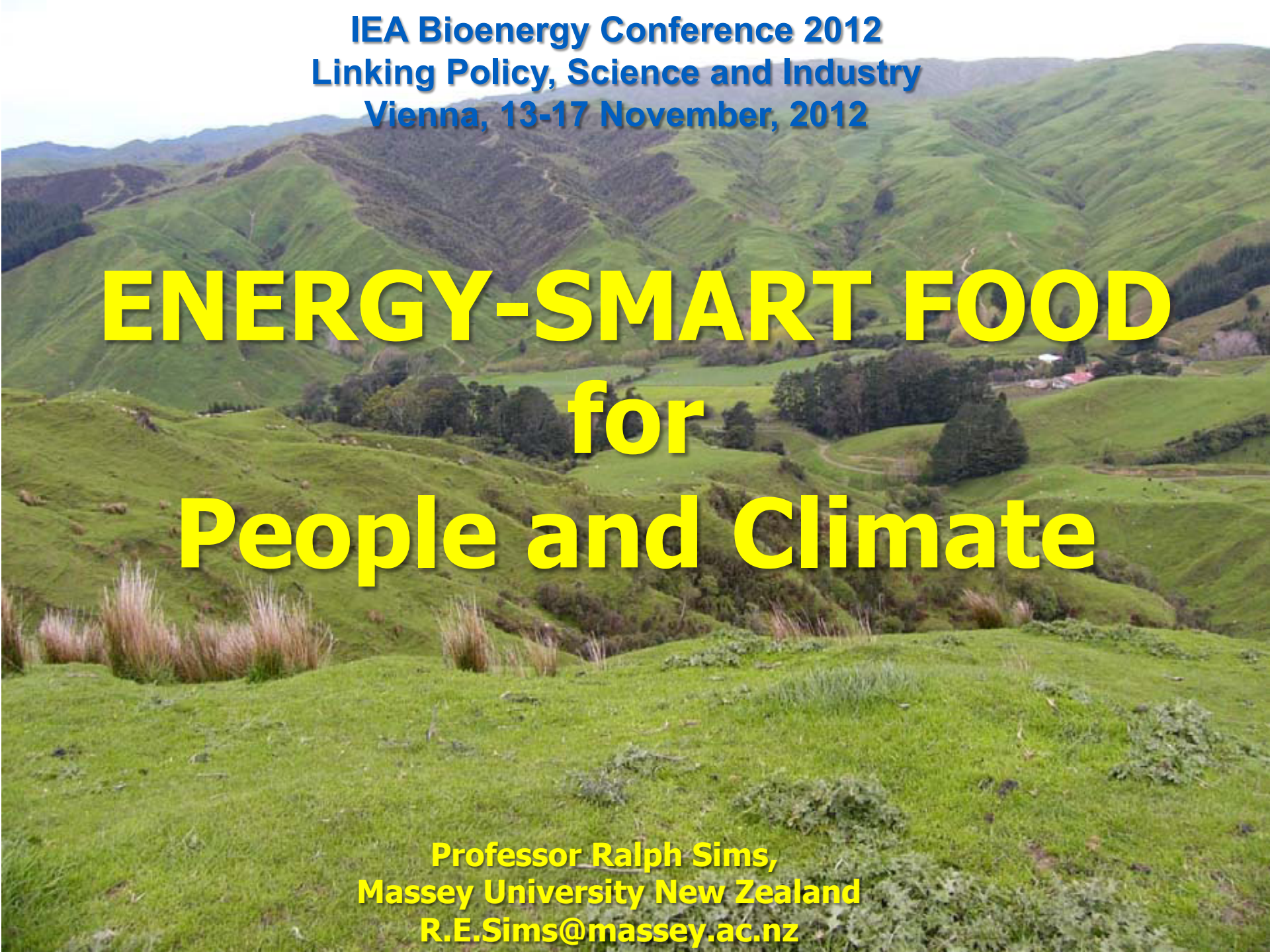

IEA Bioenergy Conference 2012
Linking Policy, Science and Industry
Vienna, 13-17 November, 2012

ENERGY-SMART FOOD for People and Climate

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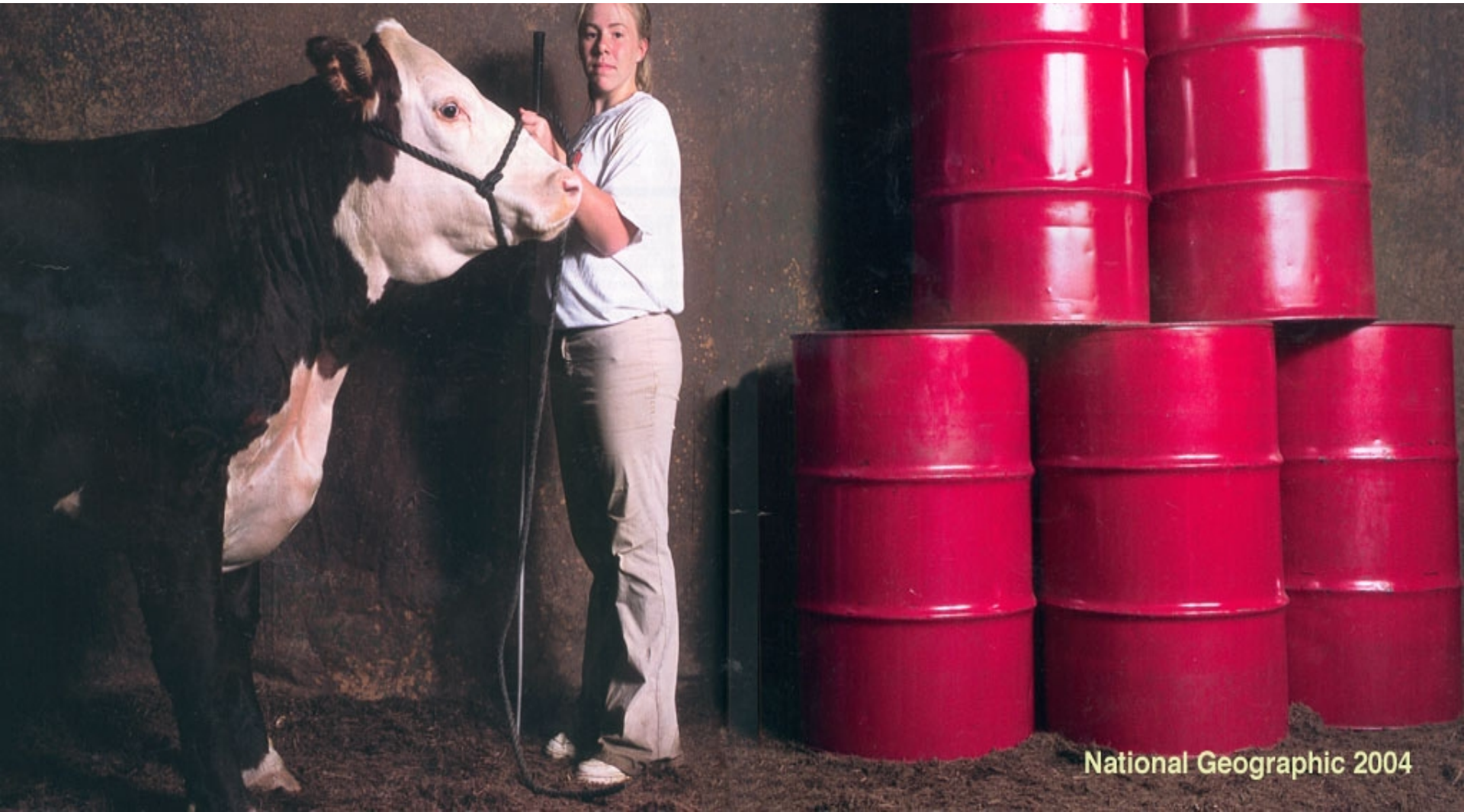
What is the FOOD-ENERGY problem?

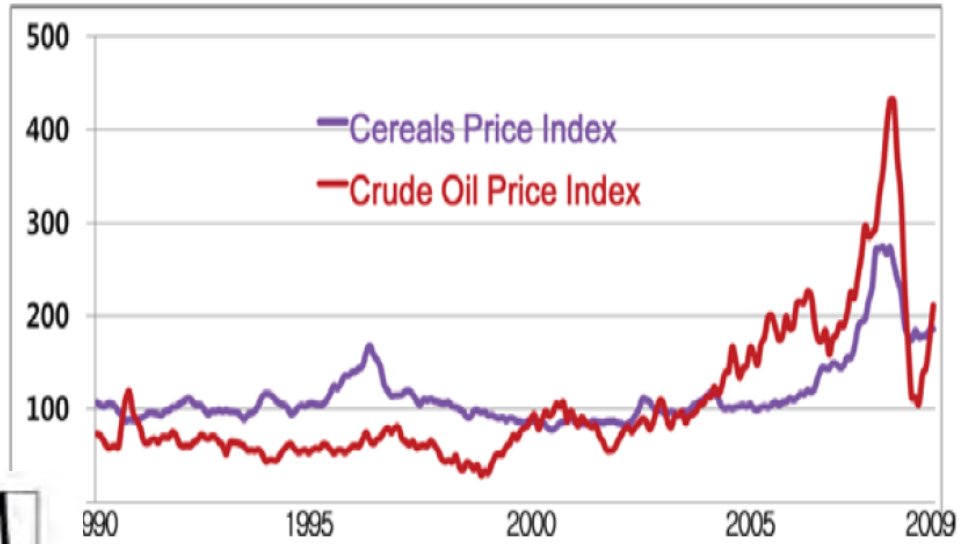
- The global agri-food supply chain (from "paddock-to-plate") is heavily dependent on fossil fuel inputs – both direct and indirect.
- The post-war Green Revolution for OECD countries was largely based upon abundant supplies of cheap energy.
- Current concerns are mounting over oil/gas/coal reserves and related greenhouse gas emissions.
- Modernizing food systems in developing countries today simply by increasing fossil fuel inputs may no longer be feasible.
- Reducing fossil fuel inputs could be an option to improve food supply systems and food and water security in all countries.

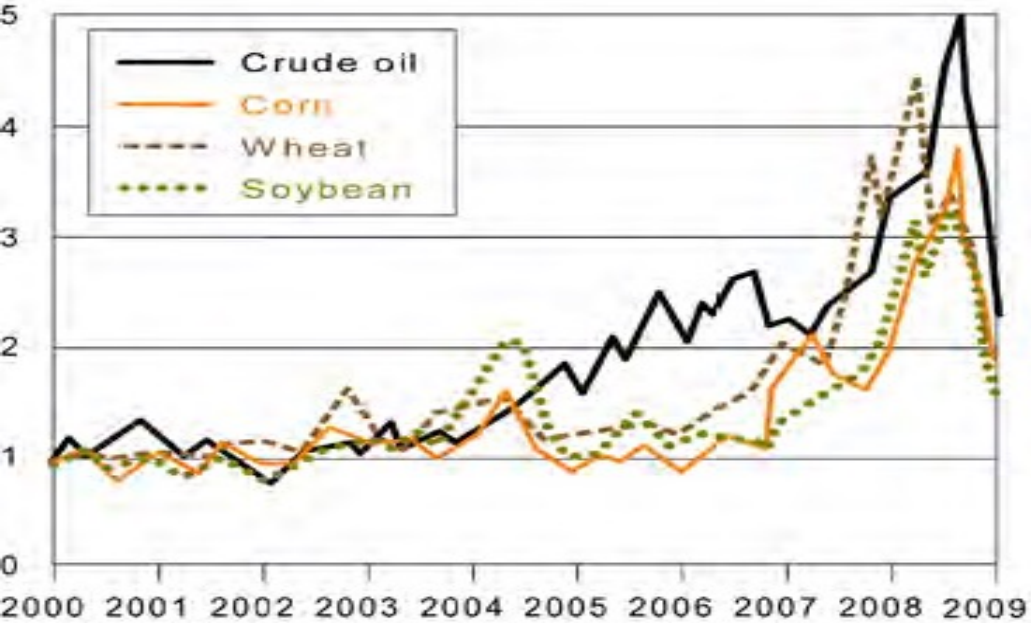
THE PRICE OF STEAK

1 steer, providing around 200kg of meat, requires around 1100 litres of oil equivalent (220 MJ/kg beef) of direct and indirect energy when raised in a feedlot.

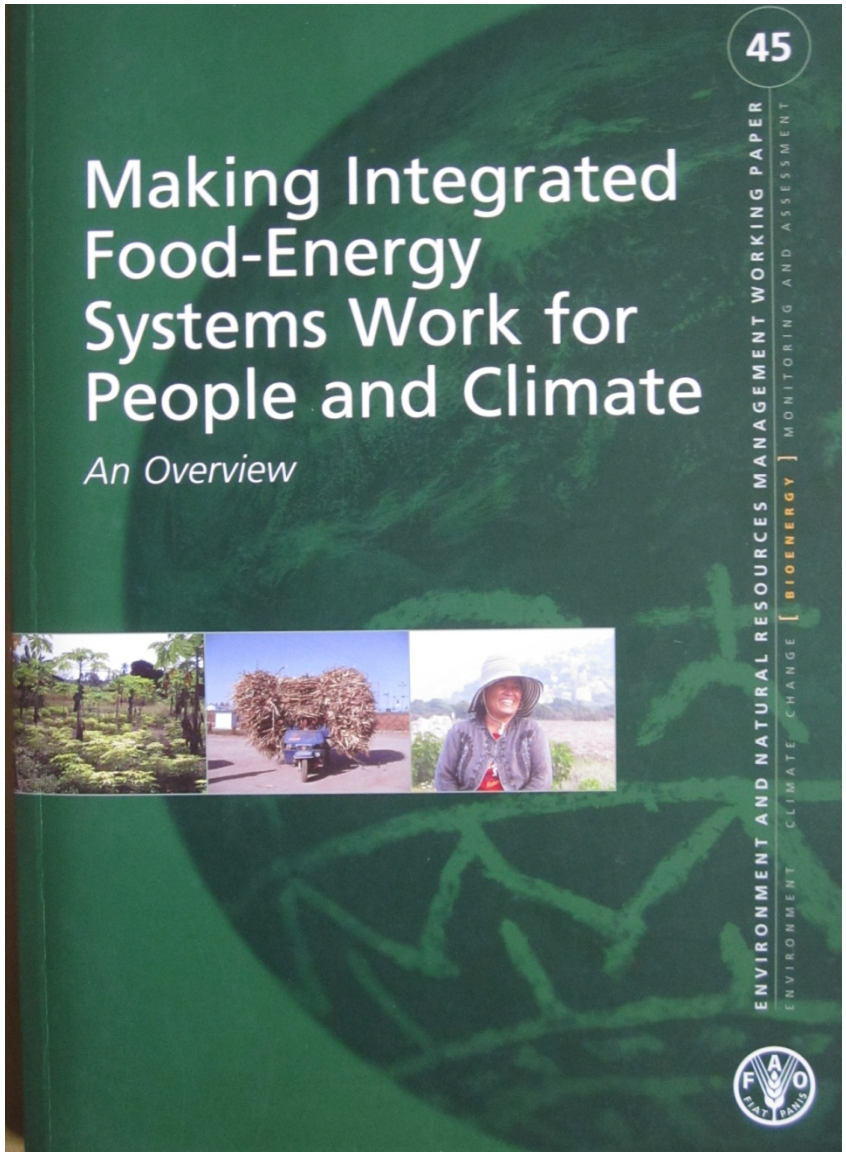


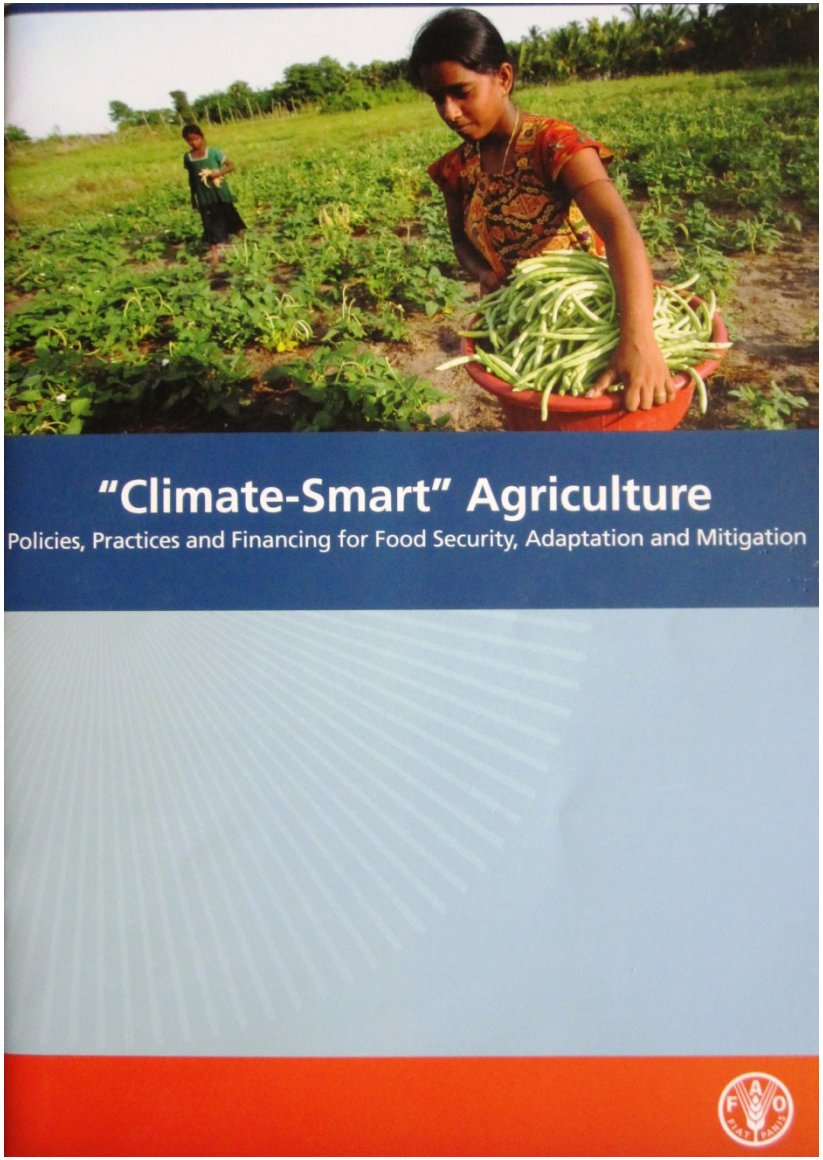
Food prices have recently become strongly linked with oil/gas prices.

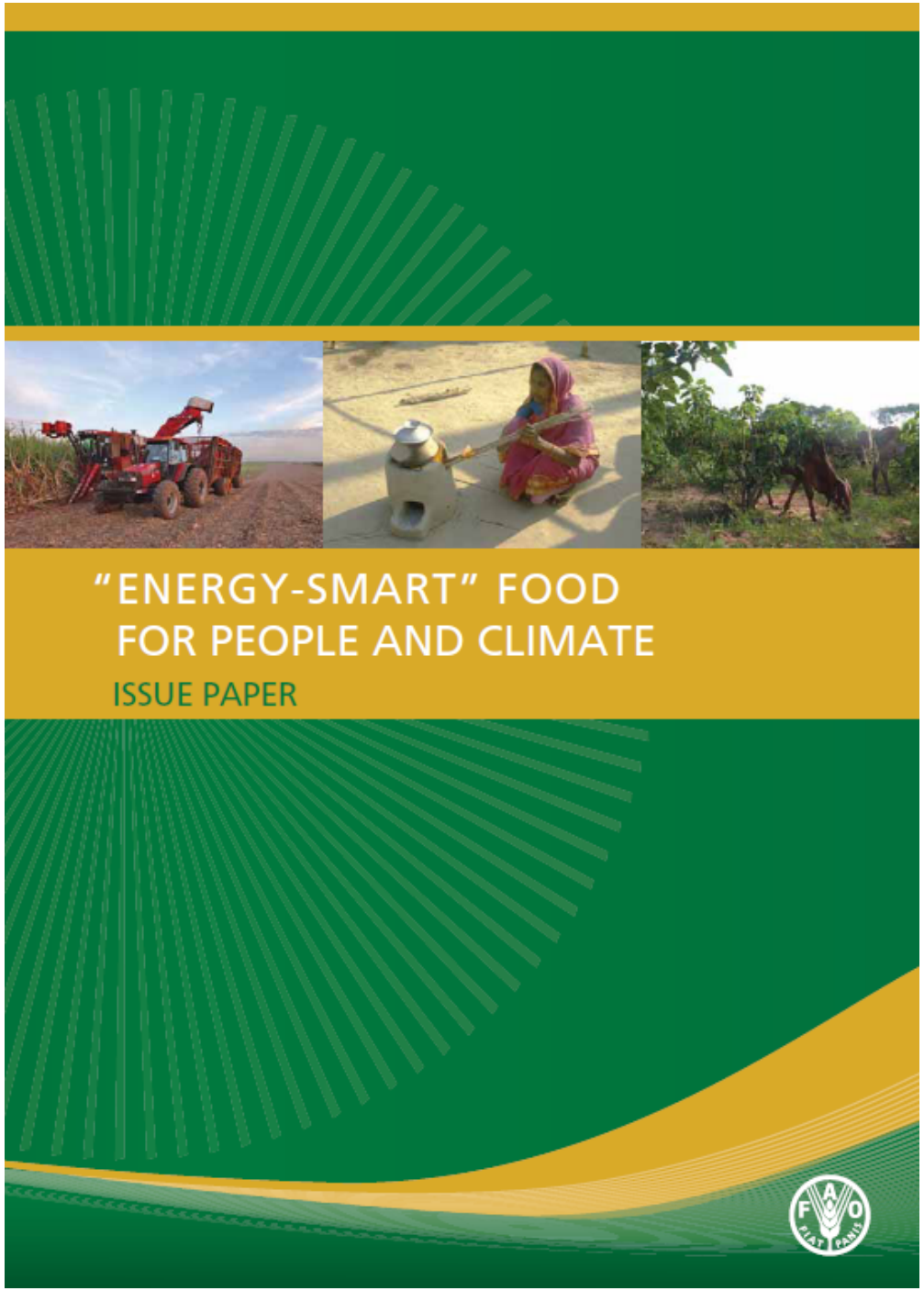




The FAO has already been concerned about the food / energy / climate nexus.







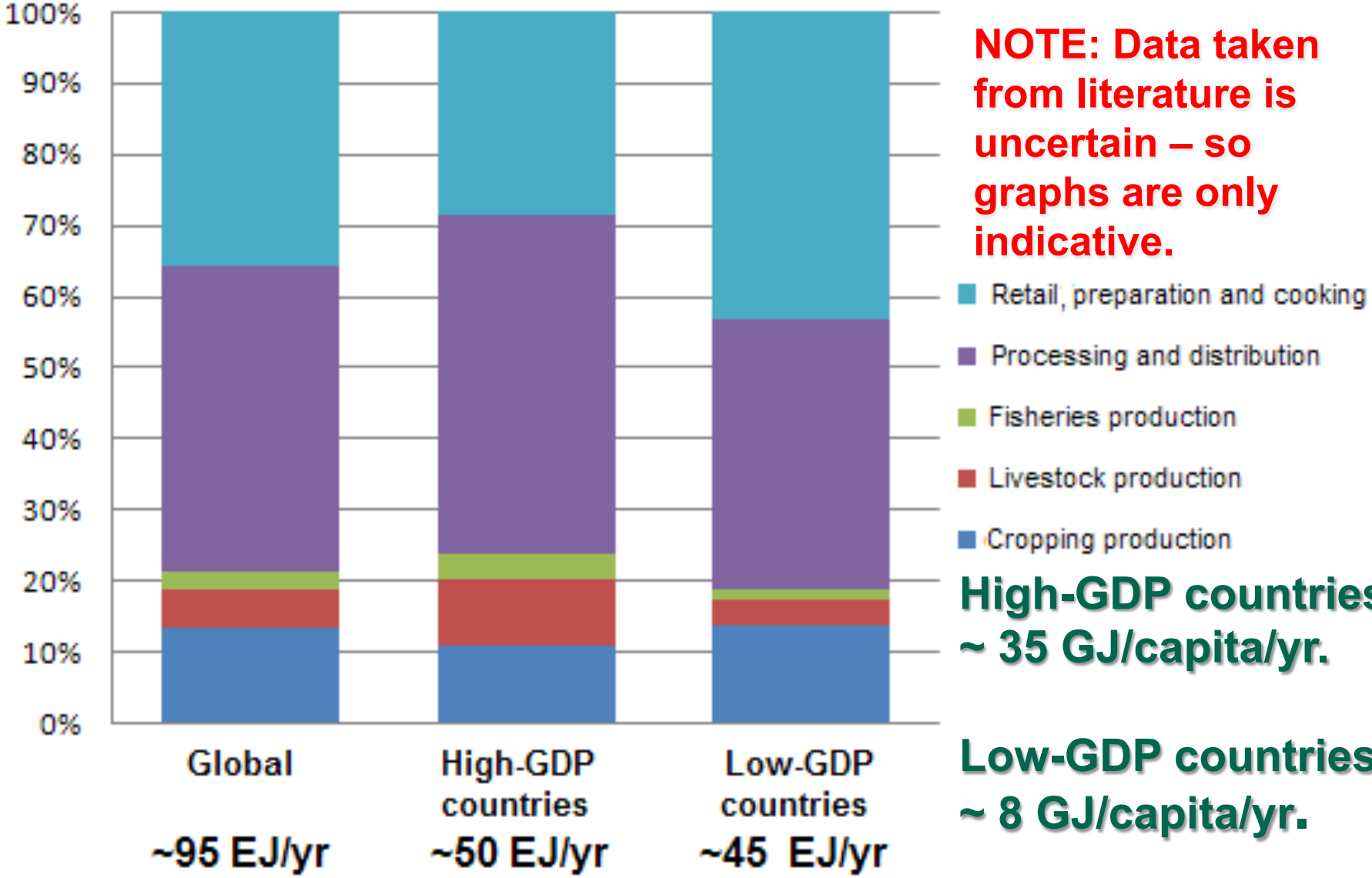
Issue paper at

http://www.fao.org/docrep/014/i2454e/i2454e00.pdf

Policy brief: "The Case for Energy Smart Food Systems" at

http://www.fao.org/docrep/014/i2456e/i2456e00.pdf

Shares of energy in Agri-food supply chain



NOTE: Data taken from literature is uncertain – so graphs are only indicative.

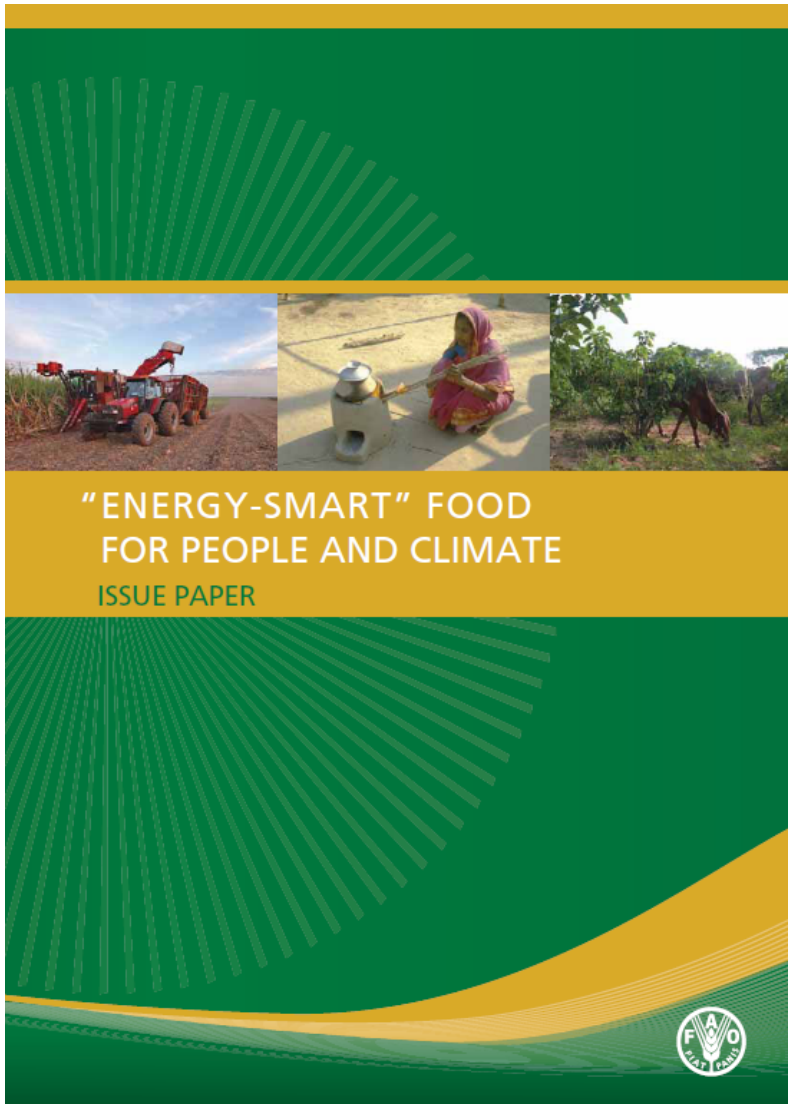
High-GDP countries ~ 35 GJ/capita/yr.

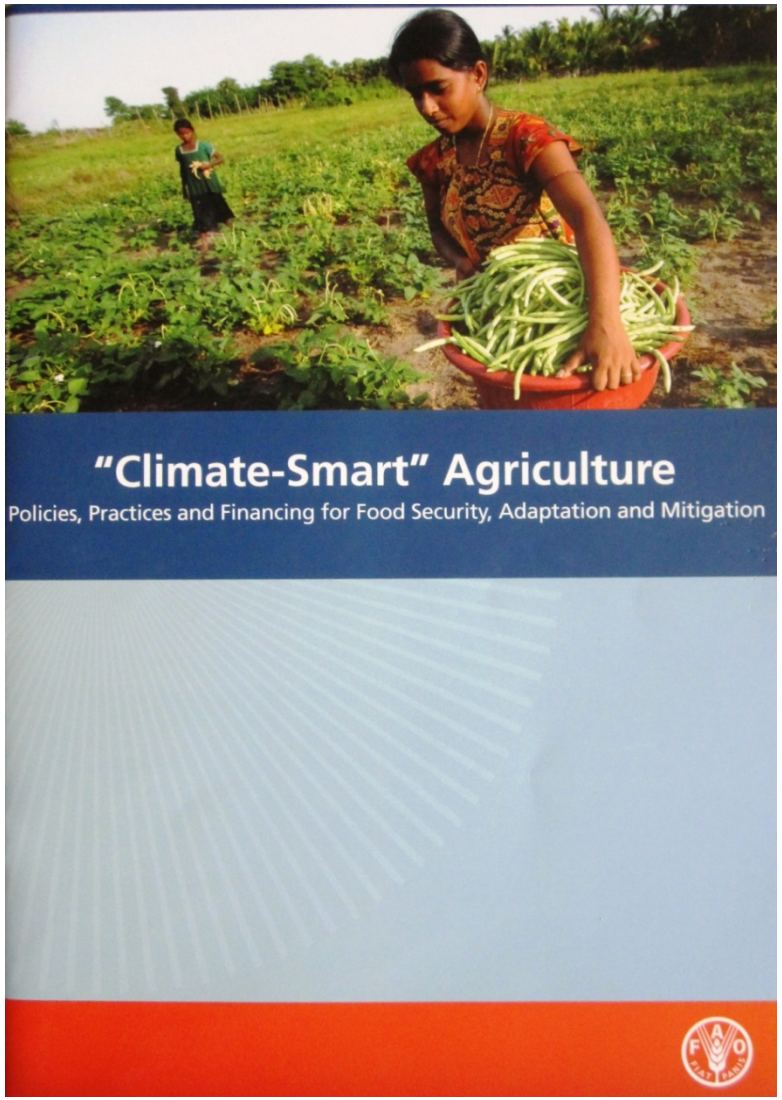
Low-GDP countries ~ 8 GJ/capita/yr.

Around 32% of the total global end-use energy demand of ~300 EJ/yr is used for providing food.

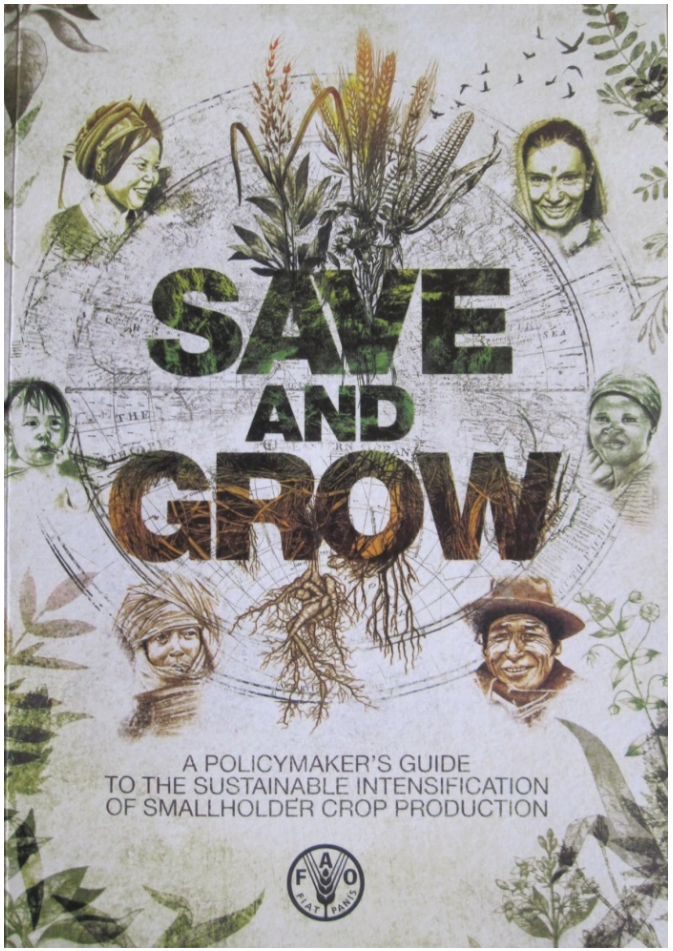
What is the solution?

"Energy-Smart is Climate-Smart"





Making the agri-food supply chain Energy-Smart and Climate-Smart is part of a larger paradigm shift to "*do more with less*" being promoted by FAO and partners as "Save-and-Grow"



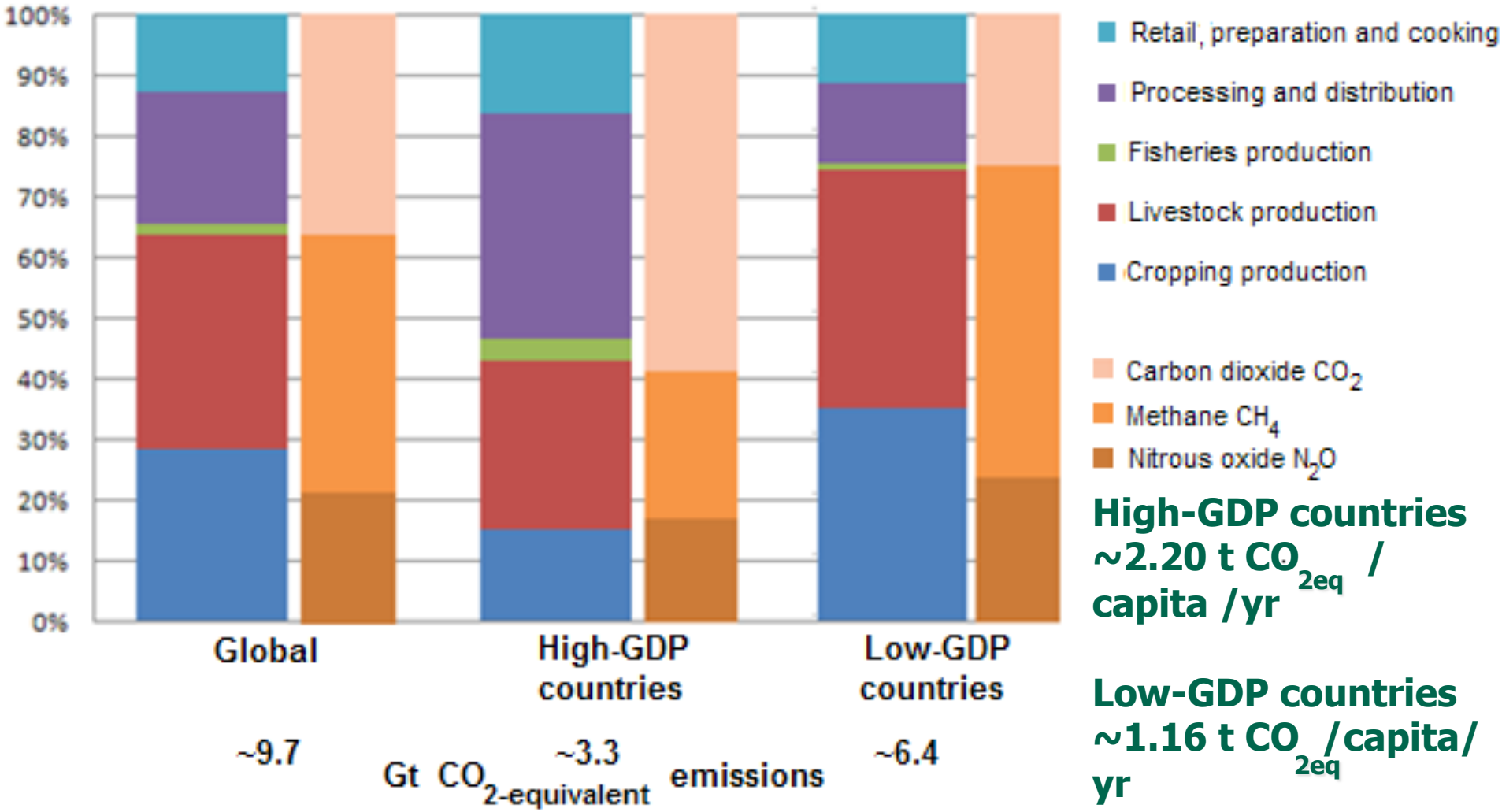
"Making agriculture more productive and resilient will demand better management of our natural resources – land, soil, water and energy."

Energy-Smart food:

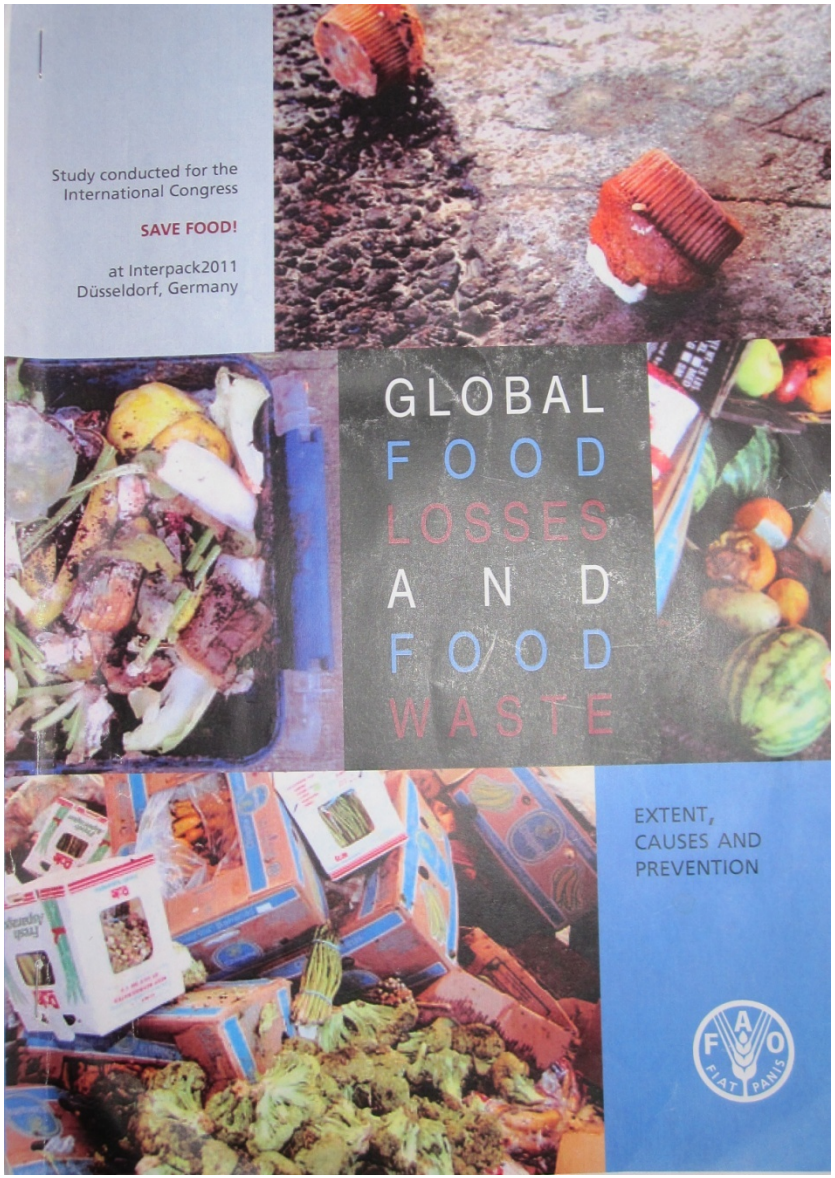
- Improves access to modern energy services for energy-poor subsistence farmers and fishers to provide increased food supply and security.
- Ensures energy inputs, from whatever sources, are used more efficiently than at present along the entire agri-food supply chain.
- Reduces the energy intensity (MJ / kg of food product) of both direct and indirect energy inputs.
- Captures the renewable energy sources available and uses them to displace fossil fuels.
- Simultaneously enhances food security, sustainable development, climate change mitigation, and resilience by reducing GHGs.

Shares of greenhouse gas emissions

Around 22% of total global GHG emissions (~45 Gt $CO_{2\text{-equiv}}$ /yr) arise from the agri-food chain.



Global food losses and food waste

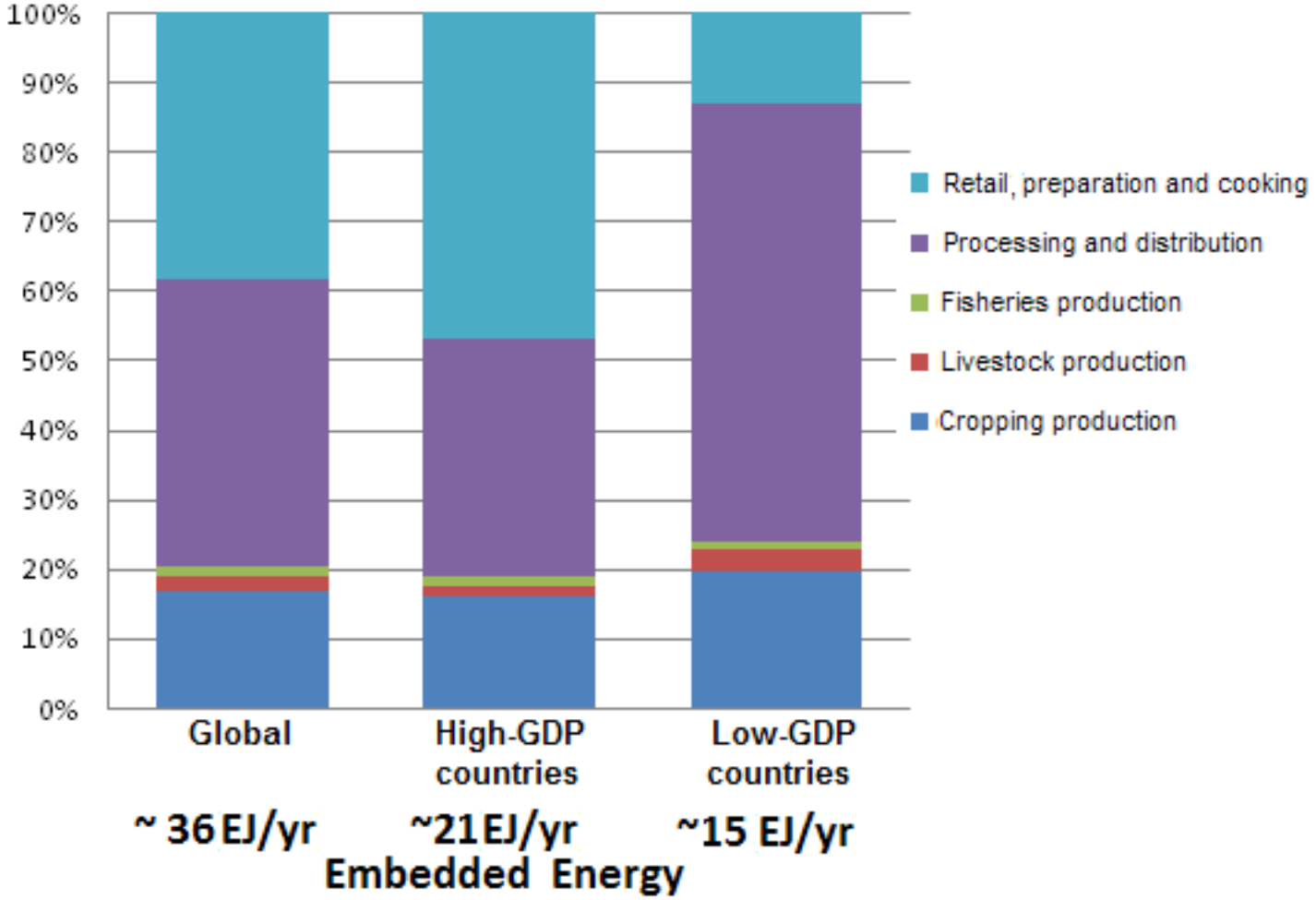


We fail to consume around one third of all food produced.

This wastes scarce land, water and energy resources.

But it does provide biomass feedstock for waste-to-energy and landfill gas plants!

Shares of embedded direct and indirect energy inputs in the ONE THIRD of food produced globally that we fail to consume.

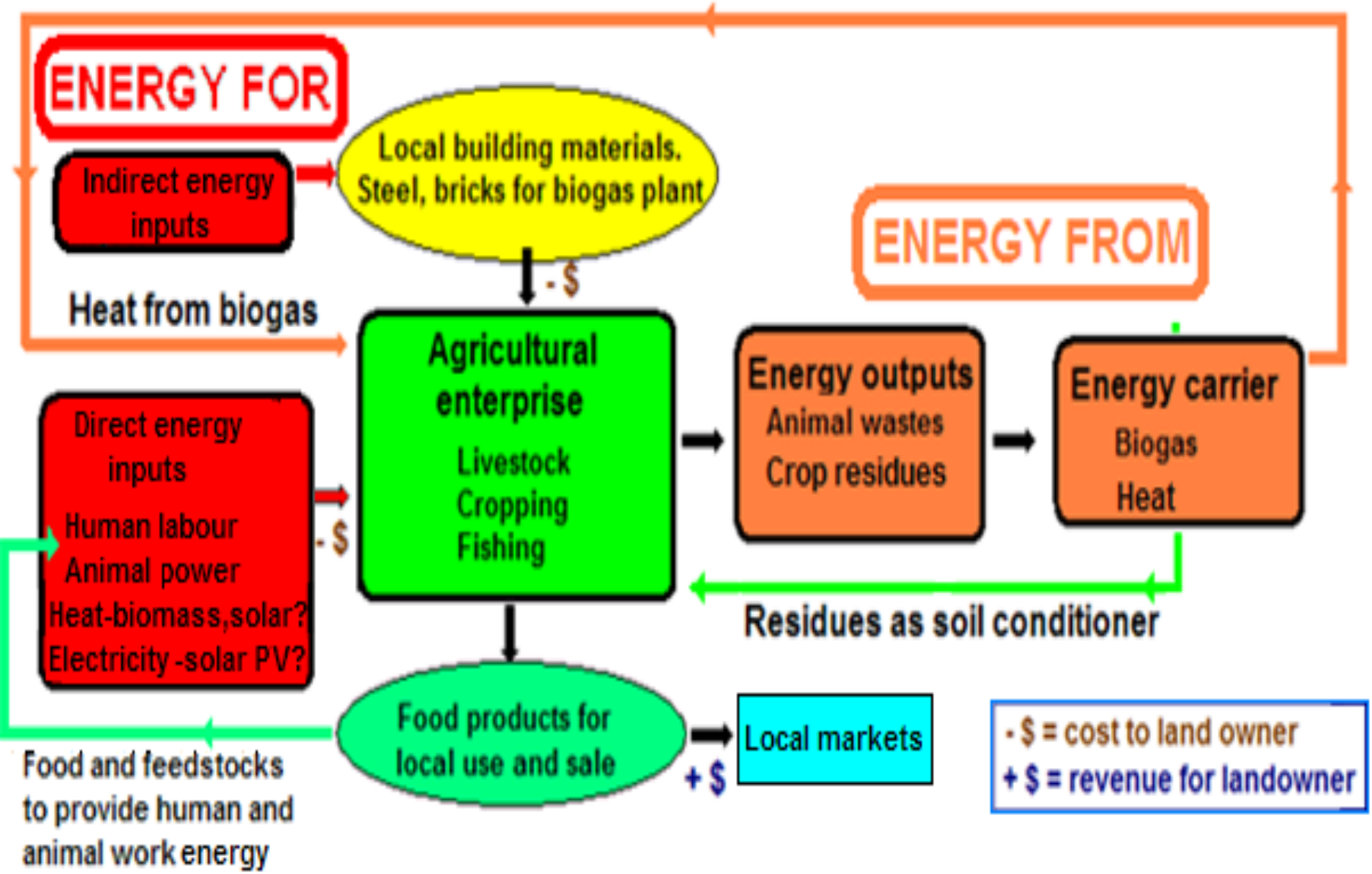


Why is the problem complex?

- All agri-food systems depend upon energy inputs regardless of scale.
- Scales of an agri-food system range from
  - subsistence farmers growing food or fishing for their own consumption,
  - family units supplying local markets,
  - small businesses employing a few staff,
  - large corporate companies supplying huge supermarket chains across the world.
- They each have different energy use priorities, but both low- and high-energy systems can also use renewable energy.

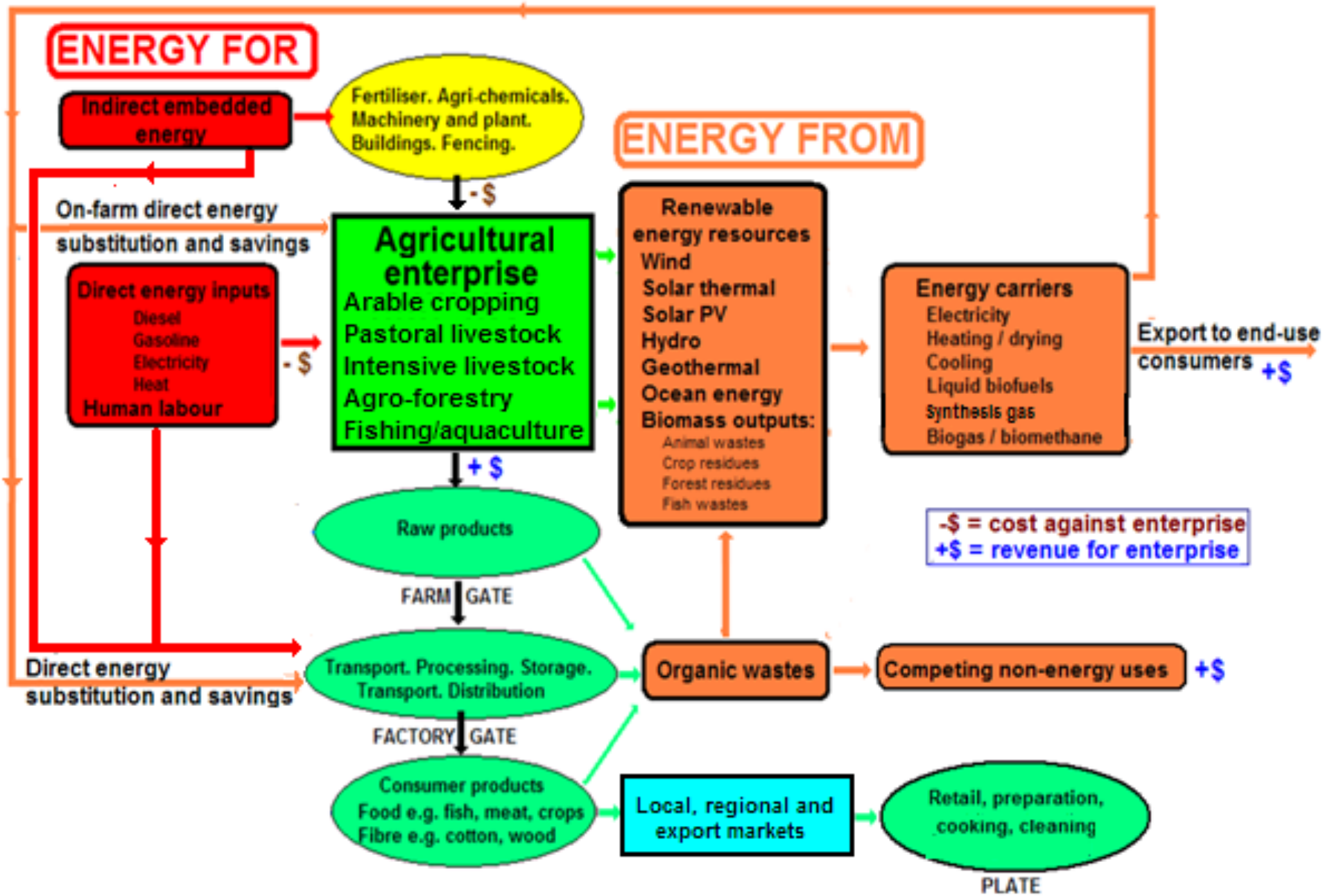
A *low input* agri-food / energy system

A *low input* agri-food /energy system



A *high input* agri-food energy system

A *high input* agri-food/energy system



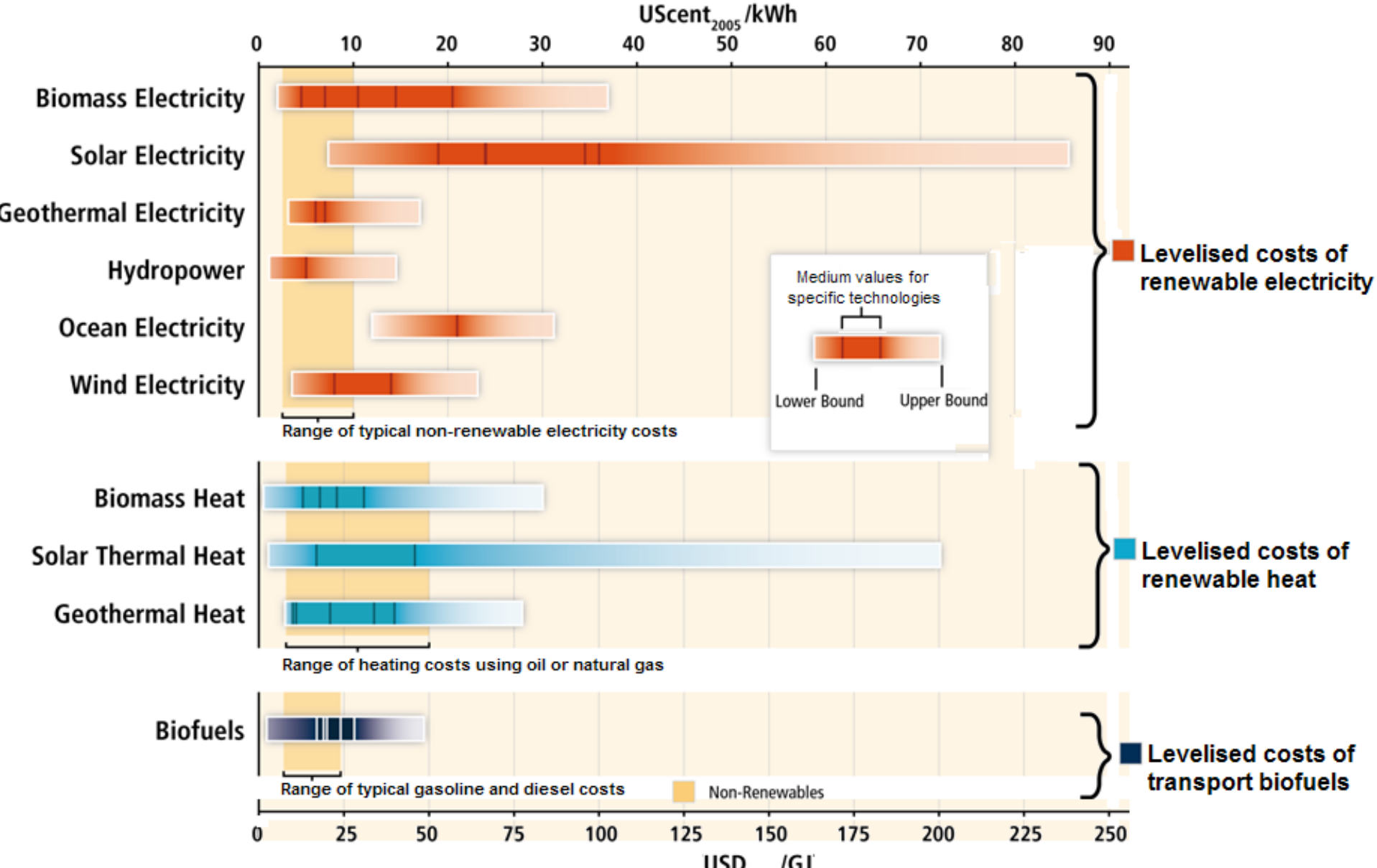
Energy efficiency opportunities are widespread throughout the agri-food supply chain

Renewable energy:

- can enhance access to reliable, affordable and clean modern energy services;
- is particularly well-suited for remote rural populations; and
- in many instances can provide the lowest cost option for energy access.

IPCC -
Special Report on Renewable Energy,
July, 2011
Chapter 2: Biomass and Bioenergy
www.ipcc.ch

RE costs are often higher than current energy prices but can be competitive in various settings.



UN Secretary General
UN General Assembly, 2011

The General Assembly of the United Nations declared 2012 to be the

International Year of Sustainable Energy for All.

Initiatives by Member States and international organizations are being undertaken to create an enabling environment at all levels for the promotion of access to energy and energy services and the use of new and renewable energy technologies.

What policies could help drive the transition to Energy-Smart food?

- A long-term view is needed to gain the paradigm shift to Energy-Smart food systems.
- Policies for supporting renewable energy uptake are diverse but well understood.
- Energy-Smart food systems can only work if legal and regulatory frameworks on land use are in place before introducing renewable energy.
- Policy formulation regarding energy and food should be co-ordinated amongst government ministries responsible for food, agriculture, energy, health, transport, economic development and environment.
- FAO is aiming to assist member countries.

In summary

- The global agri-food supply chain can be decoupled from its dependency on fossil fuels in order to meet future food demands.
- Reducing energy intensity is technically possible at all levels along the chain.
- Renewable energy technologies, particularly bioenergy, can help improve energy access, food security, price fluctuations and climate change impacts.
- Policy development to drive the transition to Energy-Smart food and reduce food losses needs a long-term vision.
- FAO keen to proceed but time is running out