Trans-SEC

Innovating pro-poor Strategies to safeguard Food Security using Technology and Knowledge Transfer

Harming own Interests? Lessons learned from accompanying Villagers' Change of Perceptions regarding innovative improved Stoves

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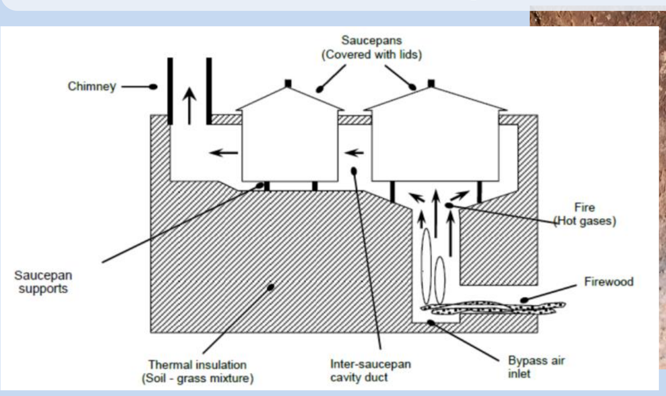
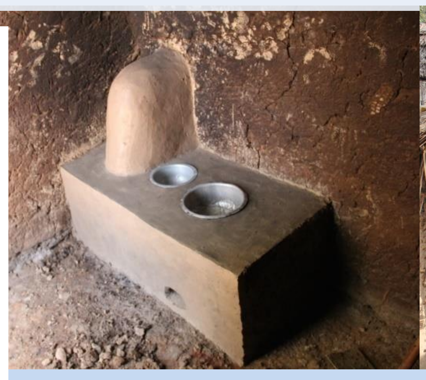
Background

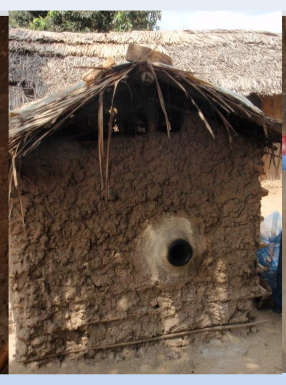
Cooking energy is scarce in developing countries where a substantial part of the population strongly depends on woodfuels — particularly firewood and charcoal. The major part of the rural population is still applying inefficient traditional three-stone firewood stoves (3-SF) during cooking which is one of the main driver of deforestation in developing countries.

UPS - Up Scaling Strategies

UPS "Improved cooking stoves" (ICS) aims at reduction of firewood consumption and reduced indoor smoke emissions.







Methods

I. Monitoring after ICS implementation

II. Targeted surveys for

a) Total Suspended Particulates (TSP) was determined to assess emission reduction of dust levels from the cooking stoves *(Casella Microdust Pro particulate monitor model 176000 A)*. The gas analyser assessed indoor air quality through carbon oxides along the stove, cook's position, at a breathing height (Kane900plus).

b) Combined Controlled Cooking Test (CCT) with Kitchen Performance Test (KPT) designed to quantitatively access the specific performance of the ICS for a standard cooking task as well as qualitative survey of stove performance and acceptability.

III. Focus Group Discussions (FGD) were held to get insights on change of perceptions, reflect scientific results from surveys, and mutually exchange knowledge on new type of stoves.

Results II a) Smoke: PM_{10} & CO - Emissions

Measurement of TSP when cooking inside indicate high average particulate matter (PM_{10}) emissions of the 3-SF (0.0060 mg/nm3) compared to ICS (0.0023 mg/nm3). Here the ICS reduced PM emissions by 61.17% via exhausting smoke through the chimney.

Table 1: CO emission comparison (mg/m3)
(n=24; 6 inside and 6 outside for each 3-SF and ICS)

Inside		Outside	
3-SF	ICS	3-SF	ICS
48.26	18.84	37.62	11.69
Diff. - 60.7%		Diff. - 68.6%	

Results III: FGD

Focus group discussion indicated intended benefits of ICS. These were not only derived by a higher thermal efficiency leading to lower firewood as well as time consumption. Group member highlighted that more important for acceptance and dissemination was the lower indoor smoke burden and an increased safety during cooking.

Objectives

Improved stove technology was implemented via action-research by the Trans-SEC project operating in four villages of Morogoro and Dodoma Region in Tanzania to combat resource depletion and health injury. Firewood and time consumption patterns of ICS were quantified against 3-SF.

Results I: Monitoring in regions

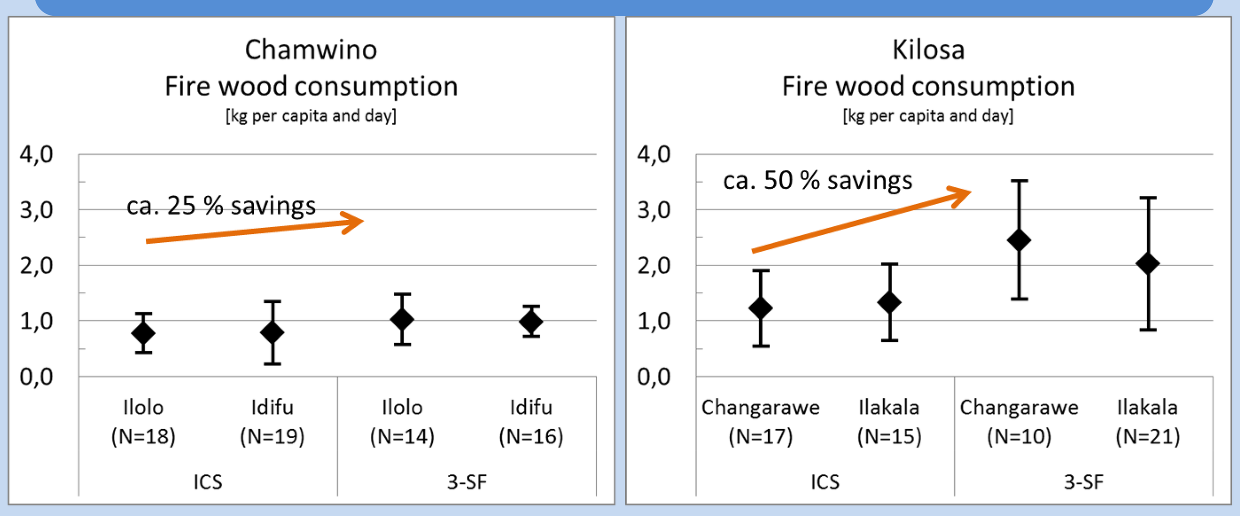


Fig 1: Comparison of daily stove performance for type of implemented ICS and traditional 3-SF in two regions.

Results II b) Performance tests

Monitoring, CCT and KPT showed significant efficiency gain of up to 50% for ICS against traditional 3-SF. One year of implementation practice led to slightly changes in ICS design. This enhanced the ICS performance through better heat distribution among two pots. Exchange of knowledge on drying and storing, chimney construction and continuous practice helped trainers to invent a new design: the ***Salama*** Stove.

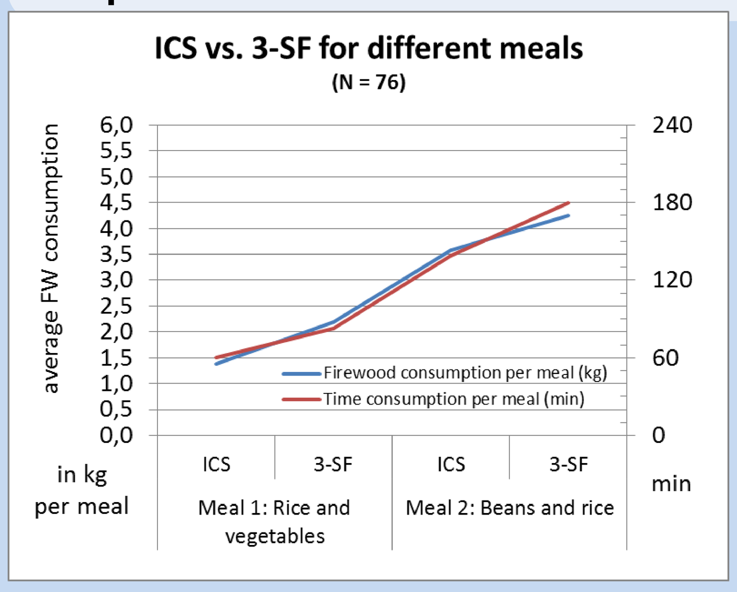


Fig 2: Performance test for types of meals and cooking devices

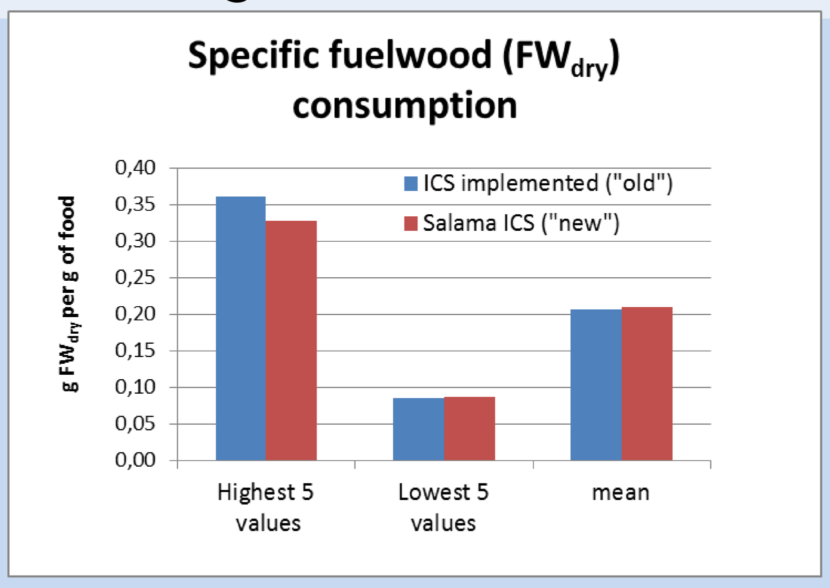


Fig 3: Performance test for ("old") implemented ICS and ("new") Salama type of ICS (cooking the maize meal "Ugali" and Vegetables

Open questions

1. How successfully establish a perpetual knowledge exchange between farmers/villagers concerning cooking habits, firewood consumption and smoke reduction?
2. How assist farmer groups in stove construction activities and in self-organizing dissemination processes?
3. What lessons do we get from farmer innovation in the stove design on satisfaction and stove performance?

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