Agronomic Crops IPM Logic Model

Situation	**Inputs**	**Outputs**		**Outcomes-Impacts**		
		Activities	Participation	Short	Medium	Long
1. Research based information & education on IPM, resistance management and pesticide safety across agronomic crops 2. Continued refinement of cotton IPM to reduce risk: more efficient control of key pests (Lygus & Whiteflies); integration of biological control into whitefly thresholds; reduced use of broad spectrum insecticides; selective management for brown stink bug in cotton; evaluation of new technologies (seed treatments, GIS, herbicides, insecticides, biotechnology, nematode resistant varieties, non-target effects); Detailed risk analysis to determine remaining high risk pesticide uses in cotton and identify mitigating practices 3. Development of IPM thresholds and reduced risk management tools for insect pests of alfalfa 4. Respond to emerging and recently discovered pesticide resistance issues (insecticide resistance in cotton insects & glyphosate resistant weeds)	1. Our time and expertise: Assistant in Extension (Lydia Brown); Agronomic Crops IPM Leadership Team (Entomologist, IPM Specialist, Agronomist, Weed Scientist, Nematode specialist, IPM assessment expert); AiE for Pesticide Education 2. IPM Assessment Leadership Team, pesticide use database and crop pest losses surveys to support evaluation 3. Travel expenses 4. Leveraged resources for research that supports our E-IPM outreach: WRIPM, Cotton Inc., AZ Cotton Growers' Association, AZ Cotton Research and Protection Council, Industry support, Western IPM Center grants, USDA-ARS 4. Resources to hold meetings, demos, trainings, etc.: Grower/PCA cooperators	1. Ongoing needs assessment and program planning (Agronomic Crops IPM and IPM Assessment Leadership Teams & APMC IPM Coordinating Committee); and project-specific Advisory Committees (e.g., Pesticide Use Database Advisory Committee) 2. Translational science and on-farm demonstrations (management of herbicide resistance, role of natural enemies, chemical selectivity screenings, economic thresholds incorporating Natural Enemy information, risk management education & mitigation) 3. Educational meetings & events (regular workshops & field days; deployment of simulation software for pest risk mitigation) 4. Development and dissemination of IPM technical resources (publications on pest management, e.g., Egyptian alfalfa weevil thresholds), online resources 5. Transdisciplinary teaching about the core principles of resistance management, cultural controls, risk, & ecosystem services (meetings, field days, on-farm demonstrations, IPM Shorts and other print and e-publications) 6. Measure adoption and impacts of IPM practices (see outcomes)	1. Growers 2. PCAs 3. Pesticide applicators 4. Ag industry representative s 5. Fellow Extension scientists 6. Other agricultural professionals	1. Improved awareness, knowledge, and understanding of IPM & new reduced-risk products and strategies 2. Increased awareness and ability to identify key pests, natural enemies and their roles in IPM 3. Increased awareness and technical knowledge of new IPM tools and practices among stakeholders 4. Increased understanding of the mechanisms and causes of pesticide resistance 5. Increased understanding of eco-toxicological risks associated with pesticide use; risk indices & their role in identifying substituted pesticide practices. **<u>Possible Measures</u>** Document change in knowledge with surveys and audience response systems deployed at meetings and field days	1. Improved IPM programs in agronomic crops 2. Increased adoption and implementation of IPM and resistance management tactics 3. Improved use, timing, and precision placement of IPM technologies 4. Reduced dependence on higher risk pesticides and practices **<u>Possible Measures</u>** Document changed behaviors with surveys and audience response systems deployed at meetings and field days; and via crop pest losses surveys; APMC Pesticide Use Database can measure changes in pesticide practices	1. Reduction of pesticide residues and environmental risks 2. Reduced risk to health and safety of pesticide applicators and the public 3. Improved yield and economic returns for growers 4. Reduced pest pressures and crop losses due to pests **<u>Possible Measures</u>** Changes in pesticide use documented on Crop Pest Losses Surveys and with APMC Pesticide Use Database; eco-toxicological risk measurement through PRiME collaboration

How our Logic Model supports Outcomes and Impacts of the CPPM Logic Model:

- We increase knowledge and implementation of new IPM tools and tactics in integrated strategies for IPM; for example, integration of natural enemy counts into existing thresholds for whitefly management in cotton to more fully integrate biological control with selective insecticide use to advance integrated control and increase economic and environmental benefits of IPM
- We adapt existing science-based IPM knowledge to new pest scenarios and foster sound IPM solutions. An example is our work to test and expand existing selective management strategies with new labels for key alfalfa pests, which will reduce broad-spectrum insecticides in alfalfa and increase populations of natural enemies for the benefit of surrounding crops.
- We will facilitate production of audience-appropriate IPM training materials for agronomic crops including traditional, web-based, mobile, in English and Spanish
- We participate in communication among the scientific community and among research, teaching and extension communities locally and regionally, through the Western IPM Center, Western IR-4 interactions and WERA-1017 (IPM) and WERA-060 (resistance management), scientific collaborations with colleagues, presentations and discussions at regional and national scientific conferences to share information and expand potential impacts of our work.
- As a result of much of our work, innovative and diversified IPM systems are adopted on an area-wide or landscape scale; examples include our cross-commodity IPM programs (e.g., Palumbo et al. 2003) and current work in development of prospective decision support tools (chemical use maps) to improve resistance management practices and sustain economic and environmental benefits of key selective chemistries across major crop groups
- Key information systems and decision support tools (see previous) are adopted for pests of national significance (whiteflies)
- More sustainable IPM practices are adopted by producers and their pest managers
- Cost-benefit ratios of adopting IPM are improved
- Human health, economic and environmental risks are reduced
- Through resources developed by the APMC IPM Assessment Leadership Team, including pesticide use data, Western IPM Center Crop Pest Losses Signature Program, and ipmPRiME collaborations with Oregon State University, we measure adoption and impact of IPM, including changes in knowledge, individual and group behaviors (e.g., pesticide use) and their impact on the environment and human health (eco-toxicological risk)