Innovation, Problem Solving and Operational Research Strategies

Paul Woomer

*Innovate:* To begin or introduce something new
This presentation serves as an introduction to the developmental research continuum and to the workshop as-a-whole

- Elements of creativity
- Interdisciplinary, developmental research
- Participatory approach: Assess, Involve, Resolve
- Scientific and social benefits from research
- Case study: Phosphate Rock Evaluation Project
- Where do we stand?: Internet Profiling
Sternberg's Theory of Creativity

all of the following are essential elements of creativity
◆ synthetic, analytic and practical intelligence
◆ state-of-the-arts technical knowledge
◆ a thinking style that questions common assumptions
◆ a personality that accepts risk and criticism
◆ intrinsic motivation and goal setting
◆ a facilitating, full-time work environment

Creativity and Innovation:
◆ requires intuition, diligence and persistence
◆ is not synonymous with intelligence
◆ is a solitary enterprise
◆ is extremely difficult to manage

managers perspective:  *if you do not know where you are going, you will not know when you arrive.*

creative researcher's perspective:  *if I knew where I was going, it would not be challenging research.*

How creativity occurs:

- in an intuitive flash of insight
- novel interpretation of the well-known
- turn disadvantage into advantage

Conventional wisdom: *Adhesives* must be strong

- de Mestral invented *Velcro* by modeling bothersome cocklebur attachment to clothing
- Fry invented *Post-It* removal notes by finding a new use for an extremely weak and discarded adhesive
History records a disproportionate number of creative discoveries by young scientists (20 to 30 years old): 

- tend to be more curious and observant 
- do not "know" what cannot be accomplished  

The problem:
Science-by-committee is often non-productive because of the contradiction between managerial and creative perspectives

Interdisciplinary teams have advantages in conducting holistic, developmental research

--------- yet --------

Most scientific landmarks result from the work of single, dedicated individuals

A solution:
Larger projects must be divided into specific, smaller tasks that are assigned to individuals
The Strategy. Strengthen the capacity of scientific research and higher education to serve Africa’s poor.

Africa needs higher-level training that addresses difficult, local problems in such areas as reproductive health, AIDS prevention, soil nutrient management, employment and education to meet society’s needs for:

- support staff in research institutes
- supervisors for agricultural extension
- managers of local NGO projects
- specialists for private industry
- junior lecturers in public universities
- qualified candidates for Ph.D. studies
The roles of scientific research and higher education in public sector reform include:

Higher degree training of Agricultural and Health Officers to meet District needs

Develop capacities for local problem diagnosis, health surveillance and assisting innovation

Establish rigorous criteria for hypothesis formation, experimental design, sampling, data management and statistical analyses

Demonstrate the importance and feasibility of decentralized approaches to priority-setting and problem-solving
Research projects can lead to improvements in the livelihood of the poor

The keys to achieving impacts through research

- Foresight and planning by the PIs and Supervisors
- Grants proceed along the research continuum
- Individual experiments work toward a larger goal
- Research products extend beyond publications

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Why is innovation in our management of organic resources important?

Two differing perspectives...

Rural perspective: As human population increases, the *per capita* availability of organic resources declines, creating need to make better use of those that remain.

Urban perspective: As human population increases, so too does the abundance of wastes, many of which remain unused or under-utilized.

*lead to the same conclusion!*
Another example of complementary interests within public health and agriculture

HEALTH EQUITY
PHSWOW

FOOD SECURITY
FORUM

HIV-AIDS effects ↔ Farm labor availability
Baseline nutrition ↔ Crop diversification
Refuse disposal ↔ Nutrient recycling
Water supply ↔ Crop irrigation

Connected projects in local areas add value to research insights
A participatory approach to solving resource management problems

- **Assess**: clients' constraints & opportunities
  - **Agents**: design survey & compile findings
  - **Clients**: summarize experience & provide information

- **Involve**: clients to assure actions are demand-driven
  - **Agents**: identify options & offer support
  - **Clients**: select & field test interventions

- **Resolve**: by offering acceptable options to clients
  - **Agents**: evaluate impacts and processes
  - **Clients**: adopt, adapt or reject intervention
Resolution of clients' problems requires more than publication as a research output.

Other important research outputs are pioneering technologies and pilot products.

Researching the impacts of promising technologies results in social benefits and may lead to improved farmer practises and products.
Phosphate Rock Evaluation Project: Moi University (J.R. Okalebo, PI)

Problem

- suitable options for P replenishment unknown
- feasibility of different replenishment strategies unknown
- Interactions between PREP-PAC components unknown
- returns and market potential of PREP-PAC unknown

Action

- convene stakeholders meeting (Woomer et al., 1997)
- survey 60 households (Makokha et al., 1997)
- assess rock P at 35 farms (Omare M.Sc. Thesis)
- Three off-station field experiments (Obura et al., 2000)
- conduct 88 on-farm experiments (Nekesa et al., 1999, 2000)
- test market PREP-PAC w/52 stockists (Mwaura et al., 2000)

Output

- Identify candidate replenishment strategies
- Formulate pilot product (PREP-PAC)
- Refine pilot product (PREP-PAC)
- Offer PREP-PAC to NGOs & stockists

1997 1998 1999 2000
Innovative research in resource management must be conducted with the client's interest foremost but with an eye toward new opportunities.
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