk reduction vary substantially between countries. The sessions on pesticide risk reduction at the 2025 Regional Consultation Meetings of CABI Member Countries aim to explore how CABI's reformulated pesticide risk reduction offering can meet the particular demands and needs of specific Member Countries, how CABI and Member Countries can collaborate on concrete plans to achieve pesticide risk reduction and, where appropriate, how CABI and Member Countries can partner to secure external funding for that work.