Participatory Plant Breeding:

A successful example of local technology innovation and adoption by combining knowledge of traditional farmers and modern scientists

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Outline

1. Historical view on plant breeding
2. Green Revolution: its achievements and limits
3. Rainbow Revolution
4. Participatory plant breeding:
   - what is it?
   - its impact pathway
5. Participatory learning and action for better agricultural knowledge systems (AKS)

Origin of Maize

Diversity developed by traditional farmers

It started ca. 9,000 years ago

Teosinte
(wild ancestor)

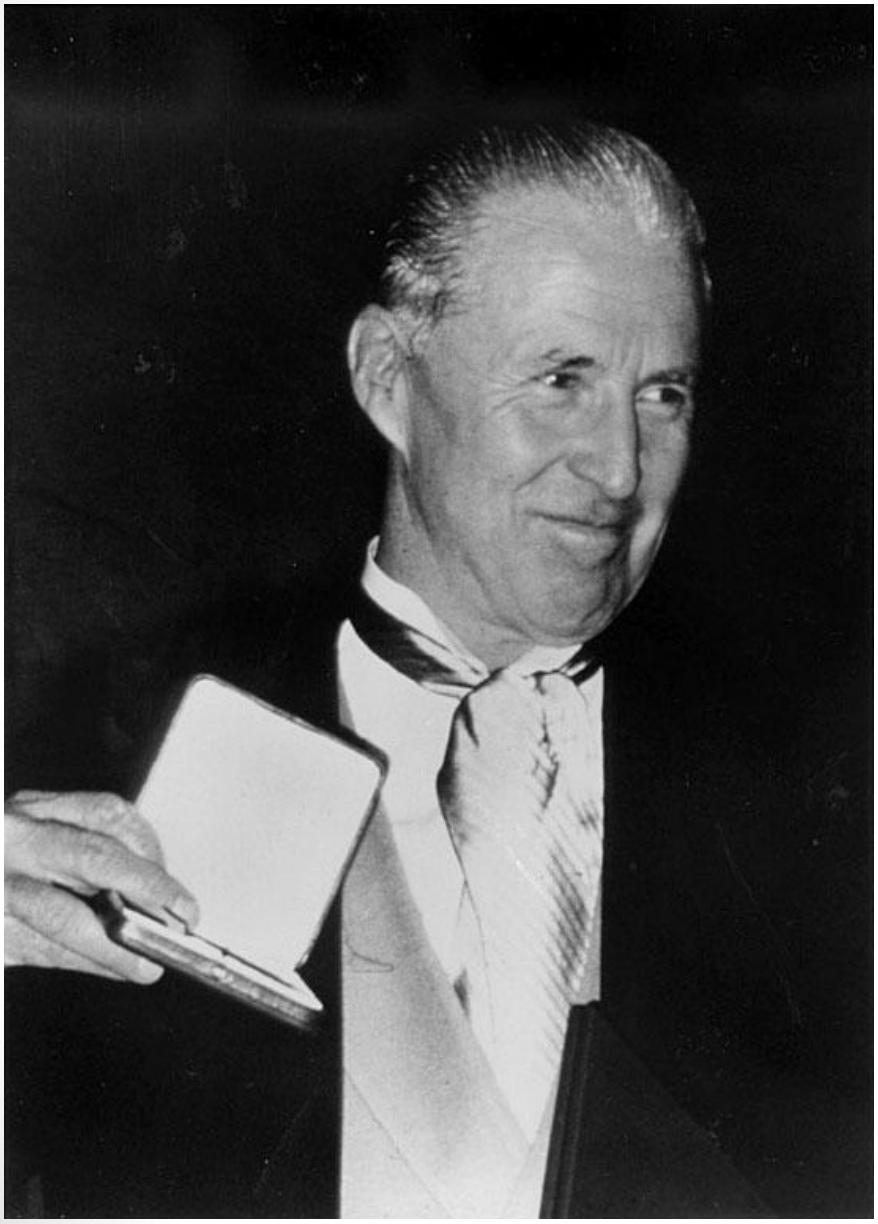
Plant Breeding

Farmers

- Main actors for 10,000 years
- Custodian of local (tacit) knowledge and diversity
- Users of varieties
- Beneficiaries
- Interest limited to own farms and villages

Breeders

- 100 years as profession
- Front runner of modern science (genetics: universal language of life)
- Seek for wide adaptation for bigger market /impact
- Technology supply-driven (liner model of technology development and transfer)



Nobel Peace Prize in 1970

Dr. Norman Borlaug
(passed away on Sept 12, 2009)
The Farther of the Green Revolution

Head of Wheat Improvement Program, International Maize and Wheat Improvement Center (CIMMYT), Mexico

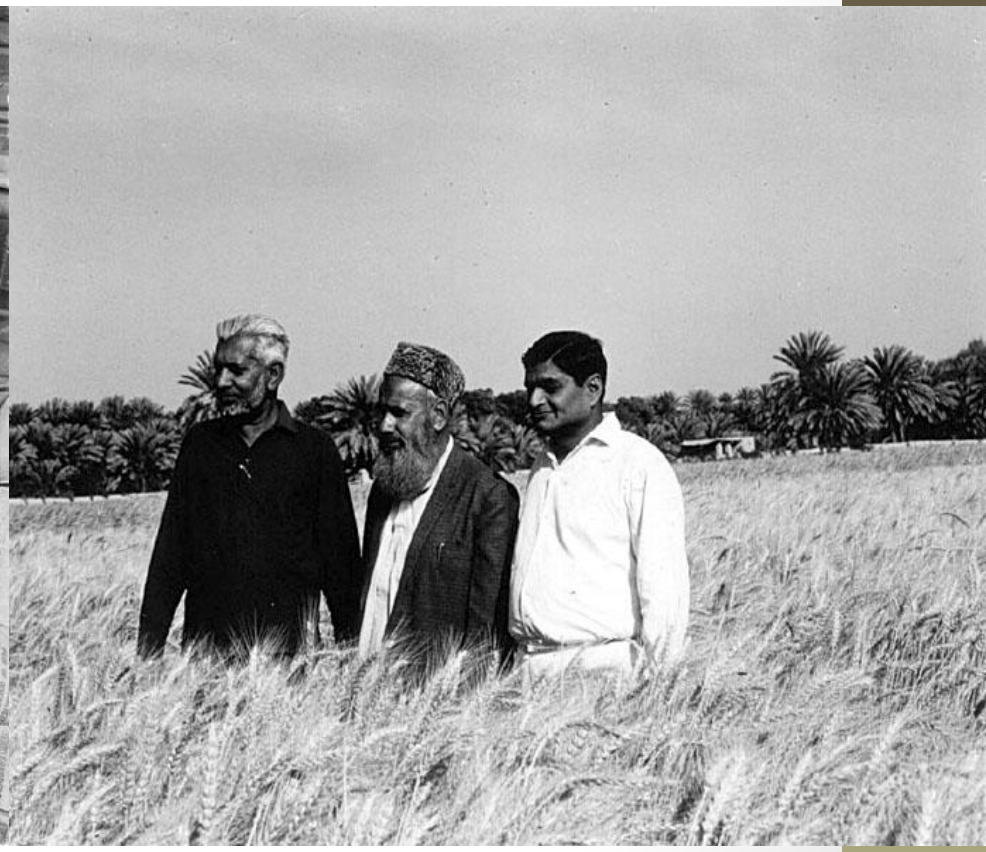
(Provided by CIMMYT)

Tall traditional wheat and high-yielding semi-dwarf wheat (middle)

Mexican wheat to South Asia

Seed shipment arrival to Pakistan

Successful adoption in South Asia

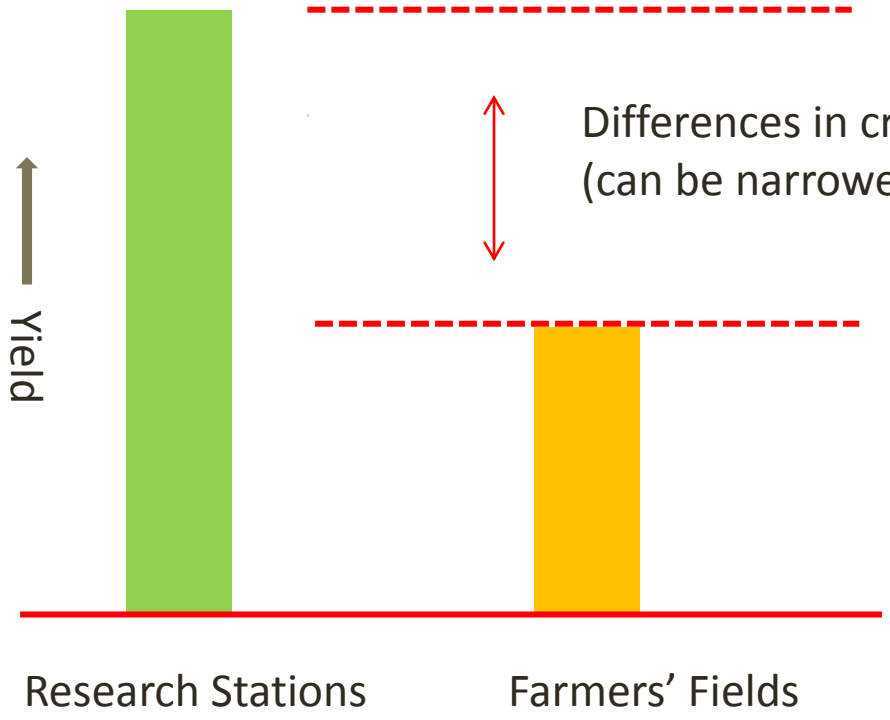


Limits of Green Revolution

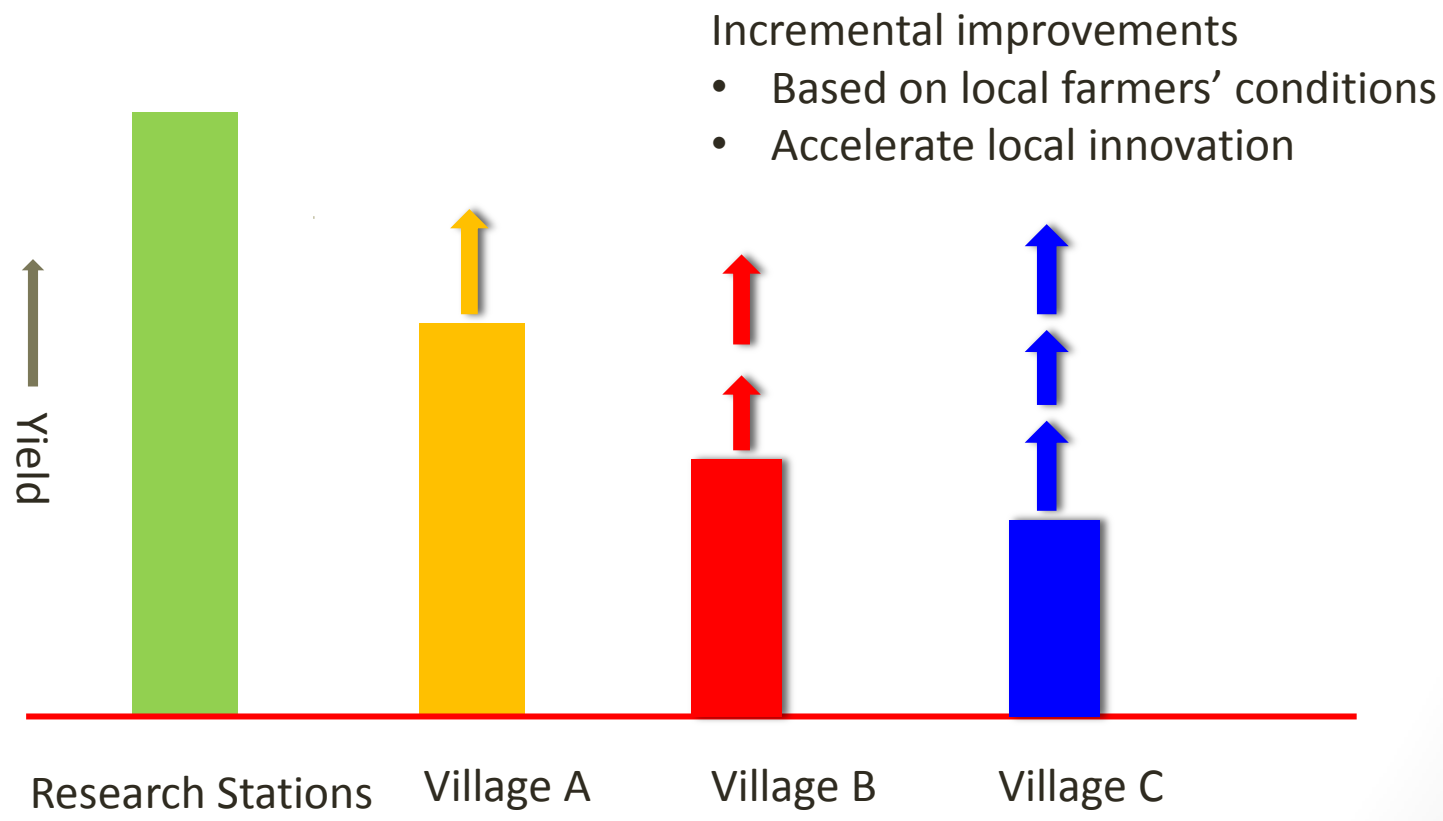
- Impact mostly confined to well-endowed areas (i.e. irrigated)
- Requiring external inputs (irrigation, agro-chemicals)
- Only marginal impact to rain-fed areas
  - Marginal and heterogeneous conditions
    - social
    - biophysical

Yield Gaps Model

- Improved variety
- Agronomic practices
- External inputs



Rainbow Revolution Model



Rainbow Revolution

- Recognizing vast diversity of agro-ecological and socio-economical conditions
  - one color does not fit for all
- Mobilizing local knowledge, technology and biodiversity
- Incremental improvements (harvesting small gains), addressing location specific constraints

What is participatory plant breeding?

- Active participation of both farmers and breeders for creation and dissemination of new variety
- Complementary roles of farmers and breeders
- Action and learning in both research stations and farmers fields
- Highly relevant when specific adaptation is sought
- Complementary to conventional breeding (especially global plant breeding)

What they contribute:

Farmers

- Clarify local needs
- Local knowledge and genetic diversity
- Testing on their fields under their management
- Local adaptation
- Local institutions/system

Breeders

- New (exotic) genetic resources
- Difficult crosses
- Long-term view (e.g. climate change)
- Key traits (e.g. heat tolerance)
- Scientific evaluation, interpretation
- Cross-region activity
- Scale-up opportunity

A Japanese scientist discussing Mother-Baby trials with farmers in Niger

Women evaluating NERICA rice varieties:

Gender-sensitive approach

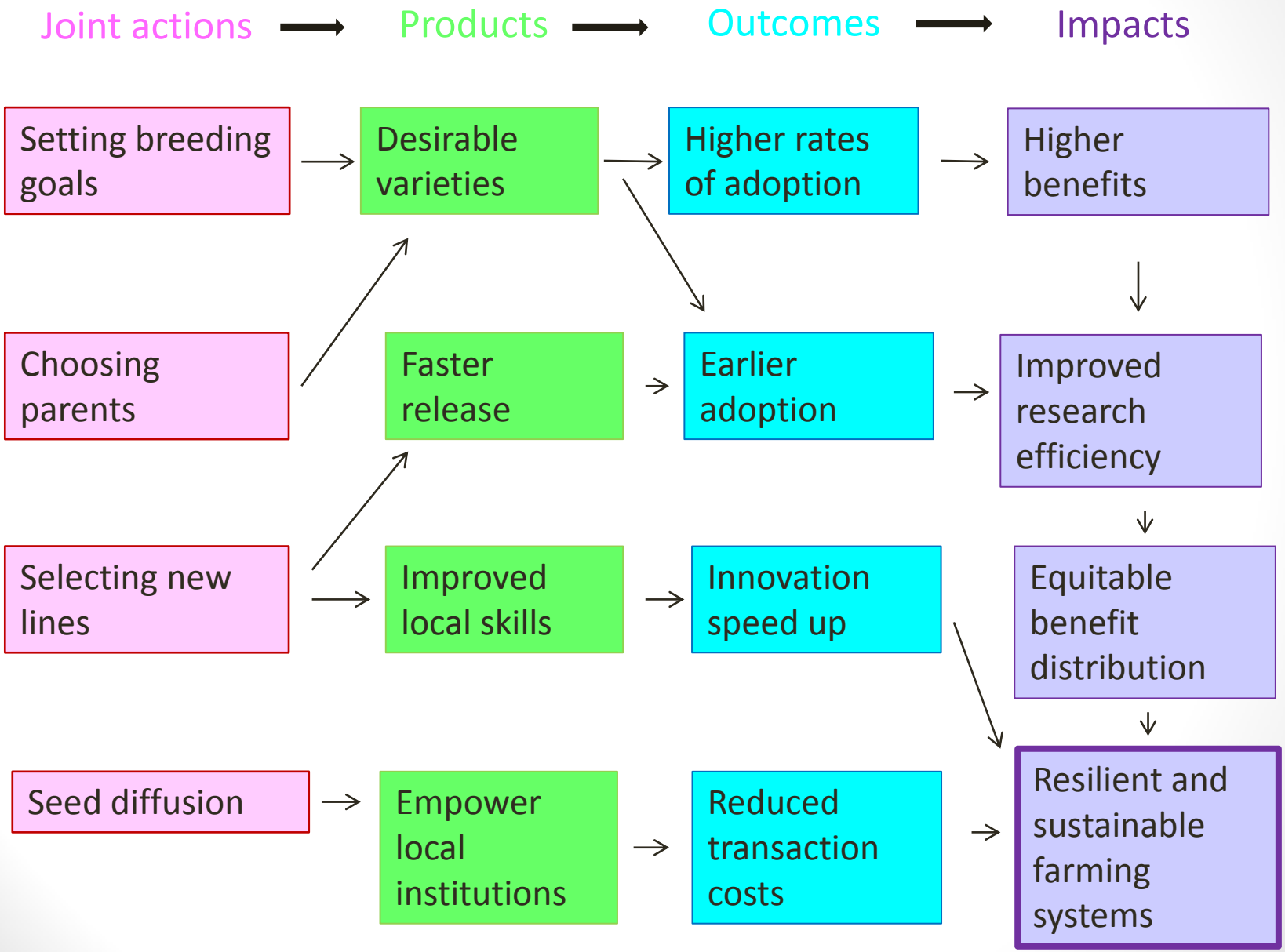
Provided by Africa Rice Center (WARDA)

Men evaluating rice varieties

Provided by AfricaRice Center(WARDA)

The feed back is used by the scientists

Participatory breeding Impact pathways (modified from Ashby 2009)



Participatory Plant Breeding: A successful case for promoting AKS

- Mobilizing tacit knowledge
- Combining both informal and formal sector knowledge, skills and institutions
- Mobilizing knowledge, resources and institutions at both local and global levels
- Cost-effective innovation system addressing local needs, still global impacts