

## ISSC 'Transformations to Sustainability' Programme Concept Note

### **The future of seeds (and agriculture) in Argentina**

*Research Note from the Argentinean Workshop, 25 November 2014  
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#### **Introduction and sustainability challenge**

Our focus on sustainability challenges in the agriculture and food sector in Argentina will be a continuation of our ongoing research on the transformation of natural resource-based industries for sustainable development in Latin America, which began in 2010 with IDRC-funded work conducted on the agricultural, mining and forestry sectors in Argentina, Brazil and Chile (<http://nrpathways.wix.com/home>).

The dominant agricultural production system in Argentina and other parts of Latin America is based on high external input, intensive, large scale commodity crop production for export (e.g. soya, maize, sunflower, etc.). This system as a whole poses sustainability challenges of three kinds: (i) in the economic realm, commercial agriculture is characterized by the concentration of activities (e.g. few types of crop), of knowledge (e.g. inputs produced by very few international firms), and of production (e.g. large size of farm units) which poses development threats in terms of low economic resilience, little added value, and limited domestic capability building; (ii) in the social realm it is characterized by low levels of benefit sharing (e.g. little employment) and low involvement in decision making (e.g. farming is increasingly contracted out to specialist firms) and (iii) in the environmental realm it is characterized by, amongst other things, loss of biodiversity, ecosystem service degradation, and resource depletion.

Those challenges have adverse implications – amongst other things for food security, rural livelihoods, the health of rural workers and inhabitants and for global environmental change - but also for national development, given for example diminished possibilities for the creation of domestic technological capabilities, and threats to the long-term viability of the activity, which provides important source of income, rents, external exchange and capabilities to the countries.

Some of these challenges are beginning to be acknowledged by national governments and other actors, but it is clear that governments find them extremely difficult to

respond to. We discuss in this note why and will propose a way to help to address these challenges with our research.

## **Historical background**

Argentina became integrated into the world economy during the 19th century by producing and exporting agricultural products. The agricultural sector has since become a key provider of resources, rents and external exchange for Argentina (e.g. the agricultural sector and related activities explain around 40% of exports). As such agriculture it is not only an economic activity on its own right, and a means of producing food and feed, but it is also one of the key means of sustaining the rest of the economy (e.g. foreign exchange from agriculture is used to purchase machinery that cannot be produced domestically, and that allows the rest of the economy to function, and agriculture provides significant fiscal revenues that fund education, health etc.).

A major factor explaining lock-in to incumbent agricultural systems (including practices, actors, institutions) in Latin American countries that depend heavily on agriculture is the structural importance of the agriculture “sector” for the entire economy. Amongst other things, this affects how people think about the possibilities for transforming agricultural production, since anything that is seen as threatening agricultural productivity or the expansion of the sector, such as general sustainability concerns, are conceived of by many powerful institutions and actors as a threat to the whole economy. It also means that actors that propose and lobby for alternative agricultural practices, which tend to adopt a micro view (e.g. concerned solely with enhancing food security, or with rural ill health from pesticide exposure), are neglected and ignored since they do not address, or have a view about, broader macro level issues regarding for instance how alternatives could become a means of economic growth, diversification, or how exports could be sustained through alternative practices, or how the incumbent agricultural sector could become transformed over time. This contributes to a failure of dialogue with actors and institutions that take a more macro view of the agricultural sector, even where they are sympathetic with the social concerns expressed by critics. The structural importance and size of the agricultural sector, and the way in which Latin American countries were initially settled and governed, also means that landowners constitute a powerful social (and governing) class with interests in the incumbent agricultural system, which also contributes to lock-in. Likewise, a major associated agricultural input and commodity crop export industry also benefits from the incumbent system, and displays little enthusiasm for change

This is the more general and broader factor contributing to lock-in to the dominant agricultural production system, but on the basis of our previous research on transformative innovation in the agricultural sector, we can point a number of other, more specific factors that contribute to lock in. These include: the production of agricultural knowledge, skills and capabilities, which, in both public and private sectors, are created and channeled in directions that overwhelmingly support the incumbent production system; global patterns of demand for food and feed which have lifted commodity crop prices, and mean that production of, for example, soya is the most profitable available choice for farmers; trade barriers and tariffs which narrow the range of products that can be exported profitably; and the evolution of regulatory and other

policy institutions and rules that support the continuation and expansion of the dominant production system.

## Sustainable alternatives

There are a wide variety of technological and social innovations that might contribute to the building of alternative more sustainable pathways of agricultural change. In our previous research work, we divided innovations that involved technologies and practices that were distinctive from, and potentially more sustainable than, those adopted in the dominant agricultural production system into three classes:

- *path-repairing* alternatives that offer partial solutions to some of the problems of the dominant production systems, but do not challenge its main logic of development;
- *path-creating* alternatives, that constitute new economic and technological developments that are related to but distinct from dominant agricultural practices; and
- *path-breaking* alternatives that seek to radically transform the agricultural sector, taking it in a different pathway of change.

The first two are visible in dominant narratives and institutions, because they are less in tension with the incumbent production system.

In this project we will focus on the third, more radical class of *path breaking* alternatives. Our provisional proposal is that we will focus on what we will refer to as path-breaking '**bridging innovations**'. The idea is that bridging innovations encompass a range of novel ideas, institutions, organizations and technologies that underpin and can enable alternative, potentially more sustainable productive enterprises in the agricultural and food sectors to emerge, develop and expand.

Examples of bridging innovations range from

- 1) **Idea/concept innovations**, (such as the Buen Vivir movement in Bolivia)
- 2) **Institutional innovations** that encourage and support the free access and sharing of knowledge (e.g. open source seed systems)
- 3) **Organizational innovations** that favour the development of domestic capabilities and more socially inclusive business and productive practices (e.g. cooperatives, and fair trade and local value chains)
- 4) **Technological innovations** (that support production diversity and are environmentally less damaging (e.g. agroecological knowledge/farming practices, participative/decentralized plant breeding, or seed improvement techniques that can support diverse systems of agriculture, such as cross breeding technologies)

These are not clear cut distinctions, since innovative sustainable practices often combine new ideas, new rules, new forms of organization and new technologies and knowledge within the same 'innovation'. However, we suggest it may be useful, as an

analytical step, to distinguish between ideas, institutions (or rules), organizations and technological practices.

We are interested in understanding: Who is developing and supporting, or might support, these kind of ideational, institutional, organizational and technological innovations? How and why? What factors, processes and actors are constraining the development of those alternatives and how and why? How might such innovations contribute to the creation and diffusion of more sustainable pathways for agriculture in the region? How can such innovations be better supported?

These alternative innovations are not only 'path breaking', in the sense that they are proposing radically different practices capable of supporting more sustainable agricultural activities, but they also potentially bridge two sets of views (or at least elements of two sets of views) about the future agriculture that were made explicit during a preparatory workshop with diverse stakeholders (described in more detail below).

One of those sets of views was concerned primarily with issues such as food sovereignty, local production and small farmers livelihoods, whilst the other was concerned primarily with the macro issue of sustaining the role of the agricultural sector, through continued innovation, as a provider of strategic resources for the national economy. This potentially bridging role exists because these innovations allow us to think about viable transformations and transformative pathways, which can take into account some of the concerns expressed in both sets of views.

For example, open source seed breeding systems can, in principle, be used to both ensure free access to seeds by seed breeders, the re-use of seeds by small farmers, and the provision of a payment to breeding companies by commercial farmers. Co-operatives, a business organizational form that is very important within the agricultural sector of both countries, has proven to be economically sustainable, and has the potential, as several examples show (see <http://nrpathways.wix.com/home>), to deliver better social and environmental outcomes, than other kind of business models and forms of organization.

## **Pathways and Actors**

Based on our previous research, the main actors in Argentina that are relevant to variously supporting and constraining alternative pathways of change in the agricultural sector are reasonably well identified, and in many cases we have well-developed contacts with representatives of the key actors and institutions. Those contacts include, for example, senior executives and scientists in Argentinean seed firms; civil servants and assistant secretaries of state in the Ministry of Agriculture, Ministry of Science, Technology & Innovation, and National Institute of Agricultural Technology; entrepreneurs in alternative agricultural businesses and ventures; plant breeders working in Universities; NGOs in the agricultural and rural economy sectors concerned with small farmer livelihoods and the local environmental and health consequences of agricultural production; trade associations of the agricultural input industries; representatives of both commercial farming and small family farming organizations; and representatives of agricultural cooperatives.

Based on our preparatory workshop with many of the above stakeholders in Argentina, we characterized a range of views about the seed sector, and the future of agriculture more generally, into two generalized but very different perspectives. One is a macro, nationalistic, market perspective, concerned with enhancing the productivity of large-scale agricultural production (seen as crucial for the national economy and for producing food for a growing global population) but by ensuring adequate incentives for ensuring the success of *domestic* technological innovation delivered by the private sector, as opposed to MNCs. In this view, concerns about the sustainability of smaller and medium scale farming were expressed, but their survival was seen as requiring State support rather than expecting markets alone to support those activities. Environmental dimensions of sustainability did not figure explicitly as a key concern within this perspective or again, these are supposed to be looked after by government.

The main aspect of this view, which marks it out as distinctive from the ways in which dominant pathways of agricultural change are unfolding, is the need to develop local production and technological capabilities to support the agricultural sector, and to use these, at the same time, to encourage the development of other related sectors (e.g. machinery, information technology, services) so that at the same time the system is not so dependent on MNCs own technologies and the country develops other sectors, contributing to diversification.

The second we characterized as a local, alternative, State-centered perspective, concerned primarily with promoting food sovereignty and security, and enhancing the social and economic diversity of farming. Decentralized measures taken by small- and medium-size independent farmers, producing food for the populations where they are located, and carrying out the associated improvements in seeds were emphasized as key to a sustainable farming system in the long term, as was an active State providing the public goods necessary for supporting agricultural activity.

These are, in many respects, opposing world-views about the desired future shape of the agricultural sector in Argentina. Both are represented in different parts of government, but the former dominates policy discourse and policy institutions and is more closely associated with the incumbent agricultural production system (the main difference being greater scope for the development of national agricultural input industries rather than international firms).

For example, the Argentinean Ministry of Agriculture's 2010-2020 ten year vision for agriculture is firmly embedded in the first world view. It envisages a 50% expansion of commodity crop exports, to be achieved by increasing the area sown to crops by 30% and by further increases in productivity per hectare, but with greater participation of national firms in providing inputs and services, for example. At the same time, the vision wishes to simultaneously promote the production of a greater variety of crops that generate greater value added at the point of origin, and that enhance social inclusion (i.e. job creation) in rural areas. Small-scale farming, food sovereignty and security issues, and environmental aspects of sustainability are absent or a very minor feature of the vision as a whole (e.g. environmental sustainability issues are raised mainly as opportunities and threats to export markets). We note that insofar as there are official concerns about production diversity and rural livelihoods, this may provide windows of opportunity for obtaining support from mainstream actors for pathways of

change that represent some of the values implicit in the second world view expressed at our workshop.

## **Coproduction – policy and stakeholder engagement**

As part of the preparatory work for this proposal, we organized a half-day workshop with the Argentinean stakeholders identified in the preceding paragraph. The workshop consisted of a structured discussion on the future of seeds and agriculture in Argentina, focusing on on-going debates about changes to seed law and property rights. We organized discussion and debate around four possible scenarios related to those changes to the seed law. The participants discussed what might happen in 2030 under each of these scenarios as regards four different social functions played by seeds. These were those of providing a source of: (i) food supply, and social and economic diversity, (ii) technological services for industrial farmers, (iii) information for biological research, and (iv) biodiversity. The aim of the discussion was, in part to serve as a lens through which to make explicit future agricultural visions and pathways amongst a varied group of actors, and to obtain commitment from those actors for the planned ISSC project.

## **Proposed research activities**

Based on the preparatory workshop we identified two sets of demands, common across the different perspectives, one general and one more specific, to which insights generated by the proposed project will contribute. The general demand concerned the fact that all participants stressed the absence of a coherent long-term strategy for agriculture, in terms of where we want to be in the future, and how to get there from the present day. The more specific demand concerned the absence of policies, regulations, institutions and knowledge generating activities that might be required to support that more general strategy. Thus, although at a general level, visions for the future of agriculture were very different across the stakeholders, a common perception was that there was an absence of strategic means of reaching preferred visions.

Our provisional research objectives fall into three categories, as follows:

1. To explore empirically diverse actors more specific understandings of the sustainability challenges in the agricultural sector, and their perspectives on the contribution that candidate ideational, organizational, institutional or technology innovations might play in addressing those challenges. One or more of those innovations, which help to bridge conflicting views about desired agricultural futures, will subsequently comprise our case studies. We will also explore empirically how those actors understand the processes and forces that act to support or constrain the development and expansion of those alternative innovations.
2. To understand how the path breaking innovations that form our case studies have emerged, how they function, and what strategies and actions are being taken to expand, consolidate and diffuse those innovations. In particular we are interested in understanding the characteristics, structure and functions of the ‘innovation networks’ that support diffusion of alternative institutions, organizational forms and technologies under study; including the ways in which actors within innovative alternatives seek to diffuse knowledge of their innovative practices and overall visions.

3. To help to support and build the path breaking innovations chosen as case studies, by taking advantage of the diversity of actors involved in our network. (e.g. by building visions, engaging people, and advocating for path breaking/bridging alternatives). For example, we will work with innovators, and a range of other stakeholders from government, the science base and the private sector, to identify, characterize, facilitate the generation and diffusion of new ideas for, and help to strengthen, the emerging innovation networks around transformative alternatives. How, for example, can we help ensure that the public agricultural science and extension system partner with innovators to develop and improve alternative technological practices? How can those parts of government that are supportive of transformative alternatives help create the conditions, and space within incumbent practices, for innovative success (e.g. via certification, export consortia, public procurement, funding and R&D support, or regulatory control of incumbent practices)? How can domestic firms and co-operatives take advantage of the opportunities and in turn support the emergence of new more sustainable ventures?

### **Research methods, disciplines and theories:**

Our research will draw on several disciplines, across the social and natural sciences, including economics, science and technology studies, and agronomy. Specifically, we will draw on and contribute to several analytical approaches within these disciplines, such as transitions studies, structuralism, and innovation studies perspectives on development. Our team, and the people we will contract to work on this project reflect those disciplinary backgrounds

#### **Methods:**

Provisionally, we propose to use two main methodological approaches.

The first approach is multi criteria mapping (MCM), which will be used to inform and support our first category of research objectives; namely those of documenting and analyzing actors' specific understandings of i) the sustainability challenges in the agricultural sector; ii) the contribution that candidate path breaking innovations might play in addressing those challenges; and iii) the processes that are variously supporting or constraining the development and expansion of those alternative innovations.

MCM is a method for exploring contrasting perspectives on complex strategic and policy issues. It aims to help 'open up' assessment by mapping practical implications of different options, knowledge, uncertainties, contexts and values – as seen under contrasting points of view. MCM exercises can document the details of different perspectives on policy issues, helping to explore how different groupings of options, criteria or perspectives differ and what they hold in common.

The second approach is network analysis, as applied to our case study innovations. We have two units of analysis: path breaking innovations and their 'innovation networks'. We define innovation networks as a set of actors linked by some kind of relational tie. Relational ties include both exchanges of knowledge, finance and material resources needed to undertake those innovations, make the pathway of change a reality, and that construct and disseminate shared views about the desired pathways for the agricultural sector.

We will combine different methods of data collection such as interviews and questionnaires, to investigate the nature of the networks associated with the path-breaking innovations, and what is being done within each network to develop, support, and scale up and out those novel ideas, practices and techniques. The empirical work will identify opportunities and barriers, as perceived by actors to the construction and performance of pathways of change based on those innovations (e.g. public and private rules, standards, and regulations, policies, activities of the incumbent agricultural sectors); how these have impacted on our case study innovations, and the strategies implemented to overcome or modify those barriers.

It is likely that the innovation networks supporting our path-breaking innovations will differ significantly from those that characterise incumbent, institutionally well established technological, organisational and institutional practices, and that have been extensively studied in the business and innovation literature. (Rothaermel *et al.*, 2004; Powell *et al.*, 1996). We have a lot to learn about these kinds of networks in which: a) network activities are not only seeking to diffuse knowledge, but also to create expectations, enrol allies, obtain policy support, and define a new pathway of socio-technical change; and b) where the relevant performance measure is not only productivity, growth or innovation outputs, but also inclusion and sustainability. In learning more about the nature of the networks supporting alternative practices we are particularly interested in the extent to which those networks overlap with actors located in incumbent agricultural systems. How might such linkages help or hinder alternatives? What kinds of knowledge and ideas are shared or taken up from one system to the other?

### **Acknowledgement of Funding Support (specified by ISSC)**

This concept note is based upon work supported by seed grants from the ISSC under the Transformations to Sustainability Programme. The Programme is funded by the Swedish International Development Cooperation Agency (Sida) and serves as a contribution to Future Earth. Supplementary support for seed grants is provided by the Swedish Secretariat for Environmental Earth System Sciences (SSEESS), the Netherlands Organisation for Scientific Research (NWO) and this particular case by the Economic and Social Research Council (ESRC) UK through the Newton Fund and the National Research Foundation of South Africa.