Title: Problem solving and innovation on the farm: A how-to manual

Draft Outline

## Introduction

* Role of experimentation in solving problems and innovating
* Formal and informal research: differences and similarities
* How This Manual Was Constructed
* How to Use This Manual

## Chapter 1: How do expert farmers problem-solve and develop innovations on their farms?

* DACUM generated chart
* Overview of the steps to problem solving and experimentation
* The cycle of inquiry: information gathering, experimentation, evaluation and interpretation

## Chapter 2: To effectively solve problems and innovate you must first have a solid farm vision and whole-farm management plan

### A.           Identify Farm Vision

A-1 Network with farmers (e.g., visit farms, attend conferences)

A-2 Identify quality of life requirements (e.g., stress, amount of work, income)

A-3 Identify personal/farm values and goals

A-4 Articulate farm vision (e.g., words, pictures)

A-5 Identify target market (e.g., retail, wholesale, CSA)

A-6 Write business plan

### B. Define Farm System

B-1 Map the farm (e.g., topography, soils, infrastructure)

B-2 Identify resource inventory (e.g., water, soil, equipment)

B-3 Develop whole farm plan (e.g., crop, livestock, ecosystem)

B-4 Determine means of production (e.g., tillage, pest control, labor)

B-5 Determine farm interactions (e.g., social, political, environmental)

* Resources for whole farm planning
* Case studies highlighting whole farm planning processes

## Chapter 3: The steps to effective problem solving and innovation

### C. Observe and Evaluate the Farm System

C-1 Walk the farm

C-2 Record observations and events (e.g., frost, rainfall, insect damage, weed pressure)

C-3 Observe patterns (e.g., plant health, animal behavior)

C-4 Perform routine testings (e.g., soil, plant tissue, fecal)

C-5 Collect outside observations (e.g., online data, other farmers, experts)

C-6 Taste your own food

C-7 Invite feedback from labor (e.g., self, others)

C-8 Invite feedback from customers

C-9 Assess equipment (e.g., , safety, functionality, efficacy)

* Case study highlighting this step in problem-solving and innovation

### D. Identify Problems and Opportunities

D-1 Review annual farm schedule/calendar

D-2 Analyze financials (e.g., cash flow, sales records, enterprise budget)

D-3 Analyze records (e.g., soil tests, journal notes, photos)

D-4 Establish benchmarks (e.g., yields, efficiency, sales/customers)

D-5 Review successes and failures

D-6 Review means of production (e.g., tillage, pest control, labor)

D-7 Identify important trends/changes (e.g., social, political, environmental)

D-8 Gather information: consult experts (e.g., other farmers, extension, financial)

D-9 Prioritize problems/opportunities

* Case study highlighting this step in problem-solving and innovation

### E. Design Actions

E-1 Investigate subject (e.g., literature review, consult experts, studies)

E-2 Research solutions/options

E-3 Assess risks and rewards

E-4 Choose best course of action

E-5 Design trial/course of action

E-6 Identify success criteria

* Case study highlighting this step in problem-solving and innovation

### F. Implement Actions

F-1 Collect resources (e.g., on-site, purchase)

F-2 Allocate necessary time

F-3 Assign roles and duties

F-4 Execute plan

F-5 Collect data

F-6 Monitor results

F-7 Fine tune actions

F-8 Review success criteria

* Case study highlighting this step in problem-solving and innovation

### G. Evaluate Actions

G-1 Observe end result

G-2 Analyze data

G-3 Reassess risks and rewards

G-4 Invite feedback from collaborators and experts

G-5 Determine next course of action (e.g., implement, redesign, abandon)

G-6 Share results with peers

* Case study highlighting this step in problem-solving and innovation

## Chapter 4: Proven tools and strategies used by expert farmers

* Strategies for capturing and organizing your observations
* Proven methods for tracking results and evaluating outcomes
* Sample experimental designs that are compatible with working farms
* Additional case studies