Integrating Food and Energy Security

Synergies and Benefits of growing fuel on-farm in Malawi

Observations from previous GIZ-work and research in Malawi in co-operation with Concern Universal and ICRISAT, with support by FAO

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Cooking energy is a crucial link in the “Nutrition-Chain”

- Increased access to unprocessed food
- More and better meals per person
- More nutrients per person absorbed and processed

Figure developed by Dr. Christoph Messinger, GIZ-HERA
Food security depends on access to energy services to cook food.
What goes into the pot is as important as....
...what goes under the pot: Fuel and an efficient stove!
How can we get more food and more fuel from the same land?
Solution: successful example of IFES in Malawi

Pigeon Pea provide both FOOD and FUEL (integrated in existing farming systems, intercropping with maize) + more efficient STOVES (to cook more food with the same energy)

self-reliant sustainable access to cooking energy and fuel from own land

• Widely accepted by the farming community
• Sustainable
• Scalable
• Replicable
GTZ-IFSP Mulanje (Malawi) interventions before 2004

Private woodlots

Pigeon Peas (Cajanlus Cajan)

Simple Claystoves
“Pigeon Pea impact chain as food and fuel crop”

Figure developed by Dr. Christoph Messinger, GIZ-HERA

- **Food crop**
- **Animal fodder**

Soil fertility and erosion control

- Increased access to unprocessed food
- More and better meals per person
- More nutrients per person absorbed and processed

Stunting rate (height/age)

Nutrition

Maize Production

- Cash ➔ purchase
- Burning the stems

- Burning the stems
Farmers perception of benefits: More maize from same land

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

Pigeon Peas = 'Forests' of the future grown on PRIVATE land

Foto C. Roth, Balaka April 2011
Perceived 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
Result 10 years after combined interventions in Mulanje to increase access to pigeon peas (food + fuel) + simple stoves:

People have transitioned from net firewood consumers to energy subsistence farmers independent from external firewood supply.
Which variety yields how much biomass under which conditions?

Example pure stand local variety in Mulanje: 50 kg dry stem from 10x10 m

= annual increment 5 tons/ha!

Research focus so far on **crop yield**, data on biomass yield needed (varieties, agro-ecological context, adaptation)
Field survey to quantify yield of crop and biomass

Carried out in 2011 in Balaka with support by FAO, Concern Universal and ICRISAT (Sample size 132 farmers)

Average yield per ten randomly selected pigeon pea plants:

2-3 kg grain as well as 2-3 kg dry stem

An average meal for a family of 5 (without beans) can be cooked with 600-700 g pigeon pea stalk.
10 plants of pigeon pea provide enough fuel for one household for 1-2 days.

More research is needed on biomass yields from different varieties and ecological zones.
Success factors for wide adoption by farmers

• addressing both food and cooking fuel needs of community

• no drastical change of farming system: building on what exists
  more/improved seed of a known crop
  simple cooking technology

• low technology level: affordable, easy access, easy to use

• low risk (no big investment needed, feasible even on 0.4 h of land)

• instant benefit after first growing season

• independent of external factors / actors or processing

• self-managed subsistence of cooking energy supply
  (cooking energy >95% of HH energy)
Conclusion

More food AND more fuel can be obtained through synergies of integrated solutions embedded in traditional farming systems. They can empower people and foment resilience and self-reliance.
Thank you for your attention