What do Food Systems Designed for the 21st Century Look Like?

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Food or Environment - Who will be the winner?

- unequal distribution of food
- conflict over control of the world’s dwindling natural resources present a major political and social challenge to governments and policy makers likely to reach crisis status
- as climate change advances
- world population expands.
- energy, fertilizers and pesticides increasingly expensive
Essentially, global agricultural production must be increased substantially to meet rising demand, each year, but it must be achieved with a decreasing impact on natural resources and the environment.

- Water resources/rivers stressed
- Loss of production due to land degradation is 19 million tons grain per year

Food for extra 70 million people each year
Figure 2. Schematic gains and losses balance out to yield the global food production. (Doos undated)
To avoid the emerging food crisis without further and increased damage to the environment.....

- at a time of rising costs for energy
- Evidence that peak P is near
- within a spectre of climate change
Food or Environment

This is perhaps the greatest challenge yet to face

- agricultural sciences
- food policy
- society
DECINE IN PRODUCTIVITY GAINS MUST BE REVERSED

OVER 40 YEARS = 1.75% pa
Currently = 1% pa

NEEDS TO BE BETWEEN 2-3% pa
Whole Systems Science Solutions Urgent

- We’ve got to look at ecological, energy and water systems as a whole to appreciate the impacts or the footprint of our food on our natural resource base.

- This was a core message from the recent International Assessment of Agricultural Science & Technology (IAASTD) report.
WHOLE SYSTEM PLEASE
River and Water Resource Management

Water in
- Irrigation
- River & Wetlands
- Groundwater
ARE ONE

Solutions to whole complex system are needed !!!

Healthy River, Estuaries & Fisheries

$Town/City

$ Irrigation

$ Drainage

$ Lands

$
Whole Systems Science
Solutions Urgent

- It’s clear that business as usual is not an option.
- For too long, the emphasis of agricultural science has been on delivering innovation and technologies to increase farm-level productivity.
- Too little attention has been paid to a more holistic integration of natural resource management with food and nutritional security (IAASTD, 2008).
- Fortunately, there is increasing recognition that this current mode of operation requires revision.
Segregate

Rotate

Integrate

NATURAL ECOSYSTEMS

DRYLAND FARMING SYSTEMS

BIOLOGICAL COMMUNITY

MUCH RECYCLING

NON-LIVING SURROUNDINGS (air, soil, water)

Mainly water

Organic matter input

Organic matter output

BIOLOGICAL COMMUNITY

SOME RECYCLING

NON-LIVING SURROUNDINGS (air, soil, water)

Mainly water

Water, Fertilizers, Pesticides

Water, Soil particles, nutrients, pesticides

Water and solute flux

Integrate

Segregate

Rotate
Challenges for Agricultural Science

Sorghum established with minimum tillage and a trash blanket is an example of improved farming practice to cope with climate variability and improve soil health. Development like this is needed to increase food security and reduce damage to the environment. *Photo: Matt McKenzie*

Millet sown into native pasture, helps to integrate productivity with the ecological processes of the landscape. *Photo: Matt McKenzie*
Pricing Food for Sustainability

- Rewarding the provision of ecosystem services is a good start
- We need investment in the economic valuation of ecosystem services
- With a market for these services, farmers in the future will not only be paid for the goods they produce but also for the services they deliver through the management of healthy landscapes, rivers, wetlands and estuaries for the public good
A future form of sustainable agriculture

Pricing Food for Sustainability

- Cost of food doesn’t include cost of maintaining natural resource base.

- We need governments to adopt policies that create incentives for sustainable practices and costs to the environment being internalised.

- Traditionally, food prices do not include the cost of environmental damage. The natural resource base (land, water, biodiversity) for agriculture continues to suffer.

- We can’t afford to keep running down the systems that feed us.
Pricing Food for Sustainability

- For as long as the cost of maintaining and improving the natural resource base in agricultural systems is not included in the price of food, farmers will never be able to farm sustainably and profitably.

- We need market and trade policies that remove perverse subsidies.
Pricing Food for Sustainability

- regulatory framework to ensure food production minimises damage to natural resources & environment
- need an Australian standard for sustainable agriculture for local & imported products
- ‘Australian Sustainable Agriculture Standard’ must include whole life cycle analysis of energy, water, land & biodiversity inputs into production
Some Ways Forward

- Expand this reformed R&D effort
- Australian Science has important place to play
- Reform of markets and regulations to ensure cost of food includes the costs to natural resources and environment
- Orientate to a more market-based system of production, distribution and consumption of food
Conclusion

- It is a time of Change.
- We cannot afford to be “asleep at the wheel!”
- It is a time for turning Challenges into Opportunities. We will have to make choices. It will pay to be on the front foot.
- Adaptation and innovation will be important.
- It is not the time to panic!
- But it is the time to think and change.
References