Blog 26: January 2014

Developing critical systems of learning competence: Is this the way out?

A few months back, Dr Laxmi Prasad Pant wrote a blog for AESA on learning and innovation competence. Expanding upon the earlier argument on developing 'learning and innovation competence', he developed the framework of 'critical systems of learning and innovation competence'. In this blog, he argues that critical systems of learning and innovation competence involving various levels of thinking and action is equally or more important than mere technological competence.

Albert Einstein's quote goes like this. "We cannot solve our problems with the same level of thinking that created the problem". Our study on critical systems of learning and innovation competence further supports this argument. We found that despite the agro-ecological competitive advantage and modest advancements in agricultural science and technology, Nepal has become a net importer of food grains, and India falls behind the non-conventional mango growers' ability to deliver mango yield, both in terms of quantity as well as quality. Can we address this problem using the same level of thinking that created them? Of course, not! Then what is the way out?

Clearly, the agro-ecological potential of the Indian mango sector and the Nepalese rice sector is not being compromised by the mere lack of advancements in agricultural science and technology in these two countries (and commodities), but more importantly due the failure to engage in critical thinking and action at various levels. Through our decade-long research, we developed the framework of critical systems of learning and innovation competence to address the question about what could be thought and done differently to effectively promote unintended positive consequences of well-meaning interventions, which we here use as examples that entail critical systems of learning competence?

We briefly discuss this key question here using a conceptual framework that have been developed through an expansion of our earlier concept of 'deliberation on dialectical divides' - divides that are

more dark and bright than black and white (Pant and Hambly-Odame, 2006). In our newer model, we recommend the use of three levels of deliberation (1) deliberation on development problems, (2) deliberation on the contexts that created the problems, and (3) their philosophical and theoretical underpinnings (Figure 1).

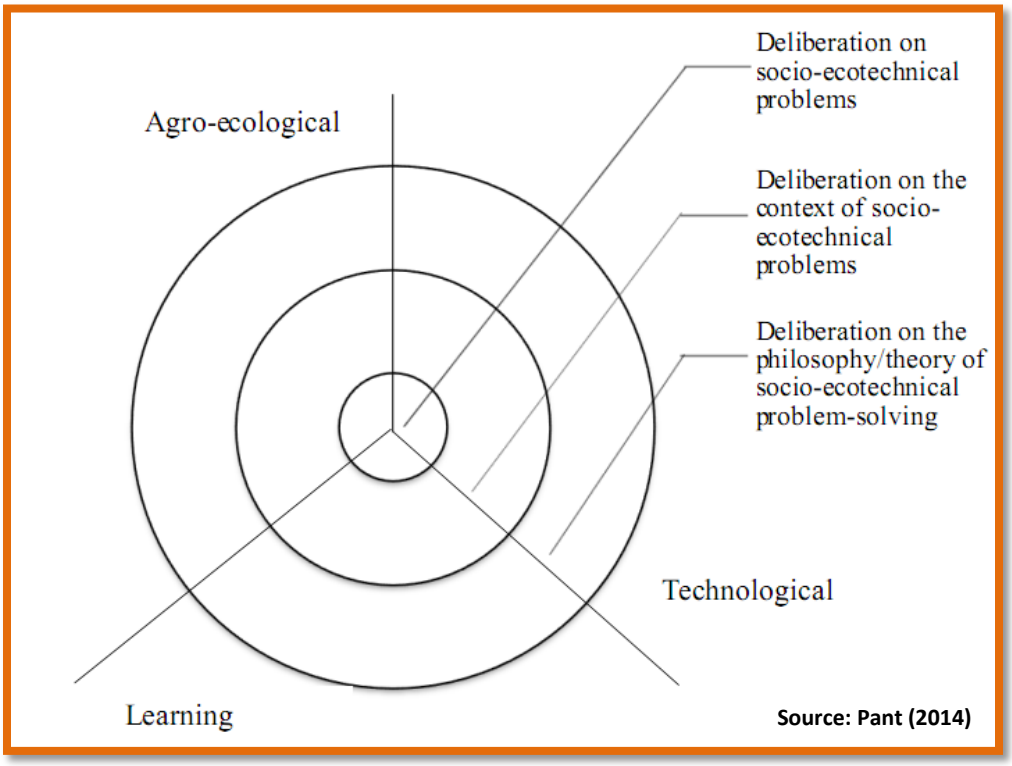

Figure 1: Multi-level deliberation on dialectical divides

Deliberation on development (socio-eco technical) problems:

Here the key development problem is the poor performance of the mango and rice sector, respectively in the Krishna District of Andhra Pradesh, India, and the Chitwan District of Nepal.

The interventions in mango (post-harvest) and participatory rice improvement have generated impressive outputs, such as improved rice varieties, mango post-harvest technology, and outcomes such as change in stakeholder relationships into more critical systems of learning and innovation. A rare human ingenuity was also evident, such as Nepalese farmers' self-motivated initiatives to improve local rice varieties for dry season planting and Indian farmers' exploration of domestic middle-class mango markets to supply premium quality mangoes to emerging super markets (see Pant and Hambly-Odame, 2009 and Pant et al., 2012 for further details).

But we have seen little impact on economic and social welfare of smallholder farmers even under the existing agro-ecological comparative advantage of growing mango and rice, extensive investment on the

part of agricultural and rural development, overseas technical assistance and the existence of farmers' organizations designed, inter alia, to stimulate technological learning and innovation.

For example, in Nepal, LI-BIRD (Local Initiatives for Biodiversity, Research and Development, Nepal) has been highly effective in facilitating multi-stakeholder deliberation on dialectical divides, such as integrating expert and local knowledge of rice varieties, centralized and participatory rice breeding, modern and local rice varieties, and rice varieties with and without regulatory legitimacy. Similarly, in India APEDA (Agricultural and Processed Food Products Export Development Authority, India) together with the State Department of Marketing facilitated stakeholder relationships to promote agro-ecological competence of using mango diversity bringing together farmers, public sector scientists, policy makers and mango traders albeit mostly on technical service delivery.

Despite these interventions, mango and rice diversity in these countries is still underutilized to enhance food security and national competitiveness. This finding implies that multi-stakeholder deliberation on agricultural biodiversity conservation and development problems *per se* are not enough unless people start questioning the contexts that have created the problems and the broader philosophical and theoretical bases of the problems.

Deliberation of the context of the problems:

Although we can argue that multi-stakeholder deliberation on the contexts of the problems of conservation and utilization of agricultural biodiversity was apparently lacking in both cases, thereby seriously compromising agro-ecological competence, some discussions were initiated around the interdependence of technological and institutional issues, and the need for looking at the context of the problems. Despite their modest advancements in agricultural science and technology, stakeholders generally agree that these countries (rather regions in case of India) fail to unleash the technological competence that could more fully utilize the existing crop diversity.

But this was not enough to convince stakeholders from research, policy, extension, and farming domains to deviate from their 'business-as-usual' habits and practices of doing agricultural research and extension, the underlying causes of the problems. What is important to the development of critical systems of learning and innovation competence is the agency of individual and organizational actors to engage in deliberation on dialectical divides, setting up new experiments that are designed to fail, and empowerment of vulnerable actors to challenge the business as usual based on new evidence generated from the new experiments, be they successful or unsuccessful (Ison et al., 2007).

Deliberation on the philosophy and theory of development problems:

Stakeholder deliberation not only requires addressing the development problems and their immediate contexts, but it should also look at the higher level of philosophical and theoretical underpinnings. For the purpose of illustration, we bring together independently evolved literature on socio-ecological systems and socio-technical systems.

On the one hand, socio-ecological system thinking has proven important to inform conservation and utilization of agricultural resources. This thinking, however, considers technology as a given entity without necessarily questioning what technology is good for local contexts and communities (van der Brugge & van Raak, 2007; Voß & Bornemann, 2011).

Socio-technical system thinking, on the other hand, explicitly addresses the complexity associated with science, technology and innovation processes with a more recent focus on transition management, particularly about how stakeholder agency for critical learning and innovation interacts with the structure put in place by the socio-technical regime of a nation, such as National Agricultural Research and Extension Systems (Smith & Stirling, 2010). Moreover, this body of literature focuses on transition experiments that are strategically designed to generate evidence-base to challenge the business as usual of the incumbent regime (Kemp et al, 1998). These experiments can serve as a safe space for critical thinking and radical actions without serious consequences of failure. In classical extension literature, this is akin to the trial phase of adoption process – awareness, interest, trial and adoption, but while the

classical adoption process is mostly orchestrated by the incumbent regime, the niche experiments are essentially radical to challenge the business as usual.

As outlined earlier, examples of the radical space of interest in agricultural innovation is the work of the Nepalese farmers who selected rice varieties suitable for dry season production with food quality comparable to the available main season rice varieties, and that of Indian farmers who successfully explored domestic middle-class markets as opposed to increasingly stringent and competitive export markets. Thus, up-scaling of such local level innovation agency of rural farming communities that are often only possible through strategically designed transition experiments would be important for successfully developing resilient, sovereign and productive local food and agricultural systems. However, up-scaling, if done prematurely, can also wipe out the core values of the niches that have been created by the agency of radical innovators.

To conclude, as implied by the unintended positive consequences of the well-meaning interventions, effectively addressing food insecurity should involve critical systems of learning and innovation, encouraging people to radically question their social, economic, ecological and technical reality – Indian mango growers turned to explore domestic middle-class mango markets, and Nepalese rice farmers challenged university trained plant breeders to select rice varieties for dray season cultivation. Thus, low and middle-income countries that are rich in agricultural resources, irrespective of their economic growth, cannot succeed unless technological competences are complemented by critical systems of 'learning competence'.

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