Overview of FS II Research on Agricultural Inputs

Presentation Prepared by:
Eric Crawford, Julie Howard, and Valerie Kelly

Food Security II Cooperative Agreement
Department of Agricultural Economics
Michigan State University

January 4, 2001

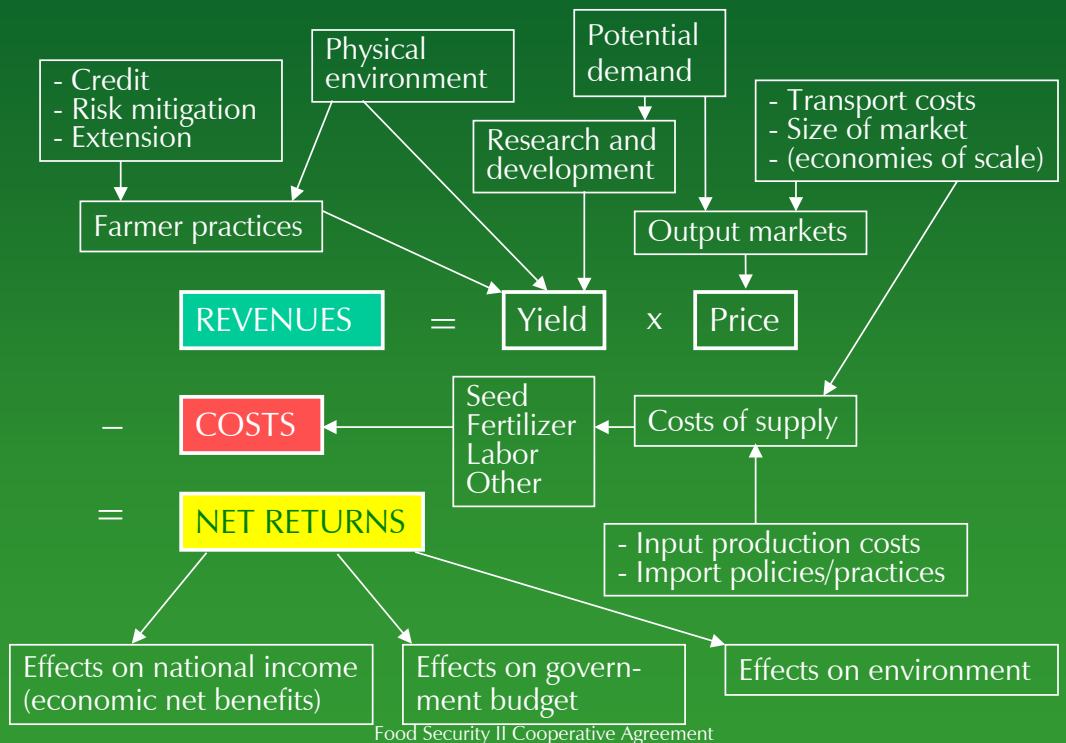
Outline of Presentation

- Evolution of FS II inputs research topics
- Conceptual framework for studying the economics of agricultural intensification
- Current research
- Selected major findings

Evolution of Inputs Research Topics

- Early studies that served as background:
  - Returns to agric. research and technology transfer
  - Determinants of agricultural productivity
  - Agricultural transformation
- Fertilizer and seed distribution and use
- Sustainable intensification:
  - Soil fertility
  - Case studies of improved input promotion programs
- Expanded conceptual framework: markets, risk
- Regions covered: West, East, Southern Africa

Economics of Agricultural Intensification



Evolution of Topics (2)

- Studies of returns to agricultural R&D in Africa
  - Cameroon, Kenya, Mali, Niger, Uganda, Zambia
  - Generally good rates of return
  - Highlighted importance of:
    - counting benefits and costs of investments that complement ag. R&D (extension, government support programs, etc.)
    - improved inputs, especially seeds
- Agricultural transformation
  - Need to transform the food system, not just farming
  - Market development is critical to this process
  - Need zone-specific technology and policies

Evolution of Topics (3)

- Determinants of agricultural productivity
  - Burkina Faso, Rwanda, Senegal, Zimbabwe
  - Results emphasized:
    - to raise productivity, need a sharp rise in use of improved agricultural inputs (fertilizer, seed, conservation investments)
    - farm productivity is linked to nonfarm productivity and environmental preservation
  - Study raised concern about the impact of structural adjustment on fertilizer and improved seed use
  - Farm input costs must be reduced without resorting to general subsidies that are not fiscally sustainable

Evolution of Topics (4)

- Fertilizer literature review:
  - Addressed the following questions:
    - Why is fertilizer not stimulating agricultural productivity?
    - How do seed systems evolve?
    - What can be done to improve the situation?
- Results:
  - Declining soil fertility is a major problem
  - More inorganic fertilizer is needed to address this
  - Fertilizer is profitable in many situations in Africa
  - Adoption depends on incentives and capacity
  - Vicious circle: high cost and low demand for fertilizer

Evolution of Topics (5)

- Seed literature review--questions addressed:
  - How do seed systems evolve?
  - What organizational and institutional strategies can be followed to improve seed systems?
- Recommendations:
  - Seed systems should combine formal & informal, and market & nonmarket channels, to meet farmers' demand
  - Effective demand by smallholders must be increased
  - Seed production and distribution costs must be reduced
  - Strengthen infrastructure, rules, and regulations
  - Government has a role to play throughout this process

Evolution of Topics (6)

- Study on restoring soil fertility--issues addressed:
  - Capacity of fertilizer to recapitalize Sahel soil fertility
  - Economic obstacles and incentives to recapitalization
  - Need to avoid negative environmental impacts
- Findings/recommendations:
  - Inorganic and organic fertilizer are complements
  - Increased incentives needed to spur their use
  - Need for case studies of aggregate benefits and costs of input promotion programs
- Case studies in Ethiopia, Mozambique, Mali

Evolution of Topics (7)

- Integrated input/output marketing framework
  - Analysis of input/output marketing channels:
    - stages, agents, costs
    - farmer and trader marketing behavior
  - Identify ways to improve marketing systems to support greater use of fertilizer and seed:
    - look for potential cost savings throughout system
    - importance of vertical integration and links between credit and output marketing
    - market information systems
  - How does cash cropping support food crops?

Evolution of Topics (8)

- Market reform--questions addressed:
  - Impact of liberalization and privatization on input and output markets
  - Pathways for increasing private sector involvement in input and output marketing
- Results:
  - Impact mixed; many reforms partially implemented
  - Little investment in complementary public goods
  - Preconditions for improved market performance therefore not yet put in place

Major Findings (1)

- Adoption of improved technology requires:
  - incentives to adopt (absolute & relative profitability)
  - capacity to adopt (needed resources are available)
- Sustained use of improved technology requires:
  - well-functioning input and output markets
  - high-quality extension services
  - financially sound credit systems (farmers & traders)
  - protection against financial risks (farmers & traders)
- Smallholders generally require credit, but early adopters & better-off farmers may self-finance

Major Findings (2)

- Structural reforms have left input markets in a low-demand, low-volume, high-input-cost trap
- Private sector input traders are put off by high costs, policy uncertainty/risk, and competition from free input giveaway programs
- Input and output markets work best when:
  - functions are vertically coordinated
  - credit and output markets are interlinked, allowing input loans to be recovered from sales of output

Current Research (1)

- Profitability of fertilizer use (Rwanda, Zambia)
- Fertilizer marketing costs (Kenya, Zambia, Rwanda; West Africa)
- Fertilizer distribution and credit (Zambia)
- Constraints and strategies for input sector development (Mozambique)
- Analyzing risks of improved input use and ways to reduce farmer/trader risk (Ethiopia, Mali)

Current Research (2)

- Aggregate benefit-cost analysis of input promotion programs (Ethiopia, Mali)
- Use of monetized food aid to stimulate improved input use
- Analysis of farm income and land holdings to identify viable target groups for intensification

Major Challenges (1)

- How to bring down the real costs of input supply?
  - Economies of scale to reduce unit costs
  - Cash crop schemes to facilitate coordination of marketing, credit, and extension
  - Collaboration between farmer associations, NGOs, and for-profit firms
  - Targeting of better-off smallholders where substantial effective demand exists

Major Challenges (2)

- How to boost demand for improved inputs?
  - Support "demand-driven" input and output markets
  - I.e., support shifts in cropping patterns in line with post-reform economic institutions and price relations
- Examples:
  - Sorghum vs. maize in remote areas of Zambia
  - "Nontraditional" crops for which there is strong commercial demand in domestic or export markets

Major Challenges (3)

- How to reduce risks?
  - Crop combinations and conservation technologies appropriate for riskier environments
  - Institutions and organizations to spread risk among farmers and input suppliers
  - More stable and transparent government policies
  - Fewer subsidized input supply programs that under-cut private sector commitment to input marketing
  - Find solutions to problems of late fertilizer delivery
  - Explore potential for area or rainfall insurance