

Women in transdisciplinary research – interacting with citizen’s science and innovation

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Introduction

It is a great honour to be a keynote speaker at this event. Mekelle University has always had a special place in my heart since I first came to this campus 21 years ago. Thank you, Fetien and Mitiku and Kindeya and Sara and all my other old friends here at the university, for inviting me to come back to Mekelle for this conference on “Women in Science, Innovation and Development”.

A bit of history: After first visiting the College of Dryland Agriculture in 1996, I returned in April 1997 with Chris Reij from the Free University of Amsterdam and Yohannes GebreMichael (now with Addis Ababa University) to discuss with Mitiku, then Dean of Mekelle University College, about collaboration in a second phase of the Indigenous Soil and Water Conservation programme, which became known as ISWC2.

This was implemented in seven countries in Africa, and the coordinators of the work in Ethiopia were Mitiku and Fetien. Together, we looked into local innovation in soil and water conservation in Tigray and tried to encourage formal scientists in academia and research centres to recognise local creativity and to support farmer-led processes of what we then called participatory technology development (PTD).

When Mitiku first introduced me to Fetien in April 1997, I can remember he said to us: “I’m sure you’ll work well together and will become good friends.” And that was indeed the case, also because Fetien and I share a keen interest in improving the situation of women. Since the start of our friendship and collaboration in ISWC2, we deliberately explored what not only male but also female farmers were doing in their indigenous experimentation and innovation – in other words, how they were doing citizen’s science.

Citizen’s science

I deliberately put this in the possessive form: citizen’s science, that is, science that belongs to citizens. This is to set it apart from the “citizen science” (without the apostrophe s) that is widely used now in this digital age of crowdsourcing: when citizens, i.e. members of the general public – the so-called “non-research actors” out there in society – test new technologies, such as crop varieties or management practices, report on local conditions such as incidence of disease or pests or birds and provide data to the scientists, often by mobile phone – in other words, citizens who

work for scientists who then analyse the data and own the results. If the farmers are lucky, the scientists may share the results with the farmers who provided them with the raw data. This is basically using local people as free research assistants.

No, what I am referring to with “citizen’s science” (with apostrophe s) is science that is practised and owned by citizens. I’m referring to the process of experimentation, knowledge creation and innovation that is happening in the real world, regardless of whether formal scientists are involved or not. In the case of agriculture, it is primarily rural citizen’s science – the experimentation that is done and the local knowledge that is developed by women, men, young and old in rural (but also some urban) farming who are trying to deal with a particular issue of interest to them – a problem or an opportunity or simply a new idea.

By exploring and supporting farmers’ innovativeness in land husbandry, Fetien and Mitiku and the many others in Tigray who were involved in ISWC2 tried to recognise, understand and strengthen the dynamics of indigenous knowledge. However, we noted that – in studies of local innovation and in supporting farmer-led experimentation – there was initially a gender imbalance. Most attention was given to the creativity and innovations of men and relatively little attention to that of women in farming as well as in processing and marketing farm products.

As mentioned, Fetien and I gave special attention to how rural women were experimenting and innovating on their own initiative. Fetien – as the first female lecturer in the College of Dryland Agriculture and as a daughter of a Tigrayan farmer – had a good eye and understanding for spheres of innovation by rural women in Tigray, and she discovered innovations that had not been noticed by male scientists or even by development agents living and working in the vicinity of the women. As described in one of her articles in the book *Farmer Innovation in Africa*, Fetien and her colleagues in ISWC2 found that most women innovators in small-scale farming were driven by poverty – because they had little access to farming resources such as land for cropping or oxen for traction and little family labour, especially in female-headed households, which at that time made up over 30% of the rural households in Tigray. These women were obliged to innovate – to find other ways of doing things with the available resources – in order to be able to feed their families.

The most striking innovations were those that went against tradition, such as ploughing as a woman (instead of hiring a man to do the ploughing) or using donkeys instead of oxen for traction. But by far the majority of women’s innovations were small- to micro-scale, less obvious changes in farming and food processing, such as digging infiltration pits, planting grasses for multiple purposes, trying to grow wild plant species in their backyards, making cooking pots that use less fuel to prepare a meal. They were thus showing how local resources can be used more intensively by resource-poor households (Fetien *et al* 2001).

Already in those early years of Mekelle University, staff members like Fetien – also male staff – and both female and male students became engaged in participatory research and joint learning with female and male farmers. In other words, Mekelle University has long been engaged in transdisciplinary research – in action-oriented research in the midst of development processes working closely together not only with other researchers but also with local farmers and artisans, development agents and local administrations – people in the wider society beyond academia.

Transdisciplinary research

There are different definitions of transdisciplinary research but what I refer to here is what Helga Nowotny calls “Mode 2 research” – knowledge production that involves numerous different social actors, is context-driven (produced in the process of interaction and application in real situations) and is subject to multiple accountabilities – not just to disciplinary scientific peers but to society. It transcends the barriers between academia and formal research, on the one hand, and citizen’s knowledge and science, on the other.

This goes far beyond multidisciplinary research – bringing together scientists from different disciplines to focus on a topic, each from its own perspective – and also beyond interdisciplinary research – synthesising the methods and analyses of scientists from several disciplines into a whole that is more than merely the sum of the parts. Transdisciplinary research goes beyond this: it involves not only bringing different disciplines together to gain a holistic understanding of complex issues but also collaboration with stakeholders to achieve an understanding that is informed by their perspectives and knowledge – and which, in turn, informs the perspectives and knowledge of all actors involved. It means not only citizens learning from scientists, but also scientists learning from citizens, through dialogue and joint exploration to create new knowledge. This approach to research leads to a paradigm shift in how scientists perceive themselves and their role in society – and also in how citizens see themselves and their role in science.

Transdisciplinary research is essential for enhancing agricultural innovation by small-scale farm households and communities. Particularly the complex issues of gender in development can be understood and addressed only through forms of research that intertwine with the knowledge and science of both female and male citizens in ways that respond to the particular situation of women in the given context. It is through the combination of different knowledge systems on an equal footing that innovation takes place – meaning change for the better in the way that things are actually done in the real world. Innovation does not happen within the walls of scientific institutions but rather out there, grounded in local action with local people such as farmers, schoolteachers, government staff and the private sector. The innovation process can be enhanced by bringing in formal scientific knowledge or methods, e.g. for validation or for providing new insights that lead to improvements that neither the local people nor the formal scientists would have imagined or developed on their own.

Making the flip

If formal scientists are to contribute to development in this way, the greatest opportunity to bring this about lies in education, such as at Mekelle University. Here you can nurture young people to develop the attitude, behaviour and skills needed to engage with the science of male and female citizens.

- 1) One way to develop the needed attitude and behaviour is to encourage students and teachers to identify local innovation and to explore together with farmers the questions that the farmers are interesting in exploring – in farmer-led joint research. This opens the eyes of both students and teachers to farmers' knowledge and capacities but also increases the farmers' pride in their own achievements and their confidence to interact with outsiders. Working in the midst of rural reality, students learn about the context-specificity of innovation in farming and the complexity of the technical, socio-economic and cultural aspects involved. While mentoring the students, the teachers gain a better understanding of the types of skills needed to operate in gender-responsive transdisciplinary research with small-scale farmers.
- 2) Another effective way to bring about a shift in perspectives is through the use of Local Innovation Support Funds (LISFs): providing funds to be used for experimentation, research and innovation by small-scale farmers. Funding is fundamental to determining power relations in research. In the case of LISFs, local community members decide how the funds will be used in research and innovation for the benefit of the community, and they also decide how outside scientists and other experts will be drawn in to support the farmer-led research. This puts farmers in the driving seat, and puts scientists in the position of being assistants to farmers. The experience of this turn-about ("flip") from conventional roles transforms how farmers and scientists see each other. Moreover, farmers develop more experience and capacity in deciding what kind of research is relevant for the community, and the supporting scientists develop deeper insight into the priorities and rationale of small-scale farming communities.

Such LISFs have been piloted near Axum here in Tigray Region and Ambo in Oromia Region and Amaro in the Southern Region, as well as in seven other countries in Africa and Asia, under the umbrella of the ProInnova network. ProInnova stands for promoting local innovation in ecologically oriented agriculture and natural resource management, and is an NGO-led multistakeholder network active now in 16 countries in Asia, Latin America and Africa, including Ethiopia. It built on the learning from the ISWC2 work. In most of the countries where LISFs were piloted, about 40–50% of the applications for experimentation and innovation were submitted by female farmers – but the percentage of women's involvement in Ethiopia was much lower. This reveals that there is still quite a bit of work to do among the supporting organisations here in Ethiopia – people from NGOs, research centres, advisory services and universities – to give equal attention to women and men in innovation processes.

There have been many attempts by ISWC2, Prolinnova and many other projects and initiatives to improve the capacity of NGO staff, advisors and researchers to integrate gender into their work, but a gender imbalance still remains. In conventional gender training, many people have heard what it means in theory – indeed, heard this many times over – but they seem to find it difficult to translate this into practice. Members of the Prolinnova network felt a need for tailor-made “grounded tools” to help them “genderise” their work in supporting farmer-led innovation and specifically in encouraging and supporting women innovators. This is why Chesha Wettasinha, a colleague of mine in the Prolinnova International Support Team, is coming to Ethiopia today to reflect together with Prolinnova partners on how to develop hands-on tools and skills to deal with gender issues in their daily work in promoting farmer-led innovation.

Foci for institutions of higher education

In relation to transdisciplinary research, citizen’s science and gender, I see two areas where Mekelle University and other institutions of higher learning should be active:

Firstly, in creating learning opportunities for current and future scientists to gain experience and skills in engaging in gender-responsive transdisciplinary research. Some of the skills and attitudes they need to develop, if they don’t have them already, are:

- skills in facilitating **communication** across disciplines and actors from formal science and society, e.g. to manage different expectations, to guide in understanding each other’s concepts and to ensure equality among all participants, whatever their sex or social status or level of formal education
- **openness** to the knowledge and ideas of others, to learning in action and to the uncertainty of trans-disciplinary research – it can’t be planned in a linear way, you never know exactly where it will lead, you need to be able to deal with messy processes
- **sensitivity** regarding how each actor – including oneself – is behaving in relation to the other actors involved in the process, with a special lens on gender issues, reflecting on these and striving to improve the interaction – this includes sensitivity to the gender implications of the innovation process
- **creativity** and **flexibility** to come up with new ways to approach challenges, also in research
- **courage** to dare to challenge the ways things have always been done, also gender norms
- **commitment** to the transdisciplinary research process and to the other partners involved in it.

There may be a need to strengthen capacity among academic staff in transdisciplinary approaches, so they can better guide students to apply such approaches and develop such skills in the process.

Secondly, the university should be activity encouraging above all women in both social and technical disciplines to gain these skills and attitudes and to engage in gender-responsive

transdisciplinary research. This is because: i) gender issues are more likely to be taken into account in agricultural research if social scientists work together with technical scientists; and ii) the concerns of women are more likely to be taken into account if female researchers are involved. This is not to say that men cannot do research together with women in rural communities but – with the current culture in many countries not only in Ethiopia, also in Germany, where I live – female scientists tend to have easier access to direct communication with women citizens, and these are more likely to feel confident and open in interacting with other women. Usually, female scientists are in a better position than men to appreciate women's issues in the home and society and to recognise women's knowledge related to food production, processing and preparation.

Some key activities to pursue

I close with some recommendations of key activities to pursue. Some of these may already be done by Mekelle University but, in that case, I simply want to underline how important they are:

- 1) Give priority (in terms of internships and funding) to students who would like to work together with female innovators as individuals or groups in transdisciplinary research, and especially female students should be given such opportunities;
- 2) Create spaces for female citizens who are involved in local experimentation and innovation to present and discuss their work with students and teachers, e.g. in the villages, at farmer innovation fairs, as guest lecturers at the university, as presenters at workshops and as practitioner-mentors of students in the field;
- 3) Facilitate networks among people – women and men – who are promoting local innovation and experimentation especially by women and are engaging in gender-responsive transdisciplinary research, so as to provide opportunity for mutual learning;
- 4) Provide small research and innovation funds to be accessed by women innovators as individuals or groups, e.g. an LISF for women's innovation for improved food and nutrition security – and be prepared to partner with these female farmer-researchers.

The overall objective of this gender-responsive transdisciplinary approach to agricultural research and development that combines conventional and citizen's science is to enhance the overall **capacity to innovate** within the entire system of small-scale agriculture so that the system can continue to adapt to new challenges and improve attention to the situation and knowledge and creativity of women.

Initiatives starting here at Mekelle University could lead to a revolution in how women academics engage with women citizens in transdisciplinary research. This would be continuing in the university's tradition of outreach and service to the citizens of Ethiopia, but with a very deliberate focus on how women holding different types of knowledge can combine forces to improve the livelihoods of small-scale farming families.