

Introduction to Research Methods in

Agricultural Extension

(A concise, easy-to-read guide for students, extension agents, and practitioners)

1. Why Research Matters in Extension

Purpose	What It Looks Like in Practice
Identify farmer needs	Surveys of cropping constraints, focus-group discussions
Test new technologies	On-farm trials of drought-tolerant varieties, precision-irrigation kits
Evaluate impact	Before-after comparisons of yield, income, or adoption rates
Inform policy & program design	Evidence-based recommendations to ministries, NGOs
Build credibility	Data-driven advice strengthens trust between agents and farmers

2. Core Research Paradigms

Paradigm	Key Features	Typical Questions
Quantitative	Structured instruments, large samples, statistical analysis	“What is the adoption rate of the new seed?”
Qualitative	Open-ended methods, small samples, thematic interpretation	“How do farmers perceive risk in using fertilizer?”
Mixed-methods	Combines both to triangulate findings	“What proportion adopt the technology and why?”

3. The Research Process (Step-by-Step)

1. Problem Definition

- Observe field realities ? formulate a clear, actionable problem statement.

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- Example: “Low adoption of Integrated Pest Management (IPM) among smallholder maize growers”

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2. Literature Review

- Search scientific papers, extension reports, and grey literature.
- Summarize gaps, theoretical frameworks, and previous findings.

3. Research Objectives & Hypotheses

- **General objective:** Broad goal (e.g., assess IPM adoption).
- **Specific objectives:** Measurable sub-goals (e.g., identify socio-economic determinants).
- **Hypotheses** (for quantitative work): “Farmers with access to extension training are 30% more likely to adopt IPM.”

4. Research Design

- **Descriptive:** Surveys, case studies – describe current status.
- **Experimental:** Randomized control trials (RCTs), factorial designs – test cause-effect.
- **Quasi-experimental:** Nonequivalent control groups, before-after studies.

5. Sampling Strategy

- **Sampling frame:** List of all eligible units (e.g., all maize farms in a district).
- **Technique:** Simple random, stratified, cluster, purposive (qualitative).
- **Sample size:** Use formulas (e.g., Cochran’s) or power analysis for experiments.

6. Data Collection Instruments

- **Questionnaires:** Structured, pre-tested, often administered via tablets.
- **Interview guides:** Semi-structured for FGDs or key informant interviews.
- **Observation checklists:** On-farm practices, field conditions.
- **Remote sensing & GIS:** Satellite imagery for land-use, soil moisture, yield mapping.

7. Pilot Testing

- Conduct a small-scale trial (5-10% of sample).
- Refine wording, timing, logistics, and data-entry procedures.

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8. Data Collection

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- Follow ethical protocols (informed consent, confidentiality).
- Use trained enumerators; monitor quality through spot checks and re-interviews.

9. Data Management & Cleaning

- Import into statistical software (e.g., SPSS, Stata, R).
- Check for missing values, outliers, and