

# Biosecurity for plant health: better justification of precautionary measures

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## Policy Summary



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**Please cite this report as follows:** C. Pollard, R. Hattersley, M. Theocharopoulos, & R. White (2022). Biosecurity for plant health: better justification of precautionary measures: Policy Summary. PHC2021/05. Scotland's Centre of Expertise for Plant Health (PHC). DOI: 10.5281/zenodo.11347997

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## Background

The introduction and spread of pests and pathogens of plants is a serious issue to be considered in the management of agriculture, horticulture, forestry, and the natural environment in Scotland. Therefore, land managers including farmers, foresters, and conservationists are constantly making decisions regarding if or how to respond to current and future plant pest threats. In many cases, prevention is seen as better than cure, particularly if introduction or spread of a plant pest will lead to significant negative impacts before it can be managed or eradicated, or if a plant pest once present is impossible to remove. Investments in precautionary measures – those made before pest or pathogen introduction – may provide significant benefits compared with managing larger financial or societal impacts after pest outbreaks. In other cases, reactionary measures – dealing with the pest after introduction – may be more appropriate. Land managers make choices regarding how to mix the adoption of preventative and curative actions and it is important to understand how such choices are made so any interventions encouraging better plant health and biosecurity behaviours are more likely to be successful.

## Research undertaken

To better understand the contexts in which land managers make decisions on plant health and biosecurity, we asked four research questions:

- RQ1 – What are the current barriers to adopting precautionary measures?
- RQ2 – How can barriers be reduced?
- RQ3 – What are the limitations in risk assessment?
- RQ4 – What are future research priorities?

The research team used a mixed methods approach which began with rapid evidence reviews followed by interviews and then an expert workshop with participants from policy, practice, or research roles across agriculture, horticulture, forestry, or management of the natural environment. The three methods were performed broadly in sequence (reviews, interviews, workshop), with findings from each influencing topics covered in the subsequent method.

<b>Method</b>	<b>Topics included</b>
Rapid evidence reviews	Descriptions of existing precautionary measures for plant health. Identifying potential trade-offs of adoption. Drivers of and barriers to practitioners adopting pro-environmental land management practices. Economic value of adopting precautionary measures.
Semi-structured interviews	Background information of the participants. Experiences of precautionary measures (e.g., positive, negative, precautionary vs. reactive measures, scales, and barriers to adoption, including economic barriers). Mechanisms to encourage adoption of precautionary measures (including case studies). Risk perceptions and assessment. Pest and pathogen information needed by participants.
Expert workshop	Collective action for plant health and biosecurity. Encouraging long-term thinking. Practitioner relationships with risk.

## Main Findings

We found two major influencers guiding those making decisions surrounding precautionary measures:

- **System factors** at three scales influence both precautionary and reactionary behaviours: **individual** knowledge and awareness of pests and possible measures, self-identity, and self-efficacy to make the right decisions; **community** networks and social norms of those within their sector and with information providers; and **wider system** availability of information, and market forces.
- Practitioner **perceptions of risk, cost benefit, and uncertainty** influence a change in practice and are potentially mediated by how far into the future the practitioner was willing or able to 1) forecast, and 2) apply that forecast to aid decision-making in the present. Precautionary measures are more likely to be preferential when considering the long term.

Additional findings were:

- Pest risk assessment is an area which practitioners find **information hard to interpret and apply** due to complexity and individual context. Needing to think longer term for precautionary measures, adds to this complexity. People acting as **trusted advisors / information gatekeepers** to help translate complex information for decision making are missing.
- **Cost-benefit analyses were of limited use for practitioners** where decisions are made at a smaller scale (farm, woodland, catchment) than are considered in the analyses. However, such analyses were useful to practitioners when they wished to **justify decisions to others** (e.g. owners or investors) who are more likely to give credence to models predicting financial impacts.
- **Considering a longer timeframe or lower discount rate** in cost benefit calculations can tip the balance in favour of precautionary measures. However, changes in the wider system over that time mean **longer forecasts maybe less reliable and can decrease trust** in advisors who choose to use them.
- Perceptions of the **uncertainties found to be important** when making plant health decisions included practical effectiveness of measures and impact on productivity of precautionary measures, as well as market forces, climate change, and policy priorities.
- Successfully using **case studies** to promote adoption of precautionary measures, should have relevant content clearly applicable to the **context of the practitioner**, and be delivered by a **trusted and genuine advisor**.

## Recommendations

### For practical actions

1. A wider range of opportunities should be made available for practitioners to connect to each other, on their own terms. The heterogeneity of individuals in all sectors, sites, and of personal experiences means an onus should be on creating the environment for collective action to emerge, rather than implementing a prescriptive 'solution'.
2. Addressing the perceived dearth of trusted pest information gatekeepers is key, as these actors have been identified as crucial in the interpretation and spread of high-quality pest information such as predictive pest models. PHC could play a key role here, acting themselves as a trusted advisor, and by coordinating / supporting a wider network of individuals who work directly with practitioners.
3. A suite of sector-relevant case studies should be developed, to highlight the range of benefits of adopting precautionary measures. Case studies should address key factors

in decision-making, such as how to apply complex risk and cost-benefit information to the local context, and strategies for addressing the uncertainties arising from considering longer timeframes.

### **For future research**

4. There are many ways practitioners and other stakeholders can work together for plant health, but are some collaboration methods better than others for certain plant health contexts? Building a knowledge base to understand what characteristics of collective action are successful in which contexts (across sector, location, plant, pest), as well as how rules, incentives and consequences are developed and communicated, and how social learning could be successfully applied, can lead to better design of collective plant health action.
5. Information gatekeepers are key actors in the translation and explanation of plant health information to practitioners. Research focussed on those gatekeepers (for example, interpersonal relationships (e.g., trust), personal / organisation objectives, pressures faced) and the resulting impact on practitioner behaviours is required to aid support of an effective plant health advisor network.
6. Risk, uncertainties, and cost benefit calculations change when considering longer time frames. The perceptions practitioners have of risk, uncertainties, and cost benefit analyses also change with the longer-term thinking required when considering precautionary measures. There is a need for longitudinal (both new and retrospective) social and economic studies to evaluate accuracy and usefulness of forecasting.

## **Conclusions**

The findings of this project emphasise that the availability of high quality evidence is not enough to encourage adoption of precautionary measures by individual practitioners. Practitioners agree that the information is high quality, and can be trusted, but they do not have the time or expertise themselves to interpret and apply to their own context. These barriers can be overcome for individuals with the aid of trusted information gatekeepers, and for groups by working collectively with case studies illustrating real life examples of navigating the journey towards a precautionary approach. It is those person-to-person interactions which give practitioners the confidence to try new practices, particularly in the case of precautionary measures where positive impacts are accrued over the longer term.

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