Increasing cropping systems resilience to reduce the costs of new weed and resistance arrivals

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Summary The invasion of a new weed species or increasing herbicide resistance can be costly to rectify where they are not readily controlled by existing practices. Consultations with growers and advisors reveal concerns with mobile new weeds and the mobility of herbicide resistant weeds. Area-Wide Management (AWM) can help coordinate surveillance and communicate information about new and emerging weed problems to encourage improved preparedness and faster adjustment across growing regions with shared problems. Better control of new mobile weed problems at the farm-level could help prevent costly incursions at this scale and avoid further spread across cropping regions. Accordingly, we investigate whether Integrated Weed Management (IWM) can help to reduce costs and increase resilience to new weed problems, contributing to an AWM approach. We focus on summer fallow weeds in case studies for Western Australia, the South Australian/Victorian Mallee, and the Darling Downs in Queensland. We are collecting data by consulting with weed experts to better understand which additional summer fallow weeds would increase weed management costs. To complement this analysis, the Ryegrass Integrated Management (RIM) model was used to evaluate the costs of gaining glyphosate resistant annual ryegrass in winter cropping systems. Scenarios examined glyphosate applications and IWM practices including early seeding and harvest weed seed control. We found the cost of gaining herbicide resistance in this context was not necessarily extreme when more diverse weed control practices and competitive crops were in place. Overall, growers investing in a diverse weed management strategy are likely to achieve profitable management of existing weeds and reduce costs and risks from new resistance and weed introductions. Practices that are likely to reduce the seed set of new potentially mobile weeds can also improve AWM.

Keywords Integrated Weed Management (IWM), Ryegrass Integrated Management (RIM) model, herbicide resistance