

Case 4: Closely intertwined aspects of innovation

In the 1980s, FAO introduced *Prosopis juliflora* as a “miracle tree” that would halt desertification in Kenya’s arid lands. However, *prosopis* was so successful that it invaded the natural pastures, and local herders demanded its eradication. Some development agencies introduced an organisational innovation – Farmer Field Schools – to find ways to control *prosopis* by cutting it, using the pods as feed and making charcoal. However, charcoal burning and trading were banned at the time, as a way to protect trees in arid areas. Therefore, the law had to be changed: this institutional innovation allowed controlled and traceable *prosopis* charcoal burning and trade. In turn, selling charcoal became a source of income for poor households and self-organised groups.

Innovation still unfolds today: some local people started producing high-quality honey from *prosopis* stands and seek to sell it at a premium price. Prospects for using *prosopis* biomass to generate electricity have emerged, which may lead to partnerships between farmers and energy producers. Thus, technical intertwined with organisational and institutional innovation – especially making the vital link to the charcoal market – helped the innovation process take root and offered multiple opportunities for local people (Mulindo et al 2013).



Making charcoal from *prosopis* (Photo: Ann Waters-Bayer)

in May 2013 identified additional concrete suggestions on how to take action on these recommendations:

- **Convince governments and donors to change the way they fund interventions**

A fundamental change must be made in the way projects are operated and funded. R&D actors should lobby actively for such change. Donors should develop specific guidelines under their portfolio of grant schemes for process-oriented proposals, designed in phases with periodic evaluation and re-approval, with budgets that explicitly accommodate the cost of a participatory, inclusive process, e.g. initial negotiation, joint reflection and M&E that can respond quickly to locally emerging needs and demands. Donors should acknowledge that change requires support well beyond the typical 3–4 year project timespan up to 10 years or more. This time is needed to deal with the numerous interlinked technical, organisational and institutional aspects of innovation that are critical for

attaining widespread and lasting benefits for smallholders and other local actors.

- **Support innovation platforms and other multi-actor alliances at different levels**

R&D institutions should provide support for creating, strengthening and working in alliances and innovation platforms adapted to the specific context and objectives and operating at all appropriate levels, from local to national. Such alliances and platforms should involve, in a flexible and dynamic manner, not only formal R&D actors but other relevant stakeholders, e.g. farmers and their organisations, entrepreneurs, government staff and NGOs. Providing “smart” and decentralised financial support to local alliances of stakeholders to strengthen their innovation capacity and initiatives is also critical, e.g. farmer-managed funds for local experimentation (Waters-Bayer et al 2011).

- **Develop innovation brokerage capacity**

In a vibrant innovation process, all stakeholders express their needs and demands, formulate goals and visions, contribute their skills, and share their knowledge, resources and responsibilities with each other. Trained “brokers” can facilitate such interactions at key stages in the process. They can encourage joint reflection about constraints and opportunities and help clarify the roles of all involved. At different stages, different actors may play the brokerage role: NGO staff, advisors, farmer leaders, entrepreneurs, researchers etc. Sometimes, external facilitation may be best to mediate conflicts. Investment is needed in building brokerage capacities.

- **Strengthen pivotal role of agricultural advisors**

Agricultural advisors are in a key position to be brokers of innovation processes and to provide a host of other support services to innovation initiatives of smallholders and local enterprises. However, they need to have an explicit mandate for playing such roles, while their capacities to do so need to be strengthened. Renewed investment in rural advisory services is needed, and institutional support for advisors to be able to play a brokerage role in innovation processes has to be firmly integrated at all levels in the advisory services.

- **Integrate innovation system approach in education and training**

Agricultural innovation system (AIS) approaches are key to understanding and enhancing innovation. Universities, colleges and vocational schools play a major role in preparing future and current researchers, rural advisors, farmer leaders and local government staff through initial and continuing education on AIS concepts and approaches. To build capacities in AIS, educational and training institutions need to interact closely on the ground with farmers, rural communities, entrepreneurs, advisors, researchers and government staff. Thus, students and teachers are exposed to existing innovation dynamics in smallholder farming, learn how to see and analyse the processes, contribute to documenting and understanding how agricultural innovation happens, and acquire the skills needed to support it.

Why institutionalising participatory approaches is critical ...

Some years ago, a programme in Limpopo Province, South Africa, developed a Participatory Extension Approach (PEA). It aimed to make rural advisors capable of building farmers’ capacities and supporting them to solve their own problems. To implement PEA and scale it out and up, a series of iterative training and practice sessions were held for advisors and their managers. Joint experimentation on green manure was a priority of some smallholders to solve soil fertility problems. Building on such experiences, smallholders seeking profitable activities started experimenting on their own with growing green maize, using organic matter to manage scarce water in the dry season. However, because the PEA had been discontinued for lack of support at higher levels in the Provincial Government, the rural advisors no longer had the mandate to respond to this promising local initiative. An approach such as PEA needs to be firmly institutionalised if it is to have a broad and lasting impact (Rootman et al 2013).

Conclusions and perspectives

Through their work over the past three years, the partners in JOLISAA have shown that support to strengthen the innovation capacities of smallholder farmers and other local stakeholders may take several forms, depending on the local and national context and the objectives pursued. Many governments, donors, research and advisory services, educational institutions and private enterprises need to change the way they perceive smallholders and the way they design interventions, if innovation in its intricate diversity and long-term character is to take place and thrive for the benefit of smallholders, rural and urban consumers, and national economies. This policy brief has highlighted key areas for change, and provided specific suggestions about how things might be done better. Let’s act on these recommendations to achieve a dynamic, innovative and productive smallholder family-farming sector.

To know more about JOLISAA results and about local innovation

Papers included in the proceedings of the Agricultural Innovations Systems in Africa workshop (Triomphe et al 2013), downloadable at www.jolisaa.net

Chengole JM, Welimo M, Belmin R, Ng’ang’a T & Kamau G: From a desired to a despised and later desired tree: the case of *Prosopis* introduction and management in Marigat, Baringo County, Kenya.



The JOLISAA project was funded under European Commission FP7 Grant Agreement 245319. The opinions expressed herein are the sole responsibility of JOLISAA. All consortium members and partners in Benin, France, Kenya, Netherlands and South Africa contributed information for this policy brief, which was compiled by Ann Waters-Bayer, Bernard Triomphe and Nicolienne Oudwater

See the JOLISAA website: <http://www.jolisaa.net> for more information

Building on local dynamics: 5 policy recommendations for enhancing innovation by African smallholder farmers

Introducing improved technology does not automatically lead to innovation and desired change! It is one of many inputs into an ongoing, collective, interactive and multi-faceted innovation process that involves continuous adaptation to new conditions so as to improve system productivity, food security, resilience and income. By acknowledging this reality and building on it, policymakers, institutional decision-makers and donors will be better able to foster a dynamic and enduring agricultural sector responding to the needs and wishes of African societies.

As a development policymaker – be it at international, regional, national and local level – or as a decision-maker in agricultural research, extension or education, you want to reduce poverty and ensure the food and nutrition needs of people in Africa. You also want to help smallholder farmers become better able to adapt to change and meet the food demands of a growing population, and you seek how best to achieve this. The African and European partners in the EU-funded project on Joint Learning in Innovation Systems in African Agriculture (JOLISAA), which was carried out in Benin, Kenya and South Africa from 2010 to 2013, identified strategic lessons and insights that can help you do so.

JOLISAA explored the questions: “How does innovation – i.e. doing new and better things – actually happen in African smallholder farming, and what conditions and policies are required to ensure its success?” JOLISAA focused on multistakeholder innovation in smallholder family farming, as this is where problems of food insecurity and poverty loom largest but also where an immense potential can be tapped.

This policy brief presents, explains and illustrates the five key recommendations that came out of the joint learning process during the JOLISAA project:

1 Build on innovation “in the social wild”

With little or no support from public research and development (R&D) institutions, many smallholders are actively innovating individually and collectively to solve problems, improve their farming and income, and grasp opportunities.

African smallholder agriculture is dynamic. Farmers respond in many innovative ways to the rapid changes and global challenges they face, including market competition, increasing and conflicting demands on use and management of land and water, and increasing unpredictability of weather and markets. JOLISAA and others have documented numerous ongoing innovation processes which show the capacity of smallholder farmers to grasp opportunities, to create or access markets, to increase their resilience to risks and shocks, to manage natural resources in a responsible and sustainable way and to reshape urban-rural linkages.

Yet many such initiatives take place “under the radar” or are ignored by state, non-state, private-sector and even national farmer organisations trying to develop and spread agricultural technologies (Case 1). Local innovation fitting the

KEY POLICY RECOMMENDATIONS

1. Build on innovation “in the social wild”
2. Combine local and external knowledge and ideas to enhance innovative capacity (1 + 1 = 3)
3. Encourage access to diverse value chains to lower the innovation risks
4. Support unpredictable innovation processes
5. Address the multiple dimensions of innovation

How JOLISAA identified lessons & policy recommendations

The JOLISAA team documented almost 60 cases covering a wide diversity of situations, approaches and types of innovation across the three countries. Researchers and local stakeholders jointly assessed a dozen “lesson-rich” cases in more detail. Each innovation case involved smallholder farmers interacting with different stakeholders, such as research, extension, NGOs, their own farmer organisations, the private sector and government at local and national level to improve their farming, protect and manage natural resources and/or reach out to markets.

The history of each case was explored going back many years far beyond the typical short duration of projects and other external interventions. The case assessment team identified who interacted with whom and what each actor contributed. It looked at what sparked off innovation (“triggers”) and what kept it going (“drivers”) or prevented this, and what came out of the innovation process along the way. Analysing these 12 cases together, and discussing and comparing them with other international experiences, allowed JOLISAA to identify widely applicable principles and elements for innovation policy for the African smallholder farming and food sector. These were broadly validated and enriched during the Agricultural Innovation Systems in Africa (AISA) workshop on 29–31 May 2013 in Kenya, which brought together about 100 research and development experts, practitioners and policymakers from Africa, Europe and Australia (Triomphe et al 2013a, 2013b).

wide variety of contexts of African agriculture needs to be better recognised, valued and encouraged. Doing this will allow to tap systematically the potential of African smallholders to work together with formal agricultural R&D actors in designing and spreading more productive, more profitable and more sustainable farming and food systems.

Formal R&D actors provide important elements, such as new knowledge and technologies, external inputs and other stimuli for innovation, but the farmers and other stakeholders such as private business in the “real world” are better placed to identify key constraints and opportunities. They are also the ones who decide if and how to use and adapt the inputs from R&D to their own context, so that innovation takes root and succeeds.

External interventions can play an important role in initiating and supporting innovation, but should avoid creating artificial “enabling” conditions and incentives (including market outlets) that don’t fit with local realities and are short-lived and unsustainable. Such interventions may easily undermine the existing innovation dynamics and can seldom drive innovation over the longer term, unless change also takes place in the policy and institutional environment.

Under such conditions, interventions should start with a thorough joint assessment with local actors of ongoing innovation processes in the area, looking for initiatives that should be supported, rather than ignoring or trying to bypass them. Such assessment will yield a picture of local dynamics, so that intervention strategies for “surfing the wave of what is happening” – building on local initiatives – can be devised.

Case 1: Aloe processing: innovation “under the radar”

Processing and marketing of aloe products in Baringo, Kenya, exemplifies innovation “in the social wild” – initially ignored by a project designed to introduce a new value chain involving a processing unit set up through public-private partnership. Somali traders had already developed an aloe supply chain for export: local harvesters of wild aloe sold sap to local boilers who then supplied the traders who worked with exporters who knew how to access international markets. Several technical and organisational innovations also took place: traders trained boilers to produce better-quality gum; a barter system developed through which poor women farmers could exchange the aloe sap they harvested for food in local stores. This value chain was not without challenges, including issues of sustainability of aloe harvest. But intervening from outside to create a certified aloe value chain through a donor-funded project and completely ignoring or bypassing the local dynamics misfired. Low levels of training, market challenges and conflict among stakeholders taking part in this externally driven intervention all played a role in preventing it from taking off and actually offering a sustainable alternative to the locally designed aloe chain (Belmin et al 2013).



Woman inspecting her aloe plot in Baringo (Photo: Bernard Triomphe)

2 Combine local and external knowledge and ideas to enhance innovative capacity (1 + 1 = 3)

Linking multiple sources of knowledge enhances the capacity of all stakeholders to innovate, to adapt to changing conditions and to grasp opportunities. Such synergies benefit all involved.

Although the innovation processes “in the social wild” are dynamic, they can be strengthened, speeded up and made more sustainable through appropriate inputs of knowledge of different types and sources that respond to farmers’ demands, needs and actual possibilities. Combining local and external knowledge and resources is necessary to meet the challenges faced by today’s and tomorrow’s agriculture. It is not, however, a simple matter of parachuting in (or transferring) “scientific” technologies from elsewhere (see Message 1 and aloe case). Linking the knowledge and ideas of smallholders, small and medium-sized entrepreneurs and local government with external knowledge and ideas leads to an improved capacity and potential of all involved to address ongoing

or emerging challenges and opportunities and, in doing so, contribute to improving food security, productivity, incomes and livelihoods. Communication and sharing has to be enhanced at different levels, using a range of approaches and methods, e.g. consortia, innovation platforms, fairs etc.

Case 2: Enhancing endogenous innovation in aquaculture

Farmers in southern Benin practising both cropping and fish farming have dug ponds (hwedos) in river floodplains to trap fish as the floodwater recedes. After giving a few months for the fish to grow, the farmers gradually harvest the ponds. This finely tuned system, well adapted to the local natural environment, depends mainly on labour inputs and very low levels of external inputs.

In recent years, the farmers have intensified the system through better drainage and irrigation to be able to grow off-season vegetables on the hwedo banks and completely ignoring or bypassing the local dynamics. Farmers now rely on both fish and vegetables for securing their income and adapting to environmental and market fluctuations. Scientific knowledge can contribute to improving these local systems in different ways: e.g. by introducing new fingerlings into the hwedos, advising farmers about vegetable plant diseases and helping farmers develop labour-saving technologies for maintaining the fishponds and raised vegetable beds (Floquet et al 2013b).



Maintaining canal to keep hwedo productive (Photo: Anne Floquet)

3 Encourage access to diverse value chains to lower the innovation risks

Markets and value chains, whether local or distant, can trigger and sustain dynamic innovation processes that benefit smallholders and consumers alike. But they imply significant risks for resource-poor farmers and small-scale processors. Having access to diverse value chains is critical for local resilience to erratic and dysfunctional markets.

When market opportunities emerge or new value chains are possible, farmers and processors respond eagerly if they have access to the resources and services to do so. Evolving consumer demand in terms of quantity and quality of products may also drive farmers and other actors in the food system to develop new practices and relationships. But focusing on linking the smallholders to only one product, buyer or market exposes them to significant risks of market dysfunction

and other challenges: price falls, collapse in demand, competition, inability to meet changing quality standards etc. In contrast, promoting diverse formal and informal value chains linking efficiently farmers and small-scale processors to local, national or international demand allows them to access the different markets in a flexible and gradual way and be more resilient to market fluctuations and challenges.

Policymakers can encourage such diversification and make it an asset for the local and national economy by ensuring that appropriate market services exist and operate well, such as decentralised infrastructure; relevant and timely information; good credit facilities and opportunities for individuals, farmer organisations and trade associations; relevant standards and regulations; and appropriate training. For their part, formal R&D actors should focus their contribution on:

- optimising the performance and functioning of the diverse markets; and
- facilitating flexible engagement of smallholders with both formal and informal value chains through negotiation and suitable arrangements.

4 Support unpredictable innovation processes

Innovation cannot be planned from the outset, as it evolves in unpredictable and often unexpected ways over long periods of time and specific to a changing context. In supporting innovation, formal R&D actors should make use of highly flexible, open-ended and iterative approaches adapted to local conditions.

Innovation does not happen in a linear way. JOLISAA studies show that innovation pathways took new and unexpected directions over many years or even decades as they unfolded within and mostly outside the framework of external interventions.

Any attempt to foster innovation processes through public intervention should recognise such unexpected deviations and act accordingly. This will require putting less emphasis on rigid pre-planned prescriptions about what to do and to be open to adjust priorities, approaches and modalities of support along the way in an iterative and flexible manner, reflecting the changing dynamics and opportunities.

In an externally driven project, space needs to be given for a process-oriented approach rather than seeking outcomes narrowly defined at the outset. Intervention can start with assuming a realistic path and designing mechanisms toward a desired outcome (such as increased productivity or emergence of a new value chain). However, all the people involved need to reflect frequently whether the assumed path is indeed being followed, what are the real drivers of change and what other initiatives and dynamics may be emerging that would benefit from support. Project activities then need to be adjusted accordingly. Wider institutional support needs to accommodate these dynamically unfolding processes, always keeping in sight the overall aim of improving the livelihoods of smallholders and other local stakeholders and benefiting the rural and urban poor consumers. Research approaches and funding should be fitting for such flexible innovation processes.

Case 3: Diverse value chains for flexible low-risk innovation

Soybean was introduced into Benin in the 1980s to make protein-rich baby food. It has now become a major crop grown on over 100,000 ha. Thousands of women processing food at micro-scale and with rich knowledge of local cuisine developed a range of affordable food products with soy, responding to the needs of poor rural and urban consumers. NGOs helped them gradually upgrade and upscale by introducing relevant technology, and women acquired assets. Some went from having no own equipment to renting milling services to owning equipment, as well as with the emergence of intermediate enterprises offering processing services and logistics.

At the same time, oil factories started buying up soybean massively when cottonseed supply dropped. This led to rapid expansion of smallholder soy farming. Local value chains for feed, artisanal oil-making and baby food are also emerging.

Relying on these diverse value chains allows smallholders and small-scale processors to avoid dependency on only one type of market and to respond to demand from a range of users. Novel arrangements along these various value chains are taking place that make them more efficient and also give a greater say to small-scale soybean producers and processors (Floquet et al 2013a).



Soy cheese in fried pieces on market (Photo: Anne Floquet)

5 Address the multiple dimensions of innovation

Beyond new technologies, innovation has important social and organisational dimensions that are closely intertwined and cannot be addressed in isolation from each other, if innovation is to be successful.

Technologies are often seen as central to innovation and transferable from one context to another. But in practice, technologies are shaped by people using them within their social, economic and institutional context. Social and institutional change (new ways for farmers to organise themselves and access markets, new services, new approaches to supporting innovation, new rules and policies) is always needed so that new technologies can be fully integrated into local practice. Similarly,

social or institutional change may come first and lead to technological innovation: e.g. helping farmers supply a new market may convey consumer demand for better or different products, which then requires farmers to change their production, processing and marketing practices. Encouraging formation and strengthening the capacities of structures representing farmers (e.g. umbrella farmer associations, farmer fora) can make farmer groups better able to negotiate fair contracts or to provide technical advice or credit to their members.

Taking a holistic view of innovation by supporting its multiple dimensions gives a better chance of achieving outcomes more relevant for smallholder farmers and other local actors. Beside generating and transferring technology, support should hence go to enabling and accompanying organisational and institutional changes that make innovation possible and successful and may drive large-scale spread and adaptation of technology.

R&D actors need relevant resources and skills to be able to take part in and support innovation processes that encompass these different dimensions. Governments and R&D funders need to invest in long-term cross-sectoral budgets to provide such necessary support.

Some promising paths in innovating innovation

The five recommendations outlined above are not brand new. Indeed, over recent years, the World Bank (2012) and the International Assessment of Agricultural Science, Knowledge and Technology for Development (IAASTD) endorsed similar and complementary recommendations. However, government and other R&D actors still need to “walk the talk” – to act on these recommendations to support agricultural innovation by and with smallholder farmers and other local stakeholders as a key ingredient for more equitable and sustainable development, better food security and a vibrant smallholder family-farming sector. Farmer organisations also have to be pro-active in monitoring innovation processes and raising issues that need attention from formal R&D. The 100 or so international participants in the AISA workshop in Kenya

Innovation takes unexpected paths over time

In Benin, the initial intention for introducing soybean was to convince mothers to integrate it into baby food to reduce infant mortality rates. But over three decades, the innovation process went well beyond this starting point and led to the unexpected emergence of a multitude of small- or large-scale value chains for soybean which are tightly integrated into the local food and agro-industrial systems (Floquet et al 2013a).

In South Africa, water-harvesting techniques introduced for large-scale grain production were later adapted by some farmers for intensive vegetable production (Letty et al 2013).

In Kenya, scientists and extension services started working with farmers to grow and sell gadam sorghum to a large-scale commercial brewery as a substitute for imported barley. But the smallholders, after facing challenges with marketing of their sorghum, started using it as a substitute for maize in local food products and thus became more food-secure in the dryland environment (Kavoi et al 2013).