FOOD AVAILABILITY AND NATURAL RESOURCE USE

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FAO/OECD Expert Meeting on Greening the Economy with Agriculture
Paris, 5 – 7 September 2011
DEFINITION OF AVAILABILITY

• Food availability is defined as sufficient quantities of food of appropriate quality, supplied through domestic production or imports, including food aid
• In a green economy context, food availability is closely linked to the availability and use of natural, human and economic resources, especially scarcity of natural resources
Trends in land use 1961-2009
The use of resources by agriculture 2010

- 12% used for crop production of world’s land surface
- AG uses 70% of all water withdrawn of total world’s water uses
1/3 of the world’s population live already under water scarcity
Biodiversity, Health and Nutrition

• Hidden hunger: missing micronutrients
  – More than 2 billion worldwide
  – Mostly women and children

• Double burden: diseases of “affluence”
  – Type 2 diabetes, obesity, heart disease, cancers

GLOBAL GRAIN PRODUCTION, FAO 2008

Rice + Wheat + Maize = 90.1 %

FOOD BASKET is decreasing in diversity (and equity)
Systems At Risk
NATURAL RESOURCE AVAILABILITY IN 2050

• Growing scarcities: agricultural land (40%), forests (31% of land), irrigation water (> 70%), marine fisheries (52% fully exploited, 32% overexploited, depleted or recovering), biodiversity at stake
• Degraded lands in Southeast Asia (~13 mi ha), through peat composition, are global hotspots for carbon vulnerability (30% GHG)
• N budget differences: N-deficiencies and N-surpluses (60% N₂O)
• 80% P currently used by agriculture: peak P? (from 3 countries)
• Shortages = price increases and sudden and unpredictable effects
THE FAO AT2030/50 PROJECTIONS

• The FAO AT2030/50 projection
  • Natural resources will be available for meeting global food demand: 3130 kcal per capita of 9 billion
  • A global equilibrium between food production and use
  • 65% consumption increases 2000-2050: 224% in SSA, 112% Near East/Africa and 105% in South Asia
• Geopolitical, socio-economic (prices!), technical conditions will be compounded by negative pressures from climate change
ALTERNATIVE SCENARIOS

IFPRI, UNEP, CIRAD/Agrimonde scenarios agree on higher consequences of shocks in resource availability

• Imbalances in supply and demand, especially regionally
• Resource boundary impact on prices: -5% of grain yield due to climate would increase grain price by 25%
• Reducing the risk of ruptures in overall food availability requires a transition to more efficient production systems
FROM MODELLING AVERAGE AVAILABILITY TO RISK PREVENTION

• FAO/IIASA Global Agro-Ecological Zone framework to assess impact of climate change on suitability of potential agricultural land, environmentally suitable production patterns and yields

• On top of climate uncertainties, still poorly understood natural resources dynamics, regional imbalances, access issues …
Those with least resources have least capacity to adapt and are most vulnerable
Ecological intensification

Intensification can be achieved either through the intensification of external input use or intensification of ecosystem services for enhanced system performance.

Ecological intensification is defined as maximization of primary production per unit of land without compromising the ability of the system to sustain its productive capacity in the long-term.
Availability
System’s capacity to produce food

Efficiency
of resource use assessed under normal conditions in terms of
- Physical yield per unit of input (productivity)
- Commercial yield per unit of input
- Life quality of producers and consumers

Resilience
to environmental and macro-economic risk assessed under disturbed conditions in terms of
- Physical yield per unit of input (productivity)
- Commercial yield per unit of input
- Life quality of producers and consumers

Coherence
Assessed in terms of
- Ecological balance (water, soil, habitat, nutrient, energy)
- Economic integration
- Household labour

Diversity
Assessed in terms of
- Biodiversity
- Income diversification
- Knowledge

Functional properties

Connectedness
Assessed in terms of
- Transboundary pollution and environmental connectedness
- Financial and input dependency
- Participation and social integration

Structural properties
SCALING-UP CHALLENGES

• Management options will need to include gradual shifts from fossil fuel based and synthetic agricultural inputs towards informed use of ecosystem goods and services and green inputs

• Scaling-up alternative systems will require:
  • Creation of local markets for “alternative” products
  • Ecological knowledge of food systems
  • Upfront financing to sustain transition phases
TRADE ISSUES

• Trade is essential to food availability, especially where there are local or regional scarcities of natural resources and inputs.
• There is an increasing concern in developing countries to reach self-sufficiency to be resilient against global price shocks.
• At the G8 Summit held in Italy in July 2009, USA President Barack Obama said “there is no reason that Africa cannot be self-sufficient when it comes to food.”
TRADE MEASURES (2)

- Avoid risk of trade protection related to green economy: carbon tariff, unequal R&D subsidies, environmental standards and compliance for aid, loans and debt relief
- Going beyond carbon markets for bundled ecosystem and social services (e.g. payments for more efficient animal waste management systems; more efficient fertilizer management)
- Access to, and transfer of, green technology to: support to local technology design capacity, enhance the pool of knowledge to all
ACTION AREAS

✓ The technological innovations of GEA include both environmental science (e.g., agroecology and marine multi-species dynamics) and green inputs, meaning safe, environment-benign substances designed to maximize energy efficiency and minimize waste disposal.

✓ Institutional and financial policy measures should be put in place to support the production of more food with less resources, including global agreements on food production and trade; national standards, taxes, incentives and public procurement of green foods; and landscape-level PES.
THANK YOU FOR YOUR ATTENTION