

Frontiers of Science – Sustainable Agriculture in the 21st Century

by

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Frontier Science for Agriculture: Challenges and Opportunities

Key Points

1. Status and Challenges new and old
2. Mobilizing the best science for sustainable agriculture and meeting the Millennium Development Goals

Status of Agriculture:

Agricultural Knowledge, Science and Technology (AKST) have contributed significantly to nourish, provide clothing, shelter and **energy to an ever increasing and demanding population through:**

- **Productivity and land area increases for major staples, vegetables, animal products, fiber and forestry species (energy often a side product)**

.....while also providing economic growth leading to reduced poverty and hunger as well as health benefits

AKST also had some positive impact on habitat and biodiversity conservation

Status of Agriculture:



~~Also characterized by Disconnects, both~~
the in developed and developing world

Disconnects between **agriculture** and
the **environment**,

Disconnects between **consumers** and
farmers or land and cities;

Disconnects between **policies** and
expectations.

Do not disconnect.

Status of Agriculture:



Also characterized by Disconnects, both the in developed and developing world

Disconnects between **agriculture** and the **environment**:



- water
- energy
- biodiversity
- soil
- productivity / sustainability
- ecosystem service / multi-functionality



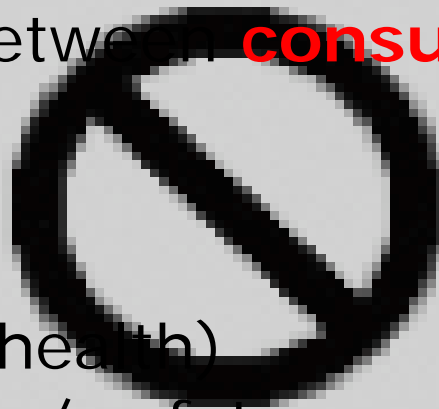
Do not disconnect.

Status of Agriculture:



~~Characterized by Disconnects, both the in developed and developing world~~

Disconnects between **consumers** and **farmers**:



- **food prices**
- externalities (health)
- trust in quality / safety

Do not disconnect.

Status of Agriculture:



~~Characterized by Disconnects, both the in developed and developing world~~

Disconnects between **policies** and **expectations**.

- investments in research & education
- pro-poor investments
- investments in infrastructure
- trade and carbon trade
- incentives (biofuels)



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Sustainable Development Goals

(From the IAASTD.org multi-stakeholder process)

- Decrease hunger and improve health and human nutrition
- Decrease poverty and improve rural livelihoods,
- Increase environmental sustainability
- Improve social sustainability, increase equity
- Strengthening governance mechanisms for improved institutional and organizational arrangements

While recognizing the consequences of further population growth, changing dietary needs, **energy transition** and climate change on these efforts

Challenges for Sustainable Development and derived Opportunities for AKST

The development challenges require that **AKST (including new frontier science)**:

- address the multifunctionality of agriculture (i.e., the foundation for communities, economies and a host of ecological relationships)
- support effective management of physical and natural resources, the internalization of externalized costs and the continuing availability of, and access to, public goods, such as biodiversity, including germplasm, and ecosystem services
- Take into account the changing circumstance under which agriculture operates (+/- of globalization and development)

Challenges for Sustainable Development and derived Opportunities for AKST

The Challenges ahead will require:

- integrated application of existing science and technology developments (AKS&T and beyond)
- new approaches for agricultural and natural resource management
- **development and application of new AKS&T (-ict, biotech, nanotech, etc....)**
- involve all stakeholder and reinforce institutions

... these represent opportunities for the development community and stakeholder **(including the private sector)** to contribute the needed new and sometimes revisited AKS&T

Turning challenges into opportunities for sustainable development by mobilizing global AKST

....require serious new thinking and handling

- Strategic thinking to harness innovations and create synergies
- Be part of the solution by being responsible and taking the longer view.....think in systems and holistic looking beyond agriculture
- Involve the communities at large in the decision making with an emphasis on the next generation



Thank you for your attention...

You cannot solve the problem with the same kind of thinking that created the problem

Albert Einstein