Integrated Food and Energy Systems

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at the think-tank conference

Pathways to cleaner cooking by 2050

UNAM Morelia, Mexico, 31.05.2017

Transformational change???

How to ensure cooking fuel supply from sustainable sources without negative impact on food security and climate?

How to harmonize food and energy security with climate impact?

How to add in cooking solutions appropriate for the respective fuels to progress on the pathway to cleaner cooking?

The Vision of Food and Energy Security is not new:

Turning competition into synergy

Based on 14 years observations of project work by GIZ continued by CU in Malawi on Food Security and Biomass Energy Conservation

Presentation elaborated in co-operation with Dr. Christoph Messinger (GIZ)
presented by Christa Roth (Food and Fuel consultant to Clioma),
Lilongwe November 2011

Clíoma
incentivising clean development

Concern
Universal

Irish Aid
Government of Ireland
Rialtas na hÉireann

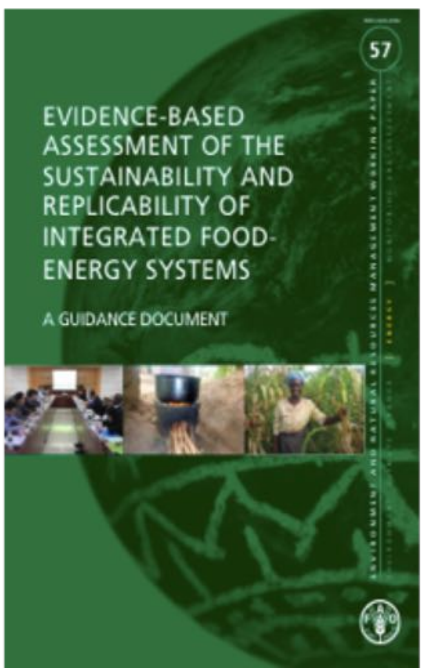
IFES ????

A new buzzword?

What do we understand by
Integrated Food and Energy Systems?

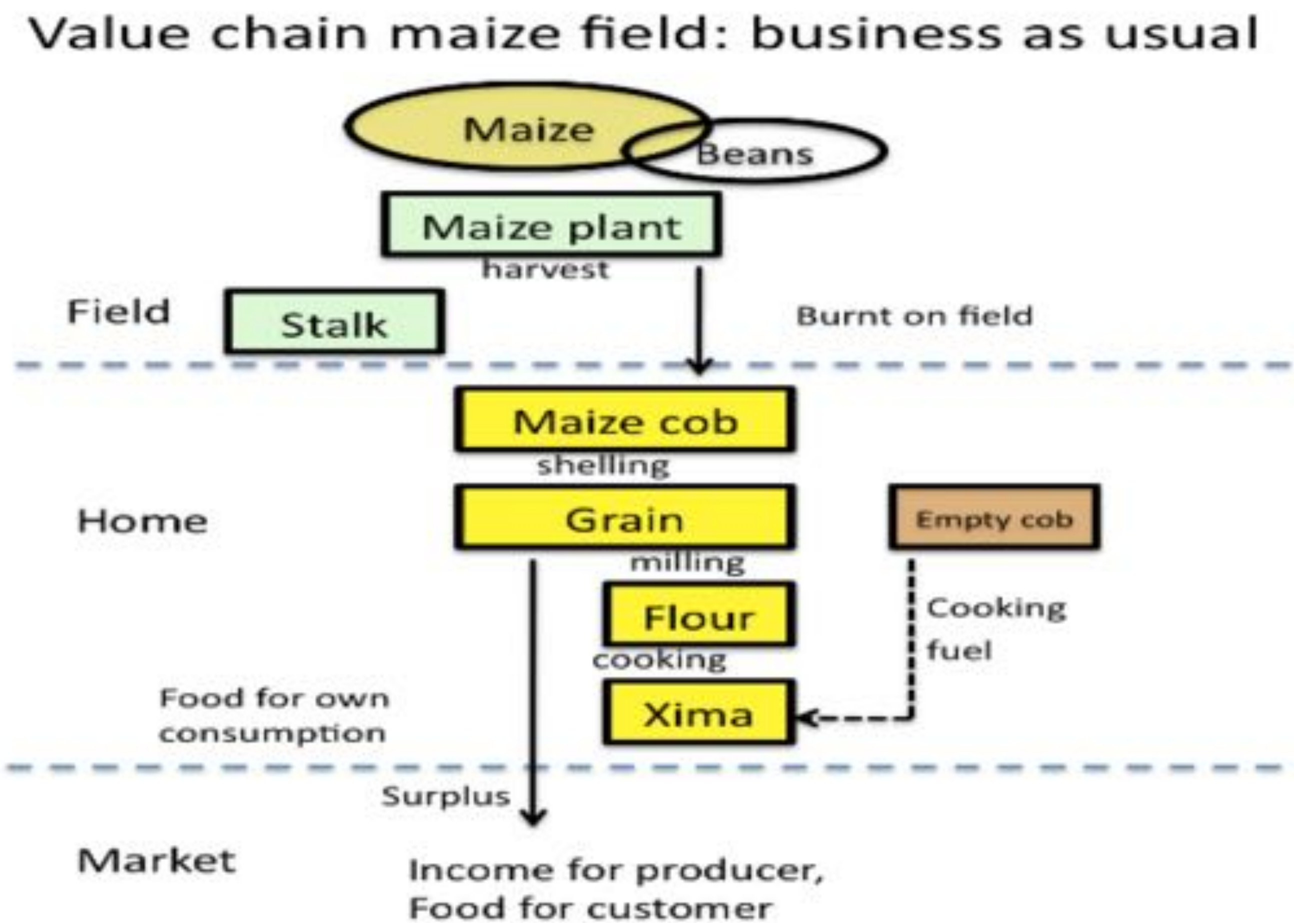
UN FAO distinguishes two types of IFES

1) Optimization of the land use
   (intercropping of food and fuel/energy crops)
2) Optimization of the biomass use
   (turn residues into input material for next process, optimise waste management and resource efficiency)

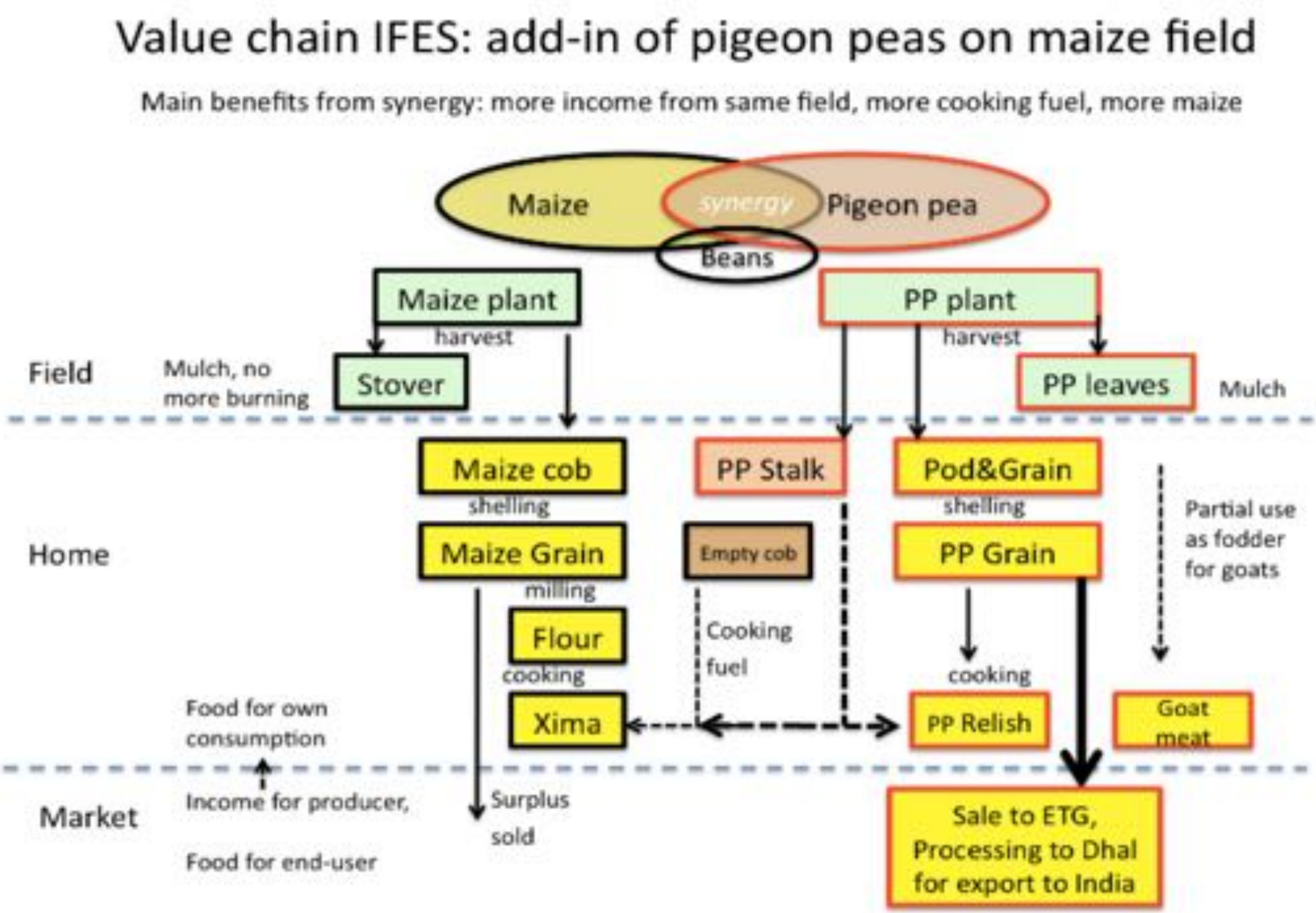


Series of technical papers published by FAO since 2009

Example from Mozambique: IFES intercropping maize and pigeon pea



Example of an IFES Mozambique (cont….)



More food

Intercropping maize with p/peas

Intercropping: More food from the same land + other benefits

- planted at the same time, p/pea removed just before new planting season
- nitrogen fixing legume reduces fertilizer needs and provides ground cover nearly all year (less soil erosion by wind and surface run-off)
- improves yield of maize (healthier plants, better root development, thicker stems, broader and darker leaves, more and bigger cobs, more grain etc.)
- annual crop, can be planted as short rotation food+energy crop on private land
- annual biomass yield can exceed 5 tons/ha, depending on climate and variety
- p/pea leaves with high nitrogen content decompose easily and improve fertility, infiltration and water retention capacity of the soils (less water logging, improved drought tolerance and resilience of crops)
- after use as fuel mineral nutrients from ash can be reincorporated into soils

Pigeon peas provide FOOD and FUEL from private land

Drawing by Dr. Christoph Messinger, 2002 in Malawi

From **competition** to **synergy:**

Integrated Food and Energy Systems

Provide at the same time both **food and energy**

IFES =

More food, fodder and access to renewable bioenergy

More (cooking) fuel

from sustainably managed sources
= 100% renewable biomass

(without compromising soil fertility)

Annual harvesting: Self-reliant instant benefit in the first year

Results in Malawi: People have transitioned from net firewood consumers **to energy subsistency farmers** mostly independent from external fuel supply and increased their food security throug access to **pigeon peas (food + fuel) + simple stoves**

This biomass fuel is mostly climate neutral as it is sustainably managed and truly renewable. It can help to replace unsustainably managed, thus considered ‚non-renewable‘ fuels.

On the pathway to CLEANER cooking –

Utilisation of fuels for cooking with
less negative impact for climate and people:

**More fuel efficiency / less fuel use
and less emissions from cooking**

How to integrate cooking solutions
appropriate for the respective fuels
to progress on the pathway to cleaner cooking?

Benefits of cooking interventions

- **fast and convenient**
- **reduced fuel consumption**
- **efficient use of residues**
- **producers earn cash**
- **users save time and money**
- **protects users health** (less burns and smoke)

Result:

less or no need to collect or purchase firewood:

„grow your own fuel“

self-reliance for cooking energy

What is holding us back?

We need to change mindsets (paradigm shift) and create awareness

- that the model of the ‘energy ladder’ where crop residues are at the bottom is outdated
- that usage of residues from IFES used in the appropriate cooking energy system can be a simple and straight forward tool to address many problems at the same time
  - Food security
  - Energy security
  - Climate change mitigation, GHG reduction
  - Climate change adaptation, resilience for farmers ….
- about the potential of IFES as a concept. It is not a silver bullet or a ‘one-size-fits-all’ solution, but it is easily overlooked from a sectoral perspective because we don’t know about IFES and we only see what we know.
- how to use existing cross-sectoral platforms to promote IFES concepts and mainstream IFES in integrated project approaches e.g. NAMA / AFOLU, NEXUS Food-Energy-Water, etc.

Discussion points:

- any fuel that is not burnt reduces cooking emissions, but agricultural residues often are left to decompose. What is the impact on carbon balance?
- Emissions depend a lot on usage: fuel processing before use, especially drying, and selection of appropriate stove technology

- CO_2: balance neutral? no difference if biomass decays or is burnt?, can be negative if biochar sequesters carbon in the soil
- CH_4: rotting biomass can emit methane, so better burn it?
- PM: depends largely on combustion system and user behaviour (fuel moisture, processing)
- CO, BC and other pollutants?