

Concept Note and Agenda: Sustainable Seed Innovations 2.0

Prof. Gregory Radick and Dr. Mrinalini Kochupillai

I Background

How can government policy in India – in particular, around intellectual property (IP) rights – incentivize innovation with indigenous varieties of seeds and other propagating materials? That was the question investigated in 2017 by a 9-month UK Arts and Humanities Research Council (AHRC) Global Challenges Research Fund (GCRF) project led by Principal Investigator Gregory Radick and Co-Investigator Mrinalini Kochupillai, in collaboration with the Art of Living (AoL) Foundation – a Bangalore-based worldwide charity with a strong commitment to promoting sustainable development – and Post-Doctoral Research Associate (PDRA) Natalie Kopytko, whose paper on the project research is currently under review for publication (together, the ‘Research Team’).

The question is an important one because, unlike the environmentally and socially damaging varieties imported during the ‘Green Revolution,’ indigenous varieties have been adapted for growth in local soils, climates, and human skill sets. As such, their promotion also has the potential to give struggling farming communities a distinctive commercial niche and a renewed sense of dignity. Through interviews with farmers and their representatives across India, culminating in the Sustainable Seed Innovations Conference 1.0 (‘SSI 1.0’) in September 2017 bringing together academics, farmers, lawyers, and government officials, the project has generated a set of new proposals for maximizing public credit for individuals (farmers, especially small farmers) and farmer groups who innovate with indigenous seeds.

Additional funding has now been awarded by the UK GCRF to accelerate the impact of the 2017 research and conference findings. The aim of this impact-acceleration project is to help translate the proposals made in the 2017 conference into action, through:

- (1) the holding of a second conference, the **Sustainable Seed Innovations Conference 2.0** (‘SSI 2.0’) to publicize and further discuss the work done by the Research Team since SSI 1.0 with the aim of finalizing the contents of a research-based position paper for the Government of India,
- (2) the writing and publicizing of the **research-based position paper for the Government of India**, co-authored by the Research Team and others, with the aim of bringing about necessary evolution in Indian laws and policies to support small farmers’ innovations and *in situ* agrobiodiversity conservation;
- (3) the web-based **dissemination of the stories of innovative farmers**, *inter alia*, through a dedicated website to be hosted by the University of Leeds and parallel stories linked and published through Art of Living’s websites; and
- (4) the **unveiling of a novel blockchain/Digital Ledger Technology (DLT) facilitated framework** for managing and monetizing plant genetic resources (PGRs) contained in farmers’ and indigenous plant varieties to bring socio-economic benefits to small farmers and their rural communities.

II Aim and Agenda of the Sustainable Seed Innovations 2.0 Conference

The 1.0 version of the project was concerned with incentivizing farmer-level innovation on and with seeds from often-neglected indigenous varieties in India. It was also concerned, in particular, with the greater role that public recognition for farmers’ seed innovation might play in that incentivization. This line of inquiry emerged at the meeting point of two research programs: first, Kochupillai’s study of how conventional IP together with certain governmental policies tend to undermine the traditional culture of seed saving and exchange on which farmer-level innovation with indigenous seeds depends, and, from a broader perspective, on which *in situ* agrobiodiversity conservation depends; second, Radick’s study of how innovation in the technosciences generally involves interactions between patent claims – IP narrowly construed – but also two forms of IP more broadly construed: priority claims (claims to have discovered or invented something first); and productivity claims (claims for the practical usefulness of a particular body of knowledge).

The 1.0 version of the project concentrated exclusively on priority claims and whether, in the spirit of Robert Merton's classic sociological analysis of the incentive structure in science, a better organized, state-run system for managing public credit for seed innovation might itself help stimulate further innovation. The results of Kopytko's interviews with farmers, along with the testimonials and inputs of participants at the roundtable held at the AoL campus in September 2017, were encouraging, and the Research Team planned, as per the recommendations that came up during SSI 1.0, to develop this research into a position paper to bring before the Indian government. At the time, there was no notion that such a credit-tracking/publicizing system might be monetized. At that time, monetization of innovation was still being thought as strictly to do with patent claims and other forms of "IP-narrow". There was also no link to the productivity-claims part of Radick's "IP-broad" proposal, aside from the suspicion that exaggerated claims for the productivity of genetics, as the indispensable key to successful plant breeding, were part of the explanation for why the seed-saving-and-exchange culture needed support for its continuation in the first place.

Since then, however, new work by members of the Research Team, done, *inter alia*, keeping the recommendations of the SSI 1.0 Conference/Workshop in mind, has led to breakthroughs on both of these fronts. From Kochupillai has come an exciting vision for how blockchain technology can be used not only to track and publicize innovation with indigenous seeds, but also to ensure that profits from the sale of those seeds go to the innovators and innovators' communities and countries. The blockchain facilitated vision also ensures that these monetary benefits can accrue while following a differentiated sales system that supports, rather than undermines, the culture of seed saving and exchange. In addition, the blockchain/DLT system would facilitate greater practical feasibility and ease of use to systems established under international instruments such as the Nagoya Protocol. These instruments support a kind of "productivity claim" by mandating "benefit sharing" with local and indigenous communities that grant access to specific Plant Genetic Resources (PGRs). Yet, because of the practical and administrative complexities inherent in the provisions of these instruments, they are sub-optimally utilized at present. DLT would help change this, ensuring that the spirit of these instruments is ethically and legally realized for the actual socio-economic benefit of indigenous communities, and for the overall economic development of the countries they are part of.

Further, from Dr Prabahakar Rao of the Art of Living has come a brilliant example of how traditional and farmers' varieties have their own deeply impressive productivity claims to make ("inherent productivity"): the old/new "Wonder Wheat," just named Sona Moti - a 2,000-year-old Indian variety of wheat with three times more folic acid than any existing variety. Also coming from the NGO partners Art of Living, is valuable practical insights of Traditional Ecological Knowledge (TEK) based farming systems that support this inherent productivity of traditional and farmers' varieties. Indeed, several of the SSI 1.0 conference participants (particularly the farmer groups) shared similar experiences. Within specific indigenous cultural contexts where this inherent productivity enhances the self-respect and worth of the entire community that has helped preserve/resurrect the variety or engaged with TEK based farming systems that facilitate this, the relevance of productivity claims going beyond IP Narrow is further enhanced and finds concrete expression.

And finally, from Radick has come a new way of teaching basic genetics which, by highlighting the importance of genetic backgrounds and gene-environment interactions as the main story (rather than an exception to the Mendelian rules), can help farmers understand *why* indigenous seeds grown in their home regions using traditional methods can be so much more productive as well as ecologically sustainable than the alternatives.

With this background, the aim of the Sustainable Seed Innovations 2.0 conference is to:

1. Recommend **shifts in the curriculums of agricultural universities** to facilitate a more well-rounded education that focusses not only on genetics, but also environmental factors,

2. Recommend **revisions in the content and focus of government agricultural extension services** to support the revival of holistic farming systems, including those based in traditional ecological knowledge of India (such as Natural Farming),
3. Recommend **shifts in agricultural law and policy** in India to support small farmer innovations,
4. Unveil a **novel DLT/blockchain facilitated framework for managing and monetizing PGRs** contained in farmers' and indigenous plant varieties in order to bring social, economic and cultural benefits to farmers as well as to the larger national economies of the countries in question, **while incentivizing the *in-situ* conservation of agrobiodiversity**,
5. To obtain additional feedback from the participants of the SSI 2.0 conference and other experts on the above 4 recommendations (in this regard, it is envisaged that most or several of the participants of the SSI 1.0 conference will be invited back to the SSI 2.0 conference) to finalize the position paper.

In addition to the above, one of the longer-term aims of the conference is to **spur Indo-European research collaborations in the field of farmers' innovations and *in situ* agrobiodiversity conservation**. Such collaborations are required, *inter alia*, for converting the DLT/Blockchain framework into a working model. The conference will also invite the Government of India to explore the possibility of it (co)funding the creation of the envisaged DLT/Blockchain solution.

The collaborations are envisaged as comprising of representatives from the government, NGOs, academia and farmers' groups, *inter alia*, for conducting multi-and trans-disciplinary fundamental and applied research necessary to convert the DLT/Blockchain framework into a working model keeping in mind various laws and ethical codes, as well as practical realities. It is anticipated that the recommendations of the Research Team together with the working blockchain/DLT model, once adopted and implemented, will support the socio-economic growth and well-being of indigenous farming communities. It will also help revive and protect agrobiodiversity *in situ*, support and facilitate innovations by small farmers, and promote more widespread adoption, especially by small and marginal farmers, of eco-friendly, sustainable farming practices including farming practices derived from Traditional Ecological Knowledge systems.

III Draft Outline of SSI 2.0 Conference (subject to change following discussions)

1. Welcome addresses
2. Keynote speech
3. Presentations by research team as a follow up to the SSI 1.0 conference (what all has been done since the SSI 1.0 from a research and action perspective, and what needs to be done in order to make most of the recommendations realizable in practice), including:
 - a. recommending new curriculums for Universities,
 - b. recommending new curriculums and objectives for agri-extension services
 - c. recommending changes to current Indian laws/policies, and
 - d. recommending a Blockchain/DLT framework as a means of accomplishing several of the goals identified by SSI 1.0 participants.
4. (Small/Specialist) group discussions on (additional) issues to be addressed when making concrete recommendations within the position paper for the GoI and when designing the working model for the DLT/Blockchain framework.
5. Additional discussions on possible sources of funding (including designing of international cooperative research grants/calls for proposals), action-items and timelines (this can start in Delhi and continue in Bangalore).

Note: A preliminary draft of the position paper will be provided to the SSI 2.0 conference participants and to the public before the conference. After obtaining additional feedback from all participants as well as from the general public, the final position paper will be released to the Government, the public and to the media by the end of the SSI 2.0 project (31 July 2019).