

Innovation, Problem
Solving and Operational
Research Strategies

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*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

after: R.J. Sternberg and T.I. Lubart. 1995. *Defying the Crowd: Cultivating Creativity in a Culture of Conformity*. The Free Press.

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.*

after: R.B. Standler. 1998. Creativity in science and engineering. www.rbs0.com/create.htm. 16 pp.

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

after: R.B. Standler. 1998. Creativity in science and engineering. www.rbs0.com/create.htm. 16 pp.

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*

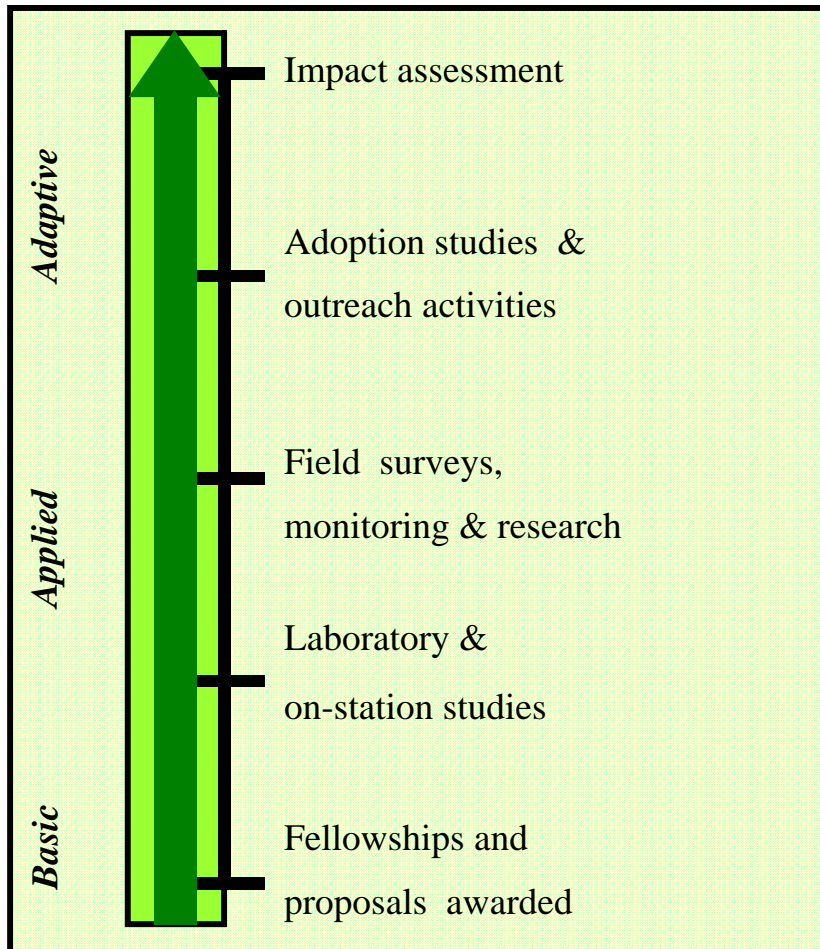
**The keys to achieving
impacts through research**

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



Paralell examples from agricultural science and population studies

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.



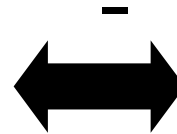
lead to the same conclusion!

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

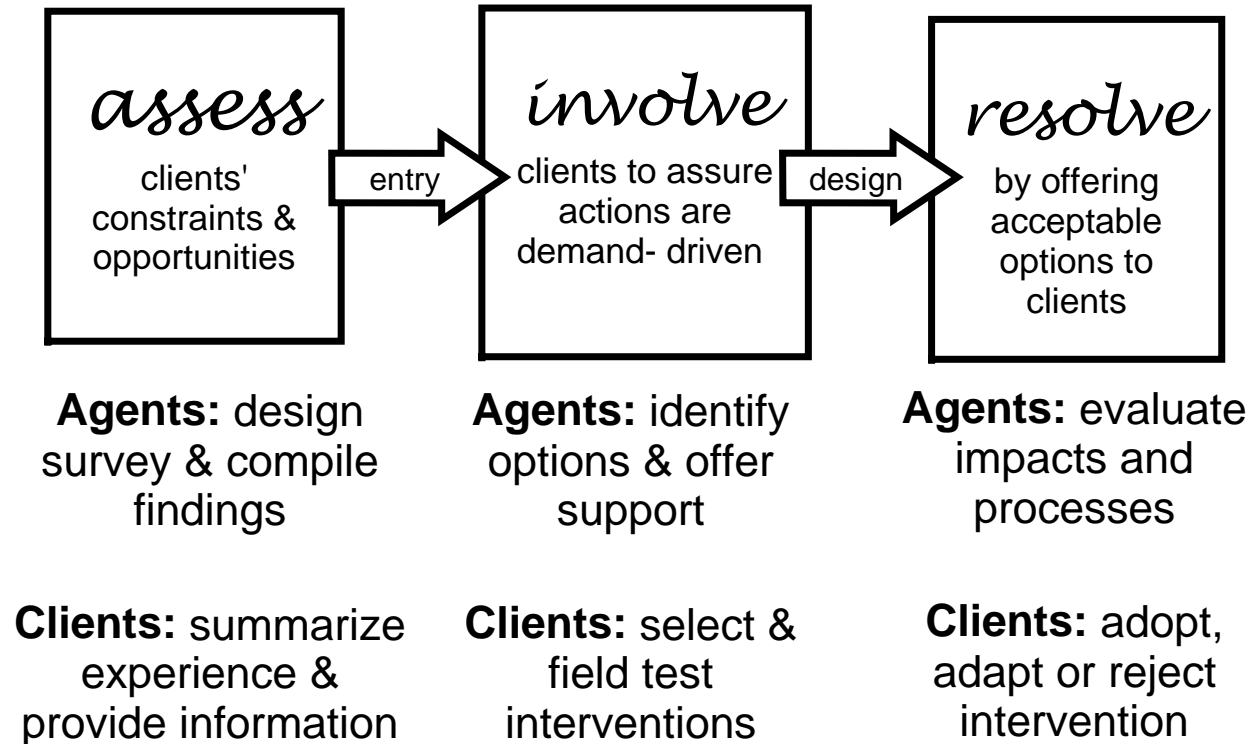
Water supply



Crop irrigation

Connected projects in local areas add value to
research insights

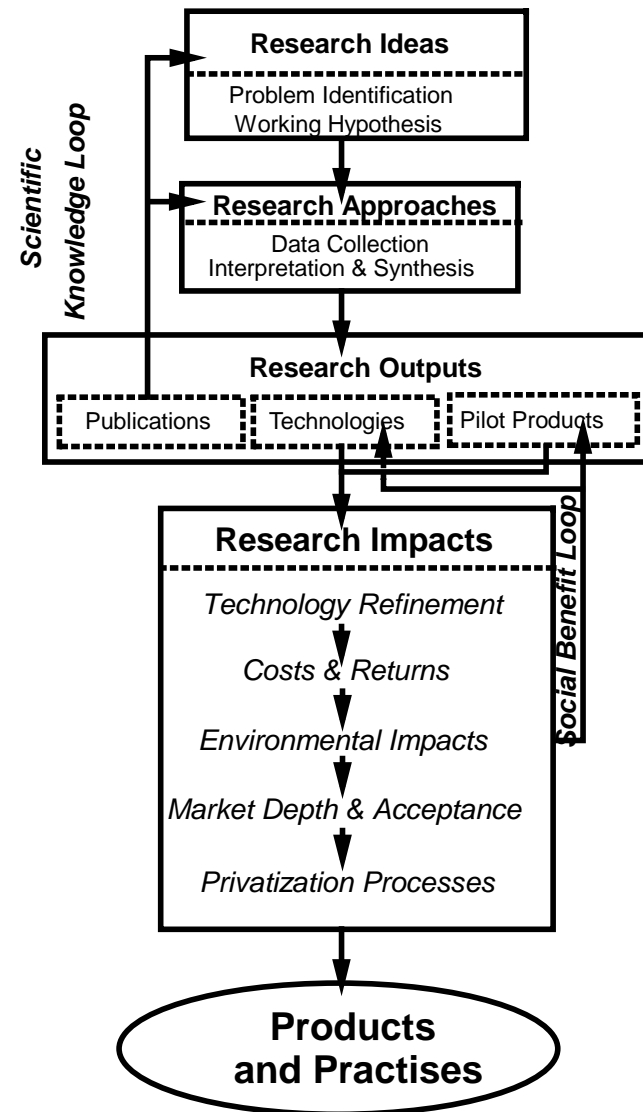
*A participatory approach to solving
resource management problems*

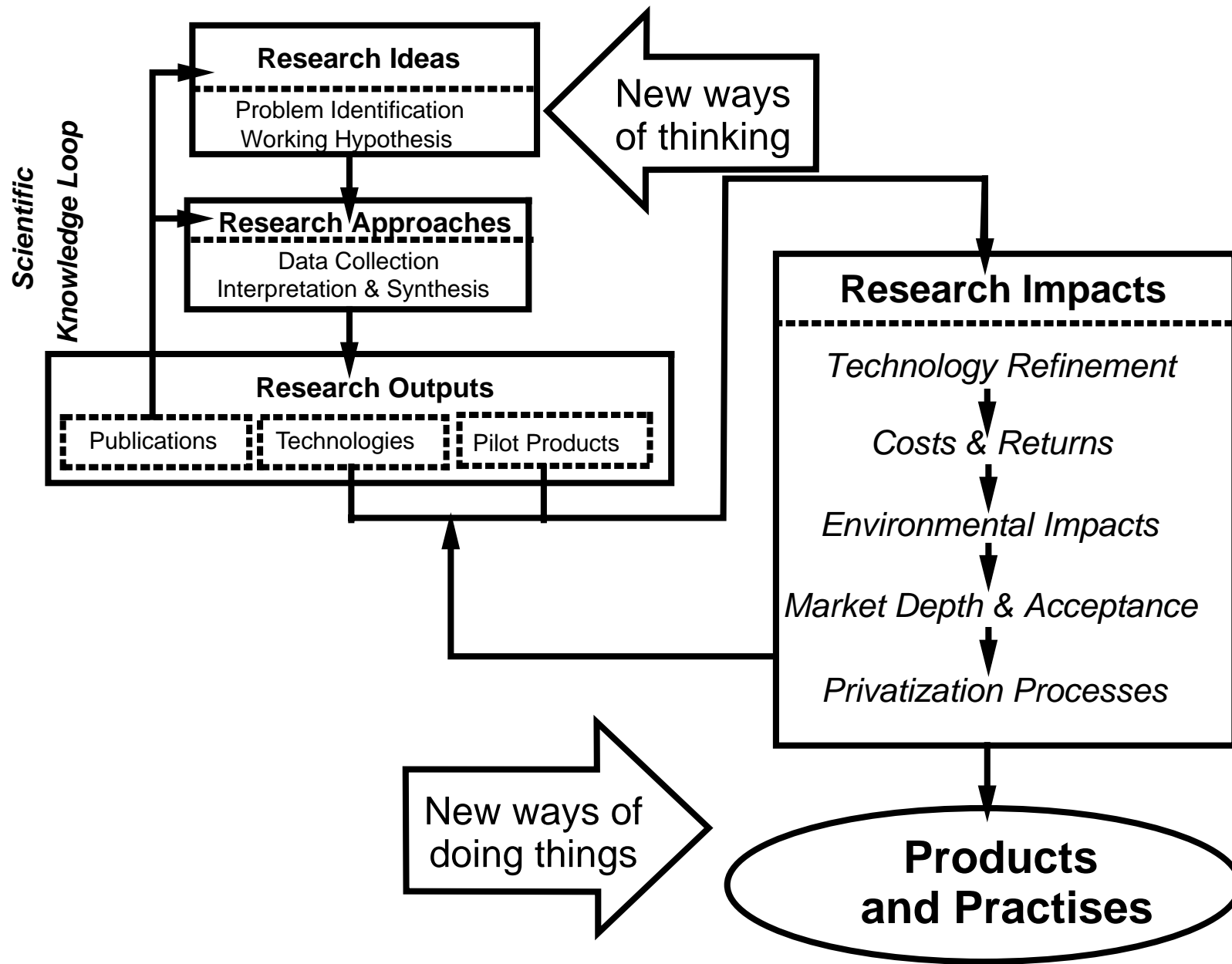


Resolution of clients' problems requires more than publication as a research output.

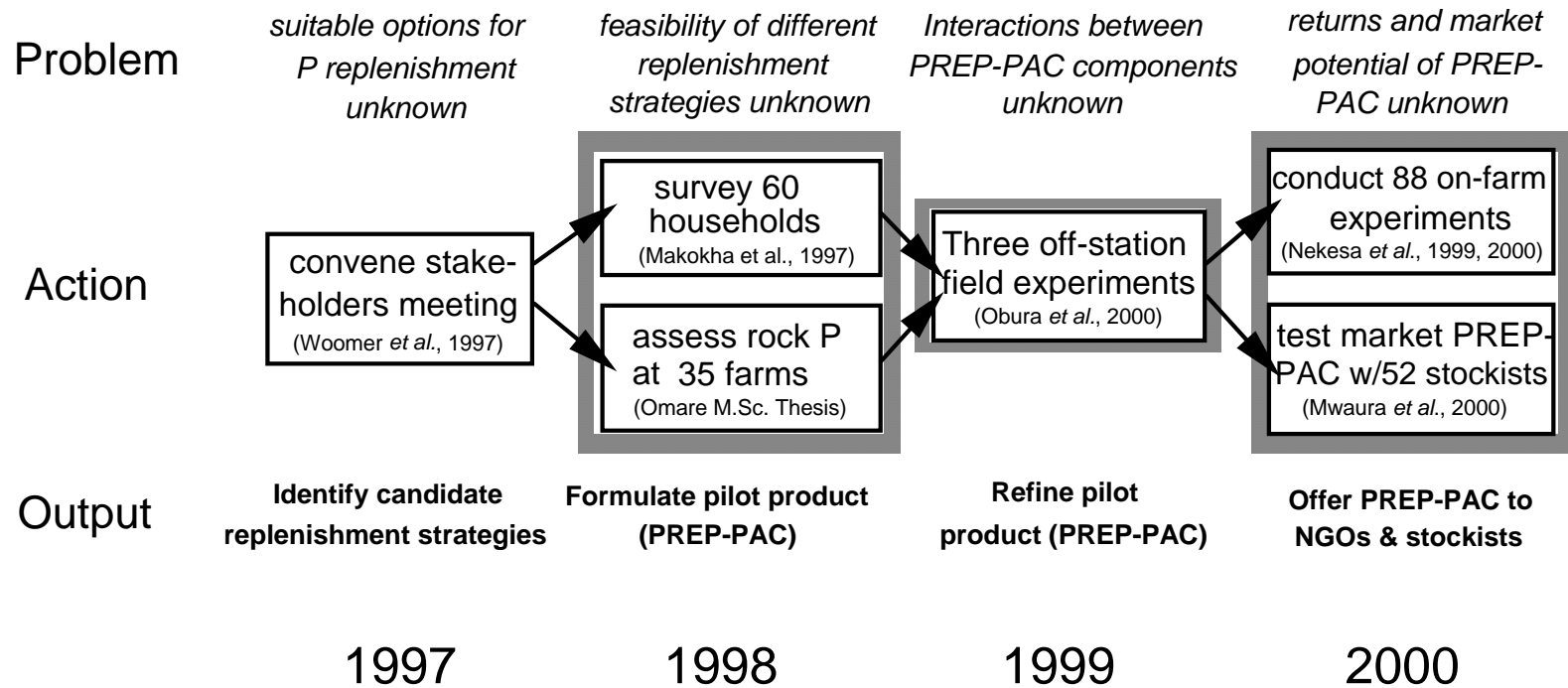
Other important research outputs are pioneering technologies and pilot products.

Researching the impacts of promising technologies results in social benefits and may lead to improved farmer practises and products.

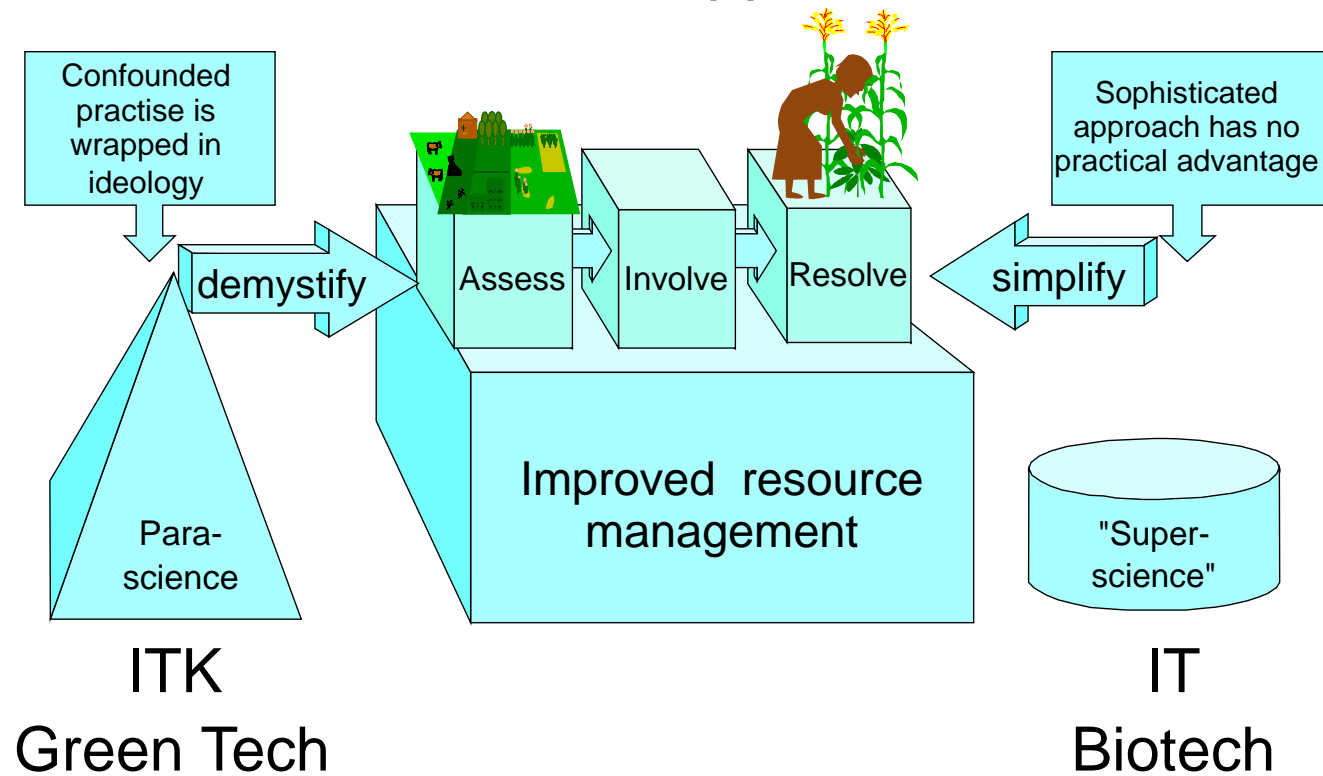




Phosphate Rock Evaluation Project: Moi University (J.R. Okalebo, PI)



Innovative research in resource management must be conducted with the client's interest foremost but with a eye toward new opportunities



search term	site matches	trends
education	29415	institutes, level
public health	2718	institutes, training
agriculture	2417	business, gov't
population studies	749	institutes, area
Africa	5651	travel, art
South Africa(SA)	2031	business, institutes
Kenya	311	travel, institutes
Africa+education	396	universities, SA
Africa+agriculture	41	business, SA
Africa+pop. studies	31	institutes, reports
Africa+public health	12	journals, training

search term	matches	trends
innovation	843	business management
technology+innovation	118	information technology
science+innovation	77	electronic journals
education+innovation	65	university institutes
agriculture+innovation	7	engineering, recycling
US+innovation	307	business, IT
Europe+innovation	12	intellectual property
Africa+innovation	2	both SA, business, IT