

# R2M rapid biosecurity risk assessment and invasion mitigation: A toolbox for national programs

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The ability of national agricultural research and extension systems (NARES) and national plant protection organizations (NPPOs) to address emerging pathogen and pest risks is key to national food security. Many countries globally are in the process of improving these systems. R2M is a set of tools for rapid risk (R2) assessment and mitigation (M) planning for crop pathogens, pests and weeds at the national or regional level. These tools can help countries develop their strategies for effective management of current crop disease problems, as well as new invasive pathogens and pests. R2M tools act as building blocks in the development of a global surveillance and mitigation system for crop disease. The R2M 'meta-tool' for expert knowledge elicitation provides an automated method for leaders in national programs to create their own tools for evaluating risk and mitigation strategies. R2M also includes geographic risk analysis such as cropland connectivity analysis, and management scenario analysis such as impact network analysis. We provide examples of R2M applications in several countries and introduce the latest R2M options available for new applications. It is hoped that the R2M framework will provide the basis for a global community of practice trying to solve similar problems. We discuss examples involving the following: (1) Expert elicitation. (2) Crop connectivity. (3) Regional assessments of invasive species management scenarios.