Thought Piece: Exploring linkages between sustainability of smallholder food value chains and poverty alleviation in low income countries
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Preamble:

Improving sustainability in any area including food, health, energy, etc., is a complex, fragile, iterative innovation process that requires consensus-based planning and implementation via specific projects, each of which will be nested within a higher-level framework and will interface to prior, concurrent & future projects. Key steps in the implementation of a particular project (eg improving food sustainability for poverty alleviation) can be summarized as follows:

1. *Problem definition:* stakeholders to be engaged, decision-making processes and motivation tools to be used, scope of issues to be addressed, objectives to be delivered, project timeline, resources required, lessons to be learned from similar projects
2. *Deployment of resources:* task and resource allocation, implementation, progress monitoring and review, project adaptation to evolving circumstances and objectives
3. *Evaluation, review and preparation for next phase:* Lessons learned and disseminated to stakeholders for this and related projects.

These ideas underpin our responses to the nominated discussion questions.

Discussion questions

1) What are the core questions that need to be answered in exploring the linkages between sustainability of smallholder food value chains and poverty alleviation in low-income countries?

- Scope and extent of poverty alleviation, referring to UN's MDG, HDI & HPI (health, nutrition, education, standard of living, equity)
- Food sustainability, considering Financial, Institutional, Social, Technological & Ecological dimensions of sustainability and specified in terms of Accessibility, Availability & Acceptability
- Core questions:
  - Food-Water-Energy nexus (water & energy are necessary to maintain food availability)
  - Food processing for preservation & to increase food value (locally if sustainability enhanced)
  - Organic fertilizer (to maintain soil fertility & manage waste)
  - Access to relevant education in food production, market & financing
  - Population trends, considering population-related impacts and access to contraception and family planning advice
  - A holistic approach considering the hardware (equipment), software (skill & information) & orgware (institutional) aspects of the intervention, thus addressing all of the food sustainability dimensions

2) What evidence do we already have to provide answers to these core questions?

Experiences related to food, water and energy linkages in Indonesia (referring to Retnanestri, 2007):

- Case studies in NTT and West Java provinces indicated the need to jointly consider food, water and energy for a successful intervention. Water was necessary for rice paddy irrigation In the West Java case (pp 107-108) and for orchards in the NTT case, (p 38).
- A solar dryer in Aceh has been designed to use a combination of wind, sunlight and biomass for fish processing & preservation to increase the financial return from fishing (p237).
- Fish farmers in West Java use Solar PV systems for lighting and for communication to access the fish market and to order feed and fingerlings (pp 130-131).
- A swallow bird farmer in Lampung province uses a Solar PV system to power a CD player to play recorded swallow twitters on a 24-hour basis to attract the birds (p 125).
- The Community Empowerment Program (CEP) for fishermen, farmers & handcrafters in NTT province facilitates the formation of enterprise groups, and provides seed capital, project & marketing management and training to increase product values. The CEP allows locally available resources (including handicraft, producing squash sweet, squash syrup, peanut cookie, palmyras stem plaiting & fabric weaving) to be marketed in Kupang, the capital city of NTT province, and to other provinces such as Bali & Java (pp 172-173).

Figure 1. a, b & c: Solar photovoltaic-based water pumping system for household water & gardening in NTT province, Eastern Indonesia. d: Water for irrigation & hydro power generation in West Java.

Figure 2. a: Cow manure used for biogas generation for cooking and organic fertilizer for crops in NTT Province, Eastern Indonesia. b: Fish farming in West Java, in which farmers purchased solar-photovoltaic panels for lighting and communication to access the fish market and to order feed and fingerlings. c: Solar dryer using a combination of biomass-wind & solar PV for food processing in Aceh.

3) *What needs to be known, and is not yet well known, about these linkages to manage them in ways that advance multidimensional sustainability objectives and contribute to alleviate poverty?*

We need to develop a more effective intervention technique for improving food sustainability. One candidate, the I3A framework (figure 4, Retnanestri 2007, Retnanestri et al 2008) is a holistic design and assessment tool (figure 5) to improve food accessibility, availability & accessibility taking into account:

- linkages between food, water & energy for poverty alleviation purposes
- the stakeholders involved in the food-related social system: target communities, facilitators (business, research agencies, educational institutions, NGO), government and donors
- the multidimensional aspects of food sustainability: financial, institutional, social, technological and ecological
- hardware-software-orgware aspects of the intervention necessary to maintain food sustainability during & beyond the intervention, thus promoting self-reliance & autonomy of the target communities (Fig 3, in which quadrant 1 represents the highest autonomy)
- the goal of eradicating poverty by community empowerment, viewing target communities as active rather passive aid recipients, and assisting them improve their economic autonomy
- the importance of education in food production techniques, financing and marketing
- food in the context of community resources (physical capital, social capital & natural capital) and
- links between population trends, food demand & ecological pressure and the importance of education & access to family planning

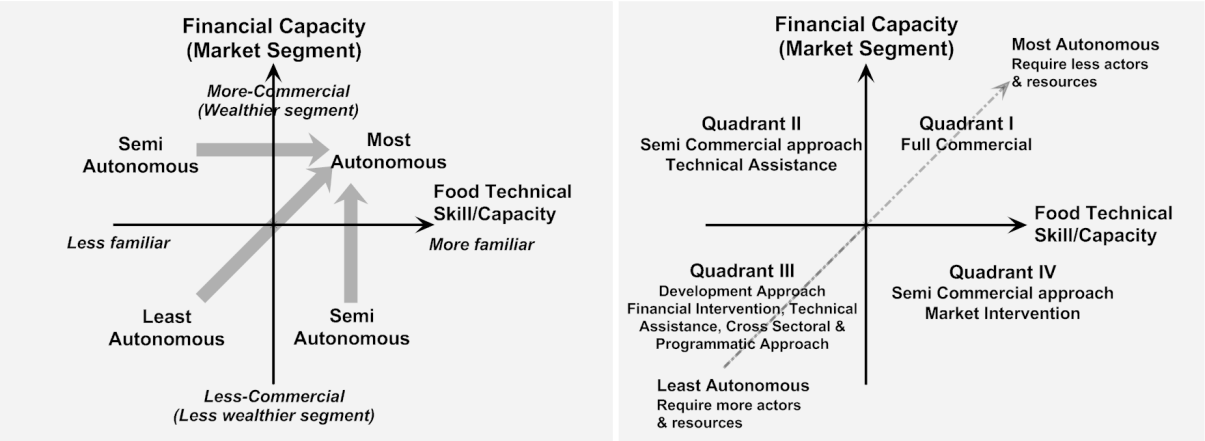

Figure 3. Community capacity as a function of financial & technical capabilities, viewed as necessary conditions for food autonomy

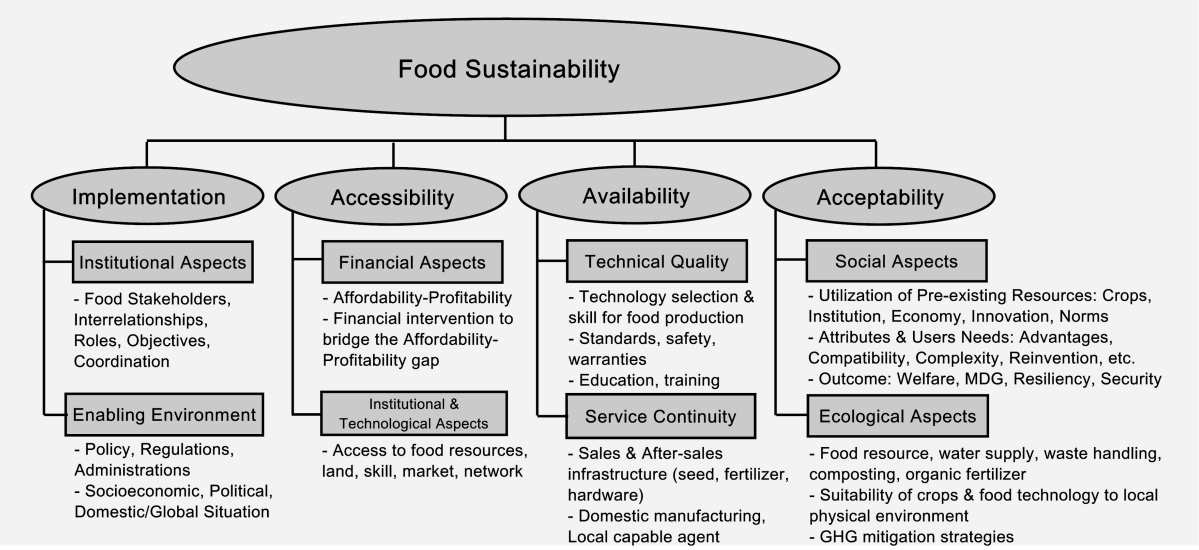

Figure 4. The I3A framework for Food Sustainability: A food intervention strategy that maintains food Accessibility (financial, institutional), food Availability (technological, institutional) and food Acceptability (social, ecological) during and beyond the project intervention

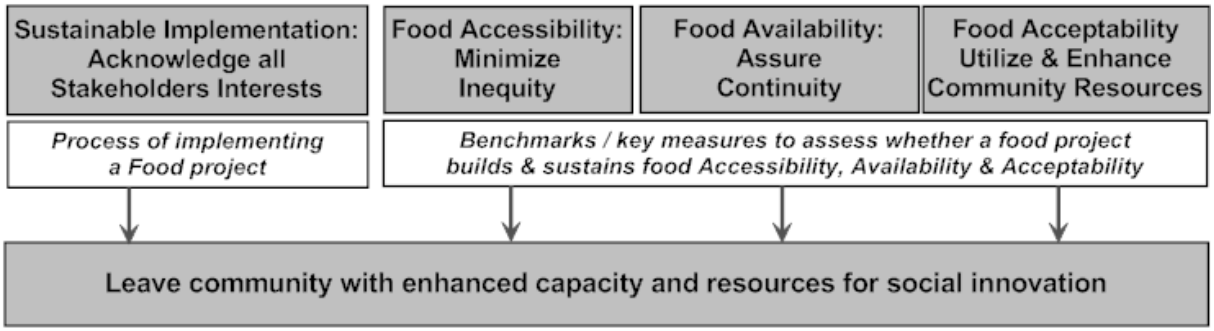

Figure 5. Use of I3A framework as a design and assessment tool for intervention in food sustainability

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