

Narrowing the Gap between Academia and Practice through Agroecology: Designing Education and Planning for Action¹



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Abstract

The Swedish project Agroecology in Practice⁷ [AGROECOPRAC] has a mission to alleviate poverty in households that depend on small-scale farming systems. The method is to establish agroecology education in farming and food systems that are aligned with challenges in small-scale farming. We recognize overwhelming challenges of low productivity, inadequate inputs, poor equity of food distribution and limitations of market infrastructure that can be overcome by thoughtful applications of appropriate technology, through informed and appropriately trained agricultural stakeholders, including educators. We developed an approach to designing creative education and training for action that integrates farmers' knowledge and practices, development work, extension, education and research using whole-systems

approaches from agroecology, with unique applications in universities in Uganda, Ethiopia and Sweden. The approach involves program coordinator workshops, teacher training, coordinator meetings, annual general meetings and short courses to facilitate the establishment introductory courses and MSc programs in agroecology. From participant evaluations we conclude that this approach to planning and implementation is narrowing the gap between academia and practice by fostering shared understandings of small-scale agriculture, introducing new educational methods and promoting communication among stakeholders.

Key words: action research, agroecology, small-scale agriculture, participatory methods, agriculture development

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Introduction

According to World Bank (2007) there are more than 1.5 billion small-scale farms with less than 2 ha of cultivated land, with these farms “the most common form of organization in agriculture, even in industrial countries.” Naranjo (2012) presents five mediating factors that describe why small-scale farmers often are caught in a “vicious cycle of poverty, hunger and environmental degradation,” including limited access to quality land, lack of control and tenure, limited access to credit, difficulties in allocating labor to family production versus wage earning off the farm and poor access to market infrastructure. Additionally, Altieri and Nichols (2008) claim that research clearly shows small scale farms to be more productive per hectare than large scale farms, due to farmers’ understanding of local production resources and striving for production efficiency with internal resources.

This current reality stimulates a challenging question posed by an official from SIDA (Swedish International Development Cooperation Agency): Why are agricultural universities uniquely focused in their research, education and training on large-scale and highly-mechanized farming systems when more than half of the agricultural lands on this planet are in the hands of small-scale farmers and managed by people in poor households who can’t afford the inputs needed for a high-tech farming system?

Mainstream agricultural education programs have been designed to: 1) focus on large scale industrialized farming systems demanding amounts of fossil fuels most peasants cannot afford; 2) present specialized courses where students’ knowledge and skills are narrowly concentrated on some components of a farming system; and 3) build on a mechanistic worldview and deliver lectures, problems and/or case-studies where there is a correct answer already decided by the teacher. Such programs may not prepare graduates well for future challenges, where many problems are complex, context-dependent and multifaceted with several potential solutions.

As a response to this situation a SIDA-financed training and education project Agroecology in Practice (AGROECOPRAC) has the objective to support poverty alleviation for rural households based on their small-scale farming systems. The Swedish University of Agricultural Sciences (SLU) in collaboration with Mekelle University (MU), Ethiopia and Uganda Martyrs University (UMU) hosts the program. These two African universities were chosen because of an expressed interest from well-trained instructors ready to initiate Master of Science (MSc) degree programs in agroecology and agreement from administrators that there would be institutional support for such an initiative. The general vision in the project was to establish an action-orientated, interdisciplinary education and training program that integrates farmers’ practices, development work, extension, education and research using the platform of agroecology as ‘ecology of food systems’ (Francis et

al., 2003). The long-term, continuing objective has been to support poverty alleviation for households based on small-scale farming systems.

One shared long-term goal in these universities is to establish a cadre of well-educated and practice-oriented agroecologists who understand the challenges of small-scale farmers. In this paper we discuss the approach used to successfully establish practical and relevant agroecology MSc programs and introductory courses in Ethiopia, Uganda and Sweden. We strive to answer this question: Did the approach used in the development project AGROECOPRAC result in successful interdisciplinary educational programs that are action-orientated, have incorporated experiential learning, with competent teachers running them, that can help narrow the gap between academia and practice especially as related to small-scale farmers and agriculture? We describe five steps in this process and an evaluation of each, with the goal of providing guidelines to others who plan to design programs with similar objectives.

Methods

The overall strategy used to design courses and to integrate them into a coherent MSc degree program in each university includes participatory learning for responsible action (Lieblein and Francis, 2007), using open-ended cases in the field (Francis et al., 2009) and applications of ecological principles such as local adaptation and uniqueness of location in design of farming systems (Altieri, 1983; Gliessman, 2007). In keeping with the fundamentals of agroecology, each university program was designed for the agroecoregion in which education takes place and for the conditions where graduates are most likely to do future research and education. Formative evaluation was done through surveys and participatory evaluation methods with instructors, students and other stakeholders to evaluate and adjust the design process as measured by survey results and observations. These are reinforced by quotes from instructors implementing the program. Such results on both content and specific methods for learning were used in an ongoing way to inform the steps in the design process:

Overall Coordination of the Program

Startup Workshops – We followed the principles of participatory and collaborative decision making that would lead to identifying: 1) what important thematic areas should be included in a master program, based on how the experienced teachers defined the most important knowledge, skills and attitudes of a person who would graduate with the MSc degree in Agroecology and then begin professional activities in the field and 2) how a pedagogy of experiential learning working with farmers on their farms using an “open-ended case” approach to learning could be applied to building capacity of graduates to work successfully in their future careers in communication with farmers and other stakeholders.

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Coordinators Meetings – These were scheduled regularly to promote close collaboration among the planners from the participating universities and assure that the group was pursuing common goals, finding creative ways to integrate agroecology into each university and clarifying financial and administrative project matters.

Workshops for Evaluation and Quality Control – These involved building consensus on necessary qualifications, methods of achieving goals and assessing progress of new programs for Master thesis students.

2. Training of Teachers (ToT) to develop a solid basis for understanding and teaching systemic approaches to study of farming systems. This included activities in the field in order to experience and further explore the holistic and detailed knowledge of farmers and to learn how to practice participatory approaches and methods with students.

3. Annual general meetings to agree on steps to implement the SIDA project. Participants met to assure that designed courses and the overall strategy was coherent and appropriate to meet the local goals and needs of students in the participating universities and to collaboratively develop the design and contents of locally adapted program and courses.

4. Short courses with stakeholders were designed to create awareness among other agricultural stakeholders at all levels to show how agroecology strives for a holistic understanding and the complexity in agriculture, including challenges at all levels in society, as well as, to provide a continuing orientation and education for the teachers who were learning to bridge the academia – practice gap.

5. Conference for stakeholders and universities was a meeting designed to present agroecology as an approach to agricultural development, the MSc education and the competence of MSc graduates to relevant stakeholders and to extend the concepts and approach to other universities potentially interested in starting their own programs.

Important to all activities in the program was promotion of systems thinking, experiential learning, integration of enterprises, dependence on local resources, emphasis on local food systems and sincere attitudes of participation with farmer stakeholders. Participatory and Action Learning approaches (Marquardt and Waddill, 2004; Narayanasamy, 2009) have helped participating farmers incorporate perspectives on their own farms and advisors to better understand the context where their clients are operating. Agroecologists must approach farmers with humility and willingness to learn in the field. As instructors, we need the same qualities when working with students, farmers and other stakeholders. These same thematic ideas have been used in planning all activities.

Results

Evaluations from meetings and ongoing interactions among instructors in three universities provide

insight on how this planning process of collaborative development and introduction of locally adapted educational programs and courses in agroecology is succeeding in bridging the gap between academia and practice. Most results are from the participatory evaluations done at the Annual General Meeting (AGM) in 2012 and from conversations with instructors, students and farmers who have been part of these five activities. As a qualitative case study, the discussion and conclusions are based on both surveys and personal interaction of the authors with participants.

Overall Coordination of the Program

Discussions provided information on the ways that arranged activities of the overall project have contributed to design and conversations have revealed that these meetings were important places for networking, exchanging of experiences and project team building. Discussions also uncovered unique circumstances and challenges that were presented in the three different countries and universities. Participants found these workshops useful in harmonizing multiple understandings of the project focus and scope and helped build the project partnership. The meetings provided a forum to jointly plan the way forward and raised a common awareness of the importance of quality. Among the participants there was a major paradigm shift from the traditional discipline and sector-oriented thinking to a system- thinking approach where the farm is seen as

Table 1. Summary of workshops, annual general meetings, coordinators meetings, trainer courses, short courses, and conferences held in AGROECOPRAC from 2008-2013.

Activities	Year and Location		Number of participants
Start up workshops	2008	SLU	11
	2008	MU	40
Annual General Meetings	2009	UMU	On average yearly: 10 participants / University In connection with Conference
	2010	SLU	
	2011	MU	
	2012	Addis Ababa, Ethiopia	
Coordinators meetings	2009	UMU	6-7/meeting
	2010	SLU	
	2011	MU	
	2011	MU	
	2012	MU	
	2012	Addis Ababa, Ethiopia	
	2013	SLU	
Trainer of trainer courses	2009	UMU	Total: 70+ participants Courses at UMU and MU where also open for teachers at SLU.
	2009	UMU	
	2009	MU	
	2009	MU	
	2010	SLU	
	2012	MU	
	2013	UMU	
Short courses	2009	UMU	Total: 161 participants at UMU and 102 at MU Central region Eastern region Tigray area Mbarara region and Fort Portal Northern region Tigray area
	2010	UMU	
	2010	MU	
	2011	UMU	
	2012	UMU	
	2013	MU	
	2013	MU	
Conference	2012	Addis Ababa, Ethiopia	58 Open for politicians, NGOs, other universities
Workshops for improved theses quality	2011	Trelleborg, Sweden	18
	2012	Malmö, Sweden	18

part of a large environment with many components that work together for sustainability. This in turn leads to food security and improved incomes.

Training of Teachers

Participants in these courses included more than 70 teachers, who reported on a survey that they were able to broaden their horizons in agriculture through the perspectives of agroecology and become better prepared to think systemically and appreciate the need for experiential learning. Several cited the importance of gaining an in-depth understanding of agroecology and its relationship to Extension and how this could help in improving livelihoods of small rural farmers. Others appreciated learning how agro-ecosystems function, as well as how design of systems impacts their sustainability. The importance of networking was expressed by several colleagues who appreciated the fantastic experience of meeting teachers from SLU, UMU and MU and developing an academic knowledge that is based on shared experiences from other countries. One African instructor observed that:

"This was done in my own country, my own village, but I had never visited this particular farmer [and] was surprised by how much knowledge she had. Now the farm is a model for my teaching ... I now take students to the farmers not the university farm.

It has enabled me to bridge theory and practice and it has turned me into a better listener to my students. I now involve my students better in knowledge generation."

These highly impactful comments represent changes in attitude and perception by teachers about their roles in education and how to better involve both farmers and students.

Annual General Meetings [AGM]

Without exception, there were positive answers about the AGM from the 22 respondents to several key questions on an evaluation survey. On average, there was 87% agreement that the project would not have been possible without the AGM meetings. The principal comments from participants emphasized the importance of networking, such as sharing of ideas and experiences, planning for future activities and building a reservoir of knowledge about the participating institutions.

Some of the impacts that were reported included participants' perceptions of the value of all activities and they described how the AGMs served to provide an overview of what has been achieved, while also reviewing the directions and filling identified gaps in the current program. They were focused on finding solutions to project challenges, adjusting and completing the curriculum and integrating evaluation into project activities,

Short Courses with Stakeholders

Over the project period from 2010-2012, there were 224 stakeholders involved in these short courses and there were successful elements that contributed to the

implementation of the program and also to ongoing planning of educational activities with students:

At Mekelle University [MU] there were separate short courses designed for farmers and other stakeholders. Observed strengths of this strategy were well-focused training with a high level of interaction among participants, season-appropriate training and participant-accessible training language. Weaknesses included difficulty solving cross cutting issues among stakeholders and gaps in identifying demand-driven research ideas. Praises for the courses included relevance, timeliness, applicability and useful all-round knowledge. Participants would have preferred smaller numbers of trainees in each course and wanted follow up courses to supplement their experiences.

At Uganda Martyrs University [UMU] the short courses were for mixed stakeholder groups. The only weakness expressed by the teachers was how to satisfy all expectations because of diverse participant backgrounds. Strengths observed in courses for mixed stakeholders included sharing diverse experiences and views, highlighting importance of multidisciplinary development approaches and bringing in key players who are important to policy formulation.

The short courses also reached a wide range of stakeholders and helped to bridge gaps and bring the university to the community, while identifying locally relevant content and providing hands-on experience.

The main critiques from the participants were the short duration of the course, desire for more details, limited number of participants and lack of follow up meetings and courses. At SLU in Sweden, no short courses were held.

Conference for Stakeholders and Universities

We asked participants in the conference what activities made the greatest impression on them and specifically: "What do you think is most important for future education to support sustainable development of small-scale farming and small-scale farming's contribution to sustainable development?" Activities mentioned most frequently as making the greatest impact were the presentations done by six MSc students (two per University) of their theses work, noted as valuable (the highest rating) by 14 of the 35 respondents.

Three main areas that were highlighted as most important by the 35 respondents included recommendations to pursue:

1. Social networks that included collaboration and sharing of experiences from three universities with broad participation – including farmers, open dialogue and respect for all ideas generated on the reflections made by different participants;
2. Focus on issues related with sustainability in ecosystems, discussions on systems thinking and relevance of the issues to the current world situation; and
3. Boosting the sustainable agroecological program, introducing ecological principles and knowledge to

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improve food production and security and providing good inputs for expanding research activities.

The conference participants also suggested more emphasis on programs to 1) reach different target groups, 2) interaction between theory and practice and 3) increased visibility of the program. For example, the first aspect could be accomplished through providing education for a greater number of students who are from different regions, extending the program to other undergraduates and high school students and including short-term training for different practitioners and particularly for grass-roots level project implementers. This could be completed by organizing workshops and other activities to influence policy makers, strengthening the existing MSc education, opening a PhD program and launching similar programs at other universities. Additional suggestions were introducing short courses in other countries, continuing discussions among teachers and students, promoting mobility and exchange and launching an international agroecology network and international PhD program. To further narrow the gap between theory and practice (2), participants urged more interactions between educators and farmers, including placing agroecology students to live with farming families in rural communities for some time to understand the system. Future educators need to engage smallholder farmers and industry players when identifying problems and this will help to relate agroecology to practice. There was strong concern to keep education multidisciplinary and transdisciplinary and that all education, training and research be focused on participation with deeper collaboration with NGOs. One suggestion to encourage linking of real life experiences to concepts and theory is to integrate small scale farmers into knowledge generation as resource persons and let them guide much of the hands-on experiences of students.

Visibility of the program (3) could be improved by encouraging researchers to channel more results into publications, writing about the best practices on every farm visited to be circulated or put on web site and creating greater awareness among the public, policy makers and NGOs. This can be accomplished by bringing key policy makers into the decision making for education, sharing results of research with those with the need to know and documenting work done so far for the wider community to be informed through appropriate local channels.

Overall reflections from teachers who participated in the courses, workshops, conference and other activities provide a multi-dimensional window on the program and evaluation of instructors, students and farmers experiences working with the MSc program and the introductory courses. They reported in the evaluation a number of on-going challenges as well as joys of working with students in practical agroecology education.

Challenges identified by teachers were inadequate educational resources and internet connections, insufficient institutional support, especially during initial phase

and need for more multidisciplinary knowledge and time for teachers to train. They recognized the need for time required for thesis supervision, building effective teams and scheduling supervisor meetings. Essential to progress is deciding how to best assess learning and evaluate clarification of attitude. There is still limited time for practical fieldwork and limited mobility funds. Another challenge is balancing different knowledge levels to accommodate all students. There are worries about a discrepancy between agroecological thinking in courses and project work and the ideas that still prevail in government and other organizations. Field experiences often reveal a gap between theory of agroecology and current farmer thinking about practices and systems and this needs to be bridged by participatory demonstrations and other activities jointly planned by all stakeholders. Finally, the time needed for launching a new program especially in meetings with educational administration is generally underestimated.

The positive aspects mentioned by teachers include a renewed focus and motivations for research that is demand driven, highly relevant and contributes to solving real problems of local people. It is stimulating to hear positive student responses such as, "Aha, this is what I am searching for!" Both teachers and students learn that team working can be fun, while also expanding horizons that proves useful for all players. It is also stimulating to further agroecological thinking while learning in collaboration with stakeholders. Co-learning with students brings diversity, spirited discussion and greater student participation with new methods of learning and it is exciting to follow development of students and changes of thinking while they are interactive and motivated in this new learning landscape.

Observations on the Agroecology MSc Program from teachers and some of the 50 students who have completed the two-year study course and thesis include:

- Mekelle University (MU) teachers are pleased with applicant numbers, but hope to accommodate more students in their program because of the large number of applicants. Program content and learning activities have achieved an agro-ecological awareness in students, as demonstrated by highly relevant thesis projects. The program is well integrated in the university but needs more project support. Staff training and student perspectives both need continuing development, with hopes for increased future exchange of students and teachers and south-south initiatives.
- At Uganda Martyrs University (UMU) teachers are impressed with a new program that is attracting students and with how they have gained an agro-ecological perspective in their courses. Integration at university level with other courses has been accomplished and teachers are content with facilities and resources, motivation and capacity building of teachers and student thesis projects.

Instructors express a need for more exchange of students and teachers with other universities.

- Teachers at the Swedish Agricultural University [SLU] are pleased with the course content and feel competent in their abilities to develop an agroecology context that is meaningful for their students. Integration on the Alnarp campus, appropriate facilities and resources, motivation for capacity building among teachers, useful student exchange and good thesis research topics are highlights. An ongoing problem at SLU is attracting students due to admission and tuition changes.
- All three universities report that field trips, farm visits and extension interactions have been valuable for students as core components of courses. Farmers are willing to receive students on a continuing basis and organizations in agriculture find discussions with students to be valuable. This demonstrates achieving the goal of respectful collaboration with stakeholders, a key to successful communication and mutual learning.

Observations on the introductory courses come from teachers who have taught 125 students during 2012:

- At MU experience has shown that more credit hours should be allocated to the course due to level of work. Students appreciated the course relevance and multidisciplinary delivery system; yet provide useful critique about the short course duration and not enough spots for the number of students wanting to take part of the course.
- UMU agroecology teachers have urged their university to institutionalize both introductory and short courses. Students from various disciplines appreciated the concept of agroecology and the power of systems-wide thinking. They recognize the importance of contextualizing knowledge into their disciplines and gaining insight into the M.Sc. agroecology program. Students found the course to be too short.
- At SLU a distance internet course is jointly taught for the past eight years within the network AGROASIS (www.agroasis.org) that involves instructors from four countries. These instructors have underestimated their teaching time in the intense seven-week program each spring term. Facilitators have learned the need for clear instructions and making themselves more available to students in order to facilitate learning.
- In general, students praise good course organization and content that includes systems thinking, Kolb's learning cycle, reflective learning and agroecosystems orientation. The use of e-cases is successful and the main critique has been need for more detailed feedback from teachers.

Discussion

The approach to organizing and implementing this new educational program has promoted local develop-

ment and continued learning on the subject made possible through facilitating and establishing interdisciplinary contacts as well as cooperation with farmer organizations and local farmers. Instructors found that the planning process and several structured activities facilitated the design of the education through experiential learning, using open cases as a primary approach of working with stakeholders. Both teachers and student participants have been inspired by the process and look at the new methods with open eyes and a renewed energy for learning. Short courses have contributed to openness among all actors in the education arena. The courses have also served as an education for the teachers, giving them new ideas for preparing their own courses within the contexts of their own unique agroecoregions.

Difficulties have included the high costs of transportation of teachers and students to get out of the university to meet the farmers, villagers and representatives of farm organizations. Yet if seen in comparison to the high-cost laboratories and equipment often needed for high-tech science education it is not too expensive. The field trips should be seen as "in real life" laboratories.

It cannot yet be claimed that students have graduated with full knowledge of agroecology and understanding of small-scale farmers' livelihoods, due to the small numbers of graduates surveyed, inadequate for robust statistical analysis of the results. Yet from the evaluation of the conference and participant reports about thesis work in all three universities, we find that instructors and advisors are impressed by the performance of students and graduates after completing the program.

Essential in the approach are systems thinking, experiential learning, integration of enterprises, dependence on local resources, emphasis on local food systems and sincere attitudes of instructors and students toward participation with farmers. These are perspectives and skills that can be learned in class and practiced in the field with farmers and other stakeholders.

Overall organization of the program could not have been accomplished without workshops with stakeholders from all partner universities. One organizer said, "*Workshops were useful in harmonizing our understanding of the project focus and scope. They also build project partnerships, establish implementation plans and help identify all inputs required to start the project.*"

Annual General Meetings were essential to allow all participants to share ideas and experiences, use face-to-face discussions for future planning and assess progress. Other quotes from meeting participants indicated the importance of: filling identified gaps, reviewing our direction, finding solutions to project challenges, evaluating progress toward project goals, completing the curriculum and promoting quality of education. Also important were resolving differences in expectations about handling administrative matters, in selecting content materials of courses and modules, in dealing with different audit systems among universities and in deciding the content of final reports. Creativity is needed to work

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within institutional rules to maintain efficient and innovative approaches to agroecology learning. We clearly recognize that it is early in the programs of the three universities to draw definitive conclusions about the effectiveness of this organizational process to arrive at an optimum curriculum and the best courses. Future evaluations of the impacts of the educational strategies and focus on agroecology must solicit responses from graduates in the field, to assess their successes on the job and how the educational program contributed to their capacities to address complexity and change, both characteristics of future farming and food systems that are addressed in study programs in agroecology.

Conclusions

In conclusion we revisit the question: Did the approach used in the development project Agroecology in Practice result in effective educational programs that were designed to be action-oriented, interdisciplinary and with focus on experiential learning? Do these programs have sufficiently high quality content and appropriate activities that will help students who graduate narrow the gap between academia and practice and are there competent teachers designing and implementing the education?

Participatory and Action Learning approaches (Marquardt and Wadwill, 2004; Narayanasamy, 2009) have helped participants understand farmers' perspectives of their own farms. Agroecologists must approach farmers with humility and willingness to learn in the field. As instructors, we need the same qualities when working with students, farmers and other stakeholders as well as when working together developing new educational programs. Through the approach and process used in planning the agroecology educational programs and courses, we were able to develop a common base, but from that foundation each group has built programs that are appropriate to each local context and agroecoregion. The common challenges of instructors could be identified, discussed and resolved without arguments. Similarities in challenges and joys could also be openly discussed, which helps build confidence and ownership in the programs, as well as adding a degree of quality assurance.

"Having three collaborating universities all committed to the same vision and mission for agroecological education achieved the goal of narrowing the gap between academia and practice," said one of the instructors involved from the start of planning. The approaches used have proven highly practical, brought academics together with stakeholders in the farming sector and promoted quality communication based on mutual respect. One challenge is that teachers themselves have engaged in new learning environments quite different from others in their universities and perhaps assumed some degree of "academic risk" for venturing into this new frontier in education.

There has been a high demand for student places in the university programs and demand is further demonstrated by the interest of trainers and farmers for relevant learning activities designed for them. Although there is institutional wariness about this new approach to education, we conclude that most barriers can be overcome and that the agroecology and integrated systems approach has a high level of relevance in today's complex arena of agriculture and food system development. We anticipate that final stages of planning the program and further evaluation and analyses will further substantiate that this approach will have lasting impact on agricultural education based on positive experiences in Ethiopia, Uganda and Sweden.

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