Establishing an Evolutionary Learning Laboratory
for Labor Saving Innovations for Women Smallholder Farmers

The world truly is at a cross roads. We face many complex problems whose solutions will take more than just physical resources and financial expenditures. Michail Gorbachev, 1995.

SECTION I: The proposal

Women farming degraded land using diverse and often complex, but inefficient farming systems that depend on physical labor is characteristic of agricultural production in sub-Saharan Africa. And a single labor-saving technology, or even a selection of technologies, will not provide much impetus for permanent change among these farmers unless it is fit-for-purpose, not just agriculturally, but also socially, psychologically and culturally. **Our proposal argues, therefore, that it is not a thing, an item, a technology or a device that is needed to assist African women. What is needed, instead, is a new way of thinking about the whole of the sub-Saharan farming system and the interactions between its component parts.**

Systems thinking and evolutionary learning laboratories

Systems are fundamental to the organization and functioning of the natural world, as well as the built environment, and the interdependence of system variables is ubiquitous. They interact with one another so thoroughly that cause and effect cannot be separated. Over the long-term, we therefore make many decisions with systemic impacts. These can be innocent accidents, like selecting 'reply all' when sending a private comment to the originator of a group email. Or deliberate choices, like refusing to ride a bus to work rather than drive a car. Both actions will affect the systems in which they occur, although we may have made our decision without any thought of the existence of the larger systems of which our actions are a part.

Over the long-term, the most insidious consequence of non-systemic decisions or solutions to problems, such as traffic congestion in a city or agricultural poverty in a rural sector, is the increased need for the introduction of more and more 'solutions' because no decision that was made considered the impact of the solution on the system as a whole or vice versa. This is why government or NGO interventions (although done with the best intentions) are not just ineffective, but are 'addictive'. They foster increased dependency and lessen the ability of local people to solve their own problems. In circumstances where beneficial changes are desired in systems, for example, reducing women's workload, actions are required that foster awareness among the stakeholders of the systemic nature of social and natural systems.

Experiments in *systems thinking* and associated *evolutionary learning* are beginning to yield behaviors among social groups, including farmers and businesses, that promise to not just change individual lives, but to change the world (as grand as that sounds, it is true). As an approach to understanding and solving problems, systems thinking, and its learning corollary, represent interaction, conversation and awakening, the acquisition of new habits of thought and action based on a fundamental reality that is commonly ignored: cause and effect are not linear. Thinking and action evolve, not in a straight line, but in spirals, circles and webs. We can, for example, give a woman farmer a solar oven to alleviate the need to collect firewood. However, the results have been universally disappointing because of the failure to acknowledge the underlying system of poverty and cultural habits, the lack of education and technical capacity and the poor capacity for institutional support.

The systems thinking proposal we are advocating focuses on the mental, cultural and institutional environment awaiting the stove. Our Evolutionary Learning Laboratory (ELLab) is an innovative and creative process in which a diverse group of stakeholders engage in a cyclical process of learning together in an 'experimenting laboratory' to understand and address complex multidimensional and multi-stakeholder problems in a systemic way. The laboratory is not a physical space, but a place in the minds of the participants. The ultimate goal is to achieve sustainable outcomes through the interaction of all the system variables, e.g., the women, the stove, the children, government, donors, food and fuel suppliers, designers, whoever and whatever is in the system since all variables are critical to its success.

That system thinking and the concept of an Evolutionary Learning Laboratory can work has already been proven. The outcomes of ELLab experiments can be seen, for example, in the Cat Ba Biosphere Reserve in Vietnam, which is currently successfully supporting the interconnected activities of conservation, land reclamation and tourism.

SECTION II: Project design and implementation

Proposed is the establishment of an Evolutionary Learning Laboratory (ELLab) for investigating labor saving innovations in Sub-Saharan Africa and South Asia.. The processes of the ELLab will involve all relevant stakeholders from the end users of new technological innovations and management strategies to the developers of technology and policy. Stakeholders will all work together to define appropriate solutions that will be useful, practical and applicable in different cultural, economic, political, social, and environmental contexts (Steps 1 to 5 of the ELLab).

Timeline	Cost	Steps	Activities
Months 1 - 2		**Planning**	
Months 3 - 5 2 persons return air tickets Africa and Vietnam	$9,600	**Step 1: Shared understanding**	Mental models reflect the beliefs, values and assumptions that we personally hold, and they underlie our reasons for doing things the way we do. The first step is therefore to gather the mental models (mind maps) of all the stakeholders through workshops, discussion forums and interviews in predetermined localities in Sub-Saharan Africa and South Asia to:.
			• *develop an understanding of women farmers' unique and changing needs" in specific natural, social, cultural and economic environments*
			• *review what has not worked in the past in order to better understand the various constraints to farmer adoption of labor saving innovations*
			• *generate ideas that will revolutionize current approaches to crop protection, management and harvesting" (particularly focusing on transformative labor-saving solutions)*
Months 6 - 8 2 persons return air tickets Africa and Vietnam	$9,600	**Step 2: Capacity building**	Workshop participants will learn about the basic concepts of how to think holistically and how systems work by being actively involved in the process of model construction
		Step 3: Model construction	The main purpose of integrating the mental models into a generic systems model is to have a transferable tool (widely applicable in different contexts and countries). The tool will describe how an understanding of women farmers' needs and perspectives inform the nature of the system they are dealing with and how other stakeholders such as technologists, politicians and developers could use this understanding to develop labor saving innovations and practices.
Months 9 - 12 2 persons X2 return air tickets Africa and Vietnam	$19,200	**Step 4: Identification of systemic interventions**	The effect of changes to components (different strategies, technologies, factors from outside, etc.) of the system will be tested to identify those that have the biggest effect on the end goal;
		Step 5: Develop an implementation plan	Novel practices, technologies and more creative designs of solutions will inform an appropriate implementation plan.
Dom Travel	$3,160		
Accom & Meals	$10,560	2 persons X 24 days Africa and Vietnam	
Researcher time	$34,020	Researcher 1 15% of FTE + on-costs	
	$15,620	Researcher 2 20% of FTE + on-costs	
Total	**$100,000**		
Months 13 - 18 Reporting	**Essential outputs and outcomes to be generated during phase 1**		
	Transferable Systems Model serving as a basis for identification of systemic novel practices and technologies that will decrease labor expenditure for women in all areas of activity (e.g. weeding row crops, planting, irrigation, balancing family responsibilities with work activities)		
	Guidelines for the design of solutions during Phase II that will comply with the needs of farmers and other stakeholders in various contexts.		
	Cost benefit analysis built into the systems model (testing scenarios for Phase II)		
	Models (informed by the mind maps of stakeholders) to positively affect incentives for farmer adoption of labor saving devices and criteria to measure adoption over time through the ELLab (in Phase II)		

PHASE II

After the guidelines for designing new innovations have been created and an implementation plan has been developed (purpose of Phase I) the research team will continue to establish the ELLab by coordinating the final steps and the ongoing cyclical process.

Step 6: Implementation: The systemically defined strategies, technologies, tools and policies addressing the root causes of the problems around boosting labor productivity will be implemented in the context of the learning laboratory (i.e experimenting through learning by doing) .

Step 7: Reflection:. Participants determine how successful or unsuccessful the interventions are and identify unintended consequences and new barriers that were previously unforeseen. The iterative process serves as a valuable informal co-learning experience, leading to new levels of capability and performance by both the end-users and those designing and providing new technologies, tools and management strategies.

Once the Evolutionary Learning Laboratory has been established and institutionalised it will operate as a management tool during phase II for the further development and refinement of appropriate technologies, reform and continuous improvement of labor saving innovations for women smallholder farmers. Of particular importance will be to facilitate the cyclical process of evaluating the adoption of innovations, identifying barriers to success and refining the systems model (management tool) and implementation plan. The ELLab will have global access to other similar initiatives in other parts of the world through the existing Global Evolutionary Learning Laboratory (GELL).