Agricultural Training and Education to Feed the Future:

SANREM Educating for Sustainable Intensification

USAID FROM THE AMERICAN PEOPLE

VirginiaTech Invent the Future

Outline

Background/context

Accomplishments to date

Future challenges

Lessons from university self-assessments

Innovations in education and training

Title XII Legislation

Declaration of Policy-Sec. 296(a)

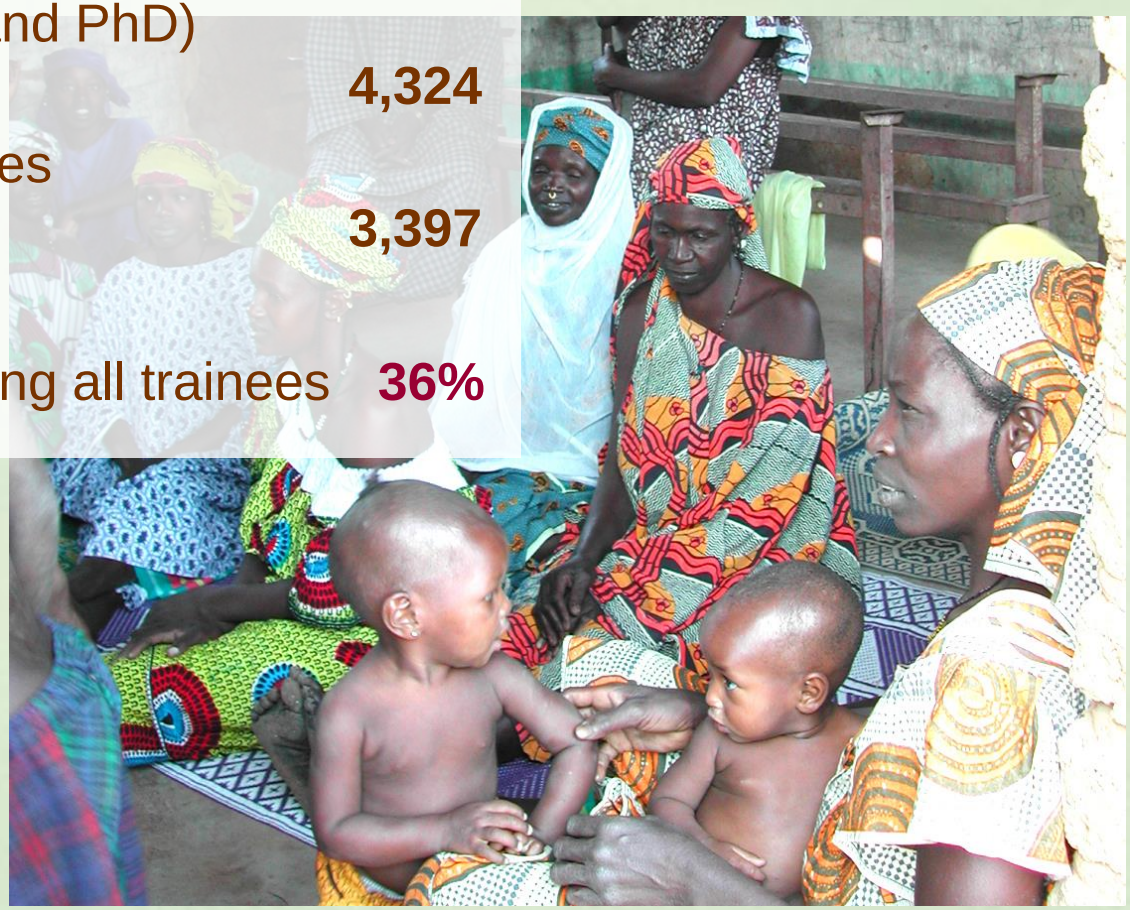
(2) Improved **human capacity** and **institutional resource development** for the global application of agriculture and related environmental sciences.

Comparative Advantage of Innovation Labs in Human Resource Development

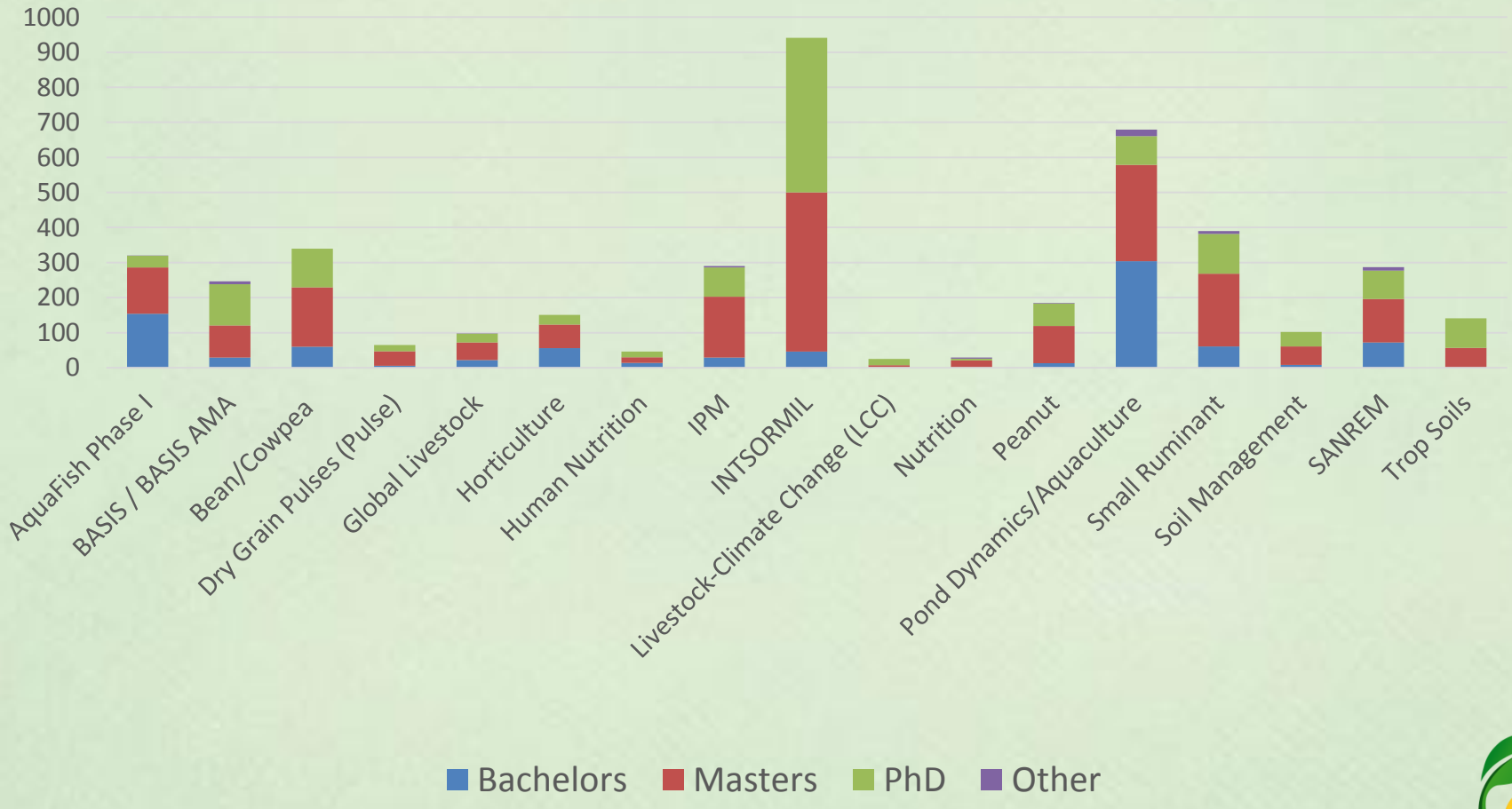
- Integration of academic, research and outreach in degree training programs
- Focus on finding solutions to private and public sector problems
- Collaboration with diverse partners (e.g., agribusiness, government institutions, IARCs, NGOs, foundations, etc.)
- Long-term institutional collaborative relationships

CRSPs Degree Training

	Total across ten CRSPs
Total Degrees (BS, MSc and PhD) awarded (1978–2014)	**4,324**
Total post-graduate degrees awarded (1978–2014)	**3,397**
Proportion of women among all trainees	**36%**



Distribution of CRSP/IL Degrees – 1979-2014



SANREM CRSP Phase III-IV Degree Trainees

	Bachelor's	Master's	Ph.D.	All
Men	44	50	31	125
Women	35	44	38	117
TOTAL	70	94	69	**242**

48 % Women

SANREM CRSP Phase III-IV Short-term Trainees

Country	Men	Women	Total
Bolivia	4,897	3,480	8,377
Cambodia	482	284	766
Ecuador	3,805	2,129	5,934
Ghana	459	239	698
Guatemala	12	6	18
Haiti	1,495	1,054	2,549
Honduras	20	15	35
India	626	357	983
Indonesia	366	324	690
Kenya	604	372	976
Lesotho	1,601	1,451	3,052
Mali	70	47	117
Mexico	47	29	76
Mozambique	4,051	3,911	7,962
Nepal	333	188	521
Peru	779	596	1,375
Philippines	2,160	1,398	3,558
Tanzania	63	42	105
Uganda	1,512	1,498	3,010
USA	294	200	494
Vietnam	359	223	582
Zambia	18,843	19,016	37,859
TOTAL	**42,878**	**36,859**	**79,737**

80,000 trainees

22 countries

46 % women

Sustainable Intensification Pretty et al. (2011)

"……producing more output from the same area of land while reducing the negative environmental impacts and at the same time increasing contributions to natural capital and the flow of environmental services"

Seven key components of successful sustainable intensification are:

- **combining science and farmer inputs**
- **creating novel social infrastructure**
- **improving farmer knowledge and capacity**
- **engaging with the private sector**
- **focusing on women's education**
- **ensuring availability of microfinance**
- **ensuring public sector support for agriculture**

To what extent are our *traditional practices of agricultural education and technology transfer applicable* to the promotion of sustainable intensification?

The Transition to Complex Adaptive Systems

In the early 20th century, Quantum theory taught us that (instead of being the objective observers of the universe) we are participants along with the objects of our observation.

It is only now that the implications for the applied sciences are becoming apparent.

This involves not only:

- the traditional sciences and new partners

but also:

- interactions and feedback mechanisms
- across multiple systems and scales

All partners are learning and adapting simultaneously

The Transition to Adaptive Management

Farmers are the key actors.

They face dynamically **changing climate and markets**.

They need to appropriate new science and technology
so that they can make sustainable adaptations

Why does the farmer need to know about how agricultural technology works beyond simply how to use it?

S/he may want to use it to solve another problem.

Waiting for researchers to figure out what to do next will likely cost the her farm or his livelihood.

Fostering Technical Change in Agriculture

- How does adaptive management change agricultural education and training?
- What is the role of learning in the process of innovation?
  - Is learning a matter of information transfer resulting in adoption of innovations?
  - Or, is learning a matter of developing capacities for on-going adaptation?
- Whose capacities should be developed?
- Where, in fact, does innovation occur?

The Educational Challenge

- Change agent perspectives

  Agricultural change agents are trained in conventional production practices and that are conveyed as memorized scientific “facts”

- Farmer agro-ecological perspectives

  agro-ecological knowledge and its application in production informs farming discourse at the local level

- Conservation agriculture requires adaptation

  CA doesn’t fit well with that memorized knowledge and challenges conventional farming wisdom

Lessons from institutional self-assessments

Instructional quality is characterized by:

- **A lack of syllabi (and their use)**
- **A lack of coherence between**
  - **Learning objectives**
  - **Pedagogical practices**
  - **Student assessment**

Although experiential learning is valued and emphasized by faculty and administrators, the tradition of memorization is profoundly engrained.

Quality control efforts are only just beginning across Africa.

Lessons from institutional self-assessments

Underfunding agricultural education leads to **low morale and rent-seeking behaviors** of talented faculty members.

- Individuals take on teaching assignments across multiple institutions leading to instructional reliance on non-permanent faculty.

- Others seek and win externally-supported research projects that don't compensate the institutions for the time lost to instruction.

There is a lack of **incentives for quality** (student-oriented) **teaching** suggesting that even minimal rewards may help to re-focus efforts.

Innovations in Graduate Training

1. **New models for graduate degree programs**
   - Joint or dual institutional degree programs
   - Sandwich programs
   - Distance education programs
   - Life-long professional development programs

2. **Changes in Graduate Program Structure**
   - Professional training vs. research focus
   - Multidisciplinary vs. disciplinary
   - Value Chain vs. subsector focus
   - “Designer” graduate programs for target populations

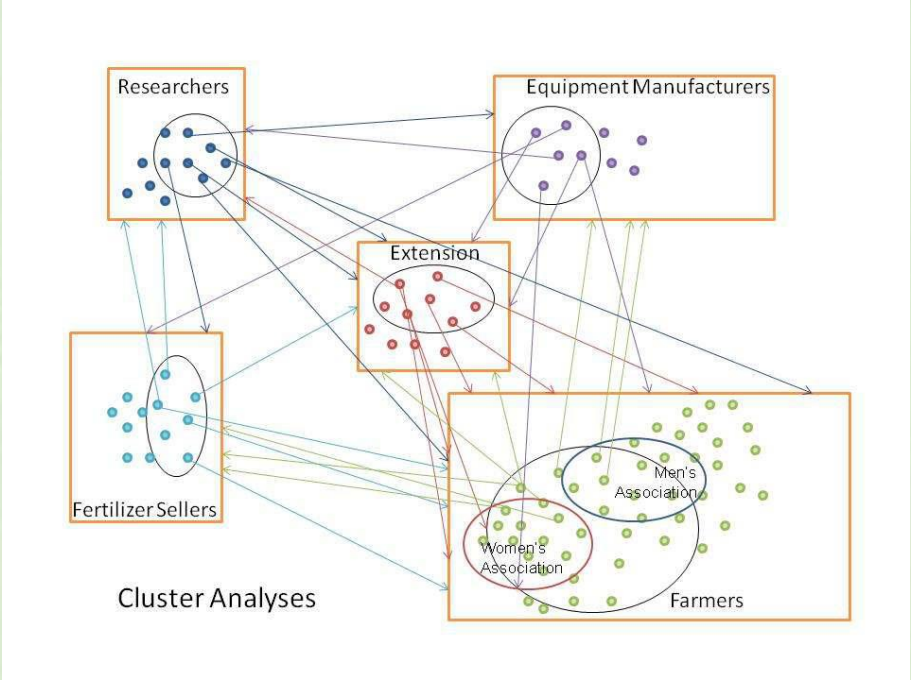
3. **Value Addition to Host Country Graduate Programs**
   - Research opportunities in U.S. university laboratories
   - Internships in U.S. agribusinesses
   - Participation in U.S. university outreach programs (Land-Grant Model)
   - U.S. university faculty instruction of courses at HC universities

Innovation Networks

Innovation networks configure actors to facilitate the flow of information and access to resources and services

Composed of:

- Farmers
- Farmer organizations
- Extension
- Input suppliers
- Researchers
- Agencies
- Policymakers



Innovation Platforms

- Create a forum for social learning
- Establish a foundation for negotiation
- Facilitate network connections
- Foster farmer-market connections

Innovations in learning for agricultural professionals
(from suppliers to producers to processors to consumers)

1. **New models for local innovation**
   - Innovation networks
   - Cluster development among value chains
   - Peer-to-peer training; farmer field schools
   - Public/private partnerships

2. **Developing communities of practice**
   - Bridging across localities
   - Connecting local with regional and national partners
   - Creating spaces for innovation

3. **Negotiating new roles and skills for facilitators and learners**
   - Local leadership development
   - Support and sustain new brokerage roles
   - An enabling national policy environment

Innovation Brokers

Main Functions of Innovation Brokers:

- Analyzing the context and articulating demand
- Bringing together stakeholders into networks
- Facilitating interaction for innovation

Challenges include:

- Formal education still reinforces top-down approaches
- Acquiring and maintaining funding
- Maintaining neutrality

21st Century Land Grant Legacy

- Leaves behind:
  - Intellectual leadership in transdisciplinary negotiation
  - Strategic and creative partnerships involving all stakeholders
  - An engaged next generation of agricultural leaders
- Integrates research/teaching/action into locally responsive institutions
  - Existing models appear to be largely NGO-led
- Maintains the role of the ‘honest broker’
  - Educated negotiation
  - Communicative competence of all partners is critical

Thank you for your attention.

Comments/questions welcomed