Multi-criteria Decision Making

Analytic Hierarchy Processing (AHP)
- Weigh and resolve seemingly conflicting criteria to achieve specified goal
- Pairwise comparisons of multiple criteria in conjunction with ratio scale
- Steps for Evaluation:
  - Define objective
  - Structure elements into criteria, sub-criteria
  - Make pairwise comparisons
  - Set up $n \times n$ matrices
  - Calculate weighted sums, Consistency ratio
  - Evaluate alternatives according to weights

Application for Weed Management
- Resolve potentially divergent IPM objectives:
  - Control options
  - Environmental concerns
  - Economic pressures
- Prioritize strategic alternatives by incorporating qualitative and quantitative data
  - Decision maker’s preferences and experiences
  - Economic or other factors

Objective: Design tailored programs for cranberry growers to manage dodder

Use Mind Mapping to Define Criteria
- Graphical representation of factors affecting decision-making for dodder control
- Organizes ideas; ID appropriate pairwise comparisons

Surveys
Measure relative importance between each pairwise comparison

Promoting Adoption of AHP for Dodder Management

Engage Early Adopters
- Demonstrate utility of AHP from other examples.
- Verify key indicators are accurate.
- Provide individual prioritized plans for dodder management.
- Work one-on-one to resolve issues and gauge implementation and effectiveness.
- Re-convene early adopters to share experiences and adjust key indicators if needed.

Fine-Tune the Process
- Evaluate other criteria groupings in a similar fashion.
- Evaluate each criteria with respect to broader concepts:
  - Maximize IPM strategies, Lower risk factors, Minimize time on-farm

Next Steps
- Do composite as well as individual assessments.
- Develop user-friendly interface (e.g., radio buttons) to allow growers to determine best IPM program each year.
- Correlate AHP plans with actual success in the field.
- Extend AHP to other IPM models.

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