Future Agricultures

Pastoral Innovation Systems

Perspectives from Ethiopia and Kenya

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About the Future Agricultures Consortium

The Future Agricultures Consortium (FAC) aims to encourage critical debate and policy dialogue on the future of agriculture in Africa. The Consortium is a partnership between research-based organisations in Africa and the UK, with work currently focusing on Ethiopia, Kenya and Malawi.

Through stakeholder-led policy dialogues on future scenarios for agriculture, informed by field research, the Consortium aims to elaborate the practical and policy challenges of establishing and sustaining pro-poor agricultural growth in Africa, with a focus on Ethiopia, Kenya and Malawi.

Current work focuses on four core themes:

Policy processes: what political, organisational or budgetary processes promote or hinder pathways to pro-poor, agriculture-led growth? What role should different actors, including Ministries of Agriculture, have in this?

Growth and social protection: what are the trade-offs and complementarities between growth and social protection objectives?

Agricultural commercialisation: what types of commercialisation of agriculture both promote growth and reduce poverty? What institutional and market arrangements are required?

Science, technology and innovation: how can agricultural technology be made to work for the poor? How are technology trajectories linked to processes of agrarian/livelihood change?

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Debating development pathways

While there has been much discussion of the importance of innovation in African agriculture[i], remarkably little has focused on mobile pastoral systems. Everyone agrees that science, technology and innovation must be at the centre of economic growth, livelihood improvement and development more broadly. But it must always be asked: what innovation - and for whom? Decisions about direction, diversity and distribution are key in any discussion of innovation options and wider development pathways.[ii]

In March 2009 over 50 pastoralists from across southern Ethiopia and northern Kenya from a dozen ethnic groups gathered in the Borana lowlands at the 'University of the Bush' to debate key pastoral development issues. This week-long event was hosted by the Oromia Pastoralist Association and organised by the Democracy, Growth and Peace for Pastoralists project of the Pastoralist Communication Initiative. Intense and animated discussions took place under the trees next to a tented camp established in the Gujji pastoral area. The Future Agricultures Consortium was represented by Ian Scoones of IDS and Andrew Adwera of African Centre for Technology Studies based in Kenya. Following two days of discussion of the implications of mobility and changes in land tenure led by Katherine Homewood of University College, London, the seminar turned to the question of innovation in pastoral systems.

Defining innovation

The seminar was being conducted in multiple languages, and one of the first tasks was to define what is meant by 'innovation' – defined in English as "a new way of doing something. It may refer to incremental, radical, and revolutionary changes in thinking, products, processes, or organizations"[iii] Box 1 gives the words used across some of the languages of the participants present.

What types of innovation take place in pastoral areas? Groups discussed a wide variety of themes, addressing the major challenges faced. Shortages of range or water featured prominently, particularly in the face of a changing climate. Challenges faced by livestock diseases were also identified, alongside institutional and political obstacles. Groups with a common language were formed to discuss examples of innovations that they had been involved in, or had observed, from their own areas. A huge variety was shared.

Somali speaking areas, Ethiopia and Kenya
Water management – "Now we dig dams and line them with plastic. Water is then trucked and bowsers fill the dams. Water used to be carried only by women on their backs. Now donkey carts are used".

Surveillance – "We used to send scouts out for days to look at the condition of grazing and the availability of water, as well as checking for enemies. Now mobile phones can be used and we get the information quickly.

Birthing kits – "The UNICEF kits that were supplied for pregnant mothers were too heavy and not used. We needed ones that were safe but simple and could be carried with us when we moved. A new kit has been produced, and now is sold in the shops"

Oromo-speaking areas, Ethiopia
Organisation – "A major constraint for us has been our lack of organisation. We only recently had a gathering across the whole of Oromiya. Before we had separate groups, now we have an Oromiya elders' forum". "Gatherings help share ideas and information".

Hay – "Pastoral women only used to gather hay in drought. Now we cut and store it. We learnt about this at the gatherings. We can now plan ahead and provide hay for the calves which we keep in the enclosures".

Destocking – "We now destock animals early, and transfer funds to building, banking and education".

Diseases – "There are those who are specialised in CBPP (Contagious bovine pleuro-pneumonia) treatment: they remove the infected lung and pierce it, and fix pieces on the faces of the animals. All will be protected". "If people use their own saliva and spit on the faeces in the enclosure, anthrax can be eliminated".

Conception – "If a tooth is plucked from a calf it will then conceive".

Calf acceptance – "After birth, camels may reject their young. But specialised medicines and skills can be applied to make the mother accept the calf, and allow it to take milk".

Oromo-speaking areas, Kenya (Boran, Gabbra, Rendille)

Conflict – "Conflict really distorted our lives. We now have peace, [in our area] and you can graze animals without fear. We can now move for marketing or trading. Solving this required organisation… We had no help from outside – no government or NGO assistance. We sat, we talked and finished. We used to meet at water points and there was fear. But now our children play together. Now children are going to school because trade has resumed. We decided that school leavers (when they finish) should go and do voluntary teaching in schools in the other area. Peace is reinforced. The initiatives of trade, sharing pasture and voluntary teaching were all agreed at the elders' meeting. Peace has allowed much to happen. When there's no peace, there is no life".

Pokot and Turkana areas, Kenya

Hay – "Hay-making took off five years ago (in Pokot). The weather has changed in many of our rangelands, so movement is important even in the rainy season. While the rest of the animals move to get the best fodder, some stay at home. We feed this herd on hay. Hay is cut and stored for feeding in the dry season. Women used to take hay for calves and weak animals, now 5-10 head are fed which provide food for the family. Children can now stay at the home and attend school".

Pasture cultivation – "When we clear bush to improve the grazing, we can even use the strong soil to grow pasture. We seed the area and good grazing results. The place becomes yours – you can harvest the pasture and given to the animals. In another year, you can move to another plot".

Surface dams – "We have been making small dams across streams and small rivers. Stones are put across, although sometimes NGOs give cement. A small amount of water can be stored for the dry season. You may not see water flowing,

but when you dig in the sand it is plentiful, even in drought".

Conflict –"Large areas of pasture are not used because of conflict. When the Turkana are fighting the Pokot, we don't go near each other and the grass is unused. Today we can move to Uganda because of peace there".

Afar, Ethiopia
Animal disease – "There are many ways we can treat our animals. Diluted drugs are put in the animal's nose or leaves are collected and placed in the animals' enclosure. The leaves from seven different trees are combined and crushed. It reduced the disease dramatically".

Nyangatom, Ethiopia
Settlement and herd splitting – "We used to settle in a central place and not split our herds. But raiding and disease became a problem. Now we divide the animals into two groups. We drive the milking herds to the place where the elders reside, and the rest are moved to grazing to distant places. This approach reduces the risk of raids and disease.

Water and pasture – "We used to keep animals in one place, but due to the changes in climatic conditions we had to move further and further to gain access to water and pasture. But water is in a different place to good grazing. So now we have trained our animals to alternate, going for a time without water or grass. When our animals face drought they are ready. Training animals to adapt to stress periods is really helpful".

A number of striking features emerged from the ensuing discussion:

- There is a huge amount of innovation going on, but it is not recorded and often not shared.

- Innovations often happen together: one follows another. Thus the bringing of peace allowed children to go back to school, opened up grazing and brought opportunities for the brokering of drought response strategies across communities.

- Intensification of production in pastoral areas is increasingly important, including hay making, water harvesting and management systems that increase

efficiencies, such as herd splitting and training animals for reduced water use.

- Old technologies can be improved with new additions (such as dams with plastic coatings on the bottom) and new technologies can be deployed for old uses (such as mobile phones for scouting for grazing and surveillance).

- Different people in different places innovate in response to a particular challenge or problem. Innovation is highly socially differentiated – men, women, richer, poorer, older, younger innovate around different things and in different ways.

- Sharing can be limited by the restrictive practices of certain holders of specialised knowledge – especially traditional healers of livestock. As a participant from Afar, Ethiopia said: "the traditional animal doctors want the knowliedge to remain with them. And they don't want to train others. But there are few and they cannot cover the whole area. They want to get the money themselves only. We are trying to convince them to train new ones".

- Organisation and networking is key, and often underpins the capacity to innovate effectively.

Innovation systems

The idea of an innovation system was another focus of the seminar (Box 2). Here, the focus moves from the innovation itself to the market settings, cultural practices, institutional arrangements, policies and the wider political environment that either help or hinder innovation.

BOX 2

What is an Innovation System?[iv]

"An innovation system can be defined as a network of organisations, enterprises, and individuals focused on bringing new products, new processes, and new forms of organisation into economic use, together with the institutions and policies that affect their behaviour and performance. The innovation systems concept embraces not only the science suppliers but the totality and interaction of actors involved in innovation. It extends beyond the creation of knowledge to encompass the factors affecting demand for and use of knowledge in novel and useful ways" (World Bank 2006:vi-vii; italics in original).

Rath and Barnett (2005:3) argue there are nine essential elements of a successful innovation system:

1. Suppliers and users of research are centrally involved
2. User needs are understood
3. Investment is made in the innovation system
4. Intermediary functions are performed
5. Financially sustainable delivery systems exist
6. Learning results from iterative action research
7. Pro-poor innovation takes place when new technologies and/or new ways of doing things are observed
8. Institutional arrangements are changed
9. Infrastructure that supports and enables the innovation system to operate effectively is strengthened

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Each group explored a major problem in their area – including drought and climate change, animal diseases, water shortage, range management and conflict – and mapped out the innovation system using coloured cards to represent each of the actors. An innovation map was produced showing which actors (individual people, groups or organisations) were more or less important, and how they were connected (or not). The maps generated much discussion and some important insights into the challenges of innovation faced in pastoral areas.

Two innovation maps are reproduced below. The first is from South Omo in southern Ethiopia, focusing on the Nyangatom pastoral area (Figure 1). This map shows responses to livestock diseases. Pastoralists are mostly reliant on informal markets and often illegal drugs smuggled across the borders. These are unregulated, and the quality of drugs is often suspect. There are government veterinarians in the area, but few. Instead, most people rely on NGOs and projects for new ideas and innovations. Gaining access to such resources requires community organisation, which is developing in the area among pastoralists.

Particular challenges in the local innovation system – as well as potential solutions – were highlighted:

- A gap between 'the community' – and organised groups within local communities –and the formal veterinary service was identified. Very often people are not getting the service they need, as government veterinarians are few and far between. There is a need for an intermediary, someone who can help bridge the formal and informal knowledge systems and make links between them, facilitating access to services and expertise. This could build on the idea of a community animal health worker (CAHW), for example. Such an intermediary would help facilitate innovation, and assist in the response to animal diseases.

- Formal research (including universities, international research institutes etc.) are very distant from the local setting. While NGOs, extension workers and other project staff are present, they are not connected to research. As a result, they often do not know up-to-date information. There is a need therefore for bridges to be built between formal research, NGOs/projects and local communities.

Figure 1*: Innovation map from South Omo: animal diseases*
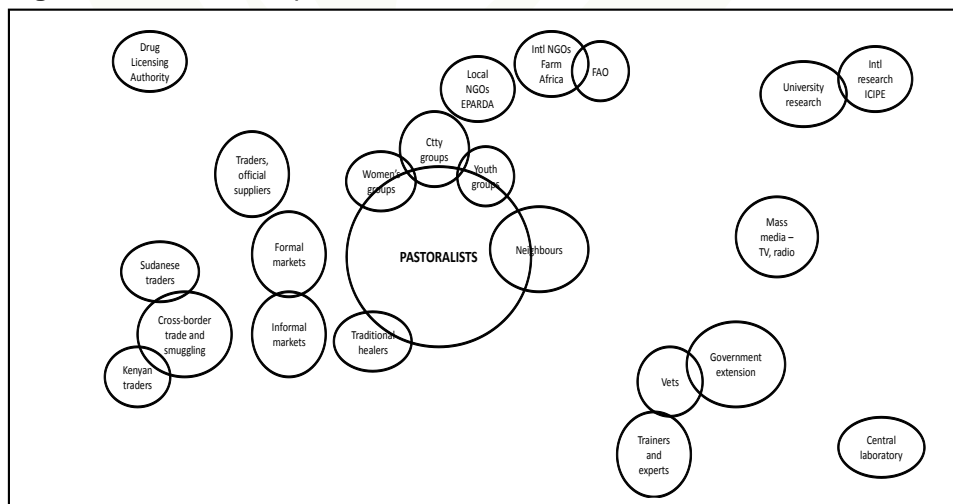
- Licensing and regulation of drugs exists, but has little effect in South Omo. Regulatory authorities may be present in Addis Ababa, but they have no influence on the cross-border flow of drugs (from Sudan or Kenya), nor the sale of drugs in informal markets. While veterinary officers may have regulated drugs, these are often not available. Accepting that the practicalities of regulating drug markets and cross-border smuggling is difficult, there is therefore a need for training of local people – including drug stockists, market traders and pastoralists in assessing the efficacy and validity of drugs available on the local market.

Figure 2 shows the innovation map produced for the Merti pastoral area of Isiolo, Kenya, focusing on the challenge of responding to drought and adapting to climate change.

The innovation map is dominated by a large, and growing, group of aid and relief agencies working with government who focus on food aid and relief efforts in 'crisis' and 'emergency' mode. This effort is seen to undermine the traditional, local innovation system, diverting energy and attention and developing a 'dependency culture' which challenges pastoralists' abilities to innovate themselves.

Figure 2: *Innovation map, Merti, Isiolo, Kenya: responding to drought*
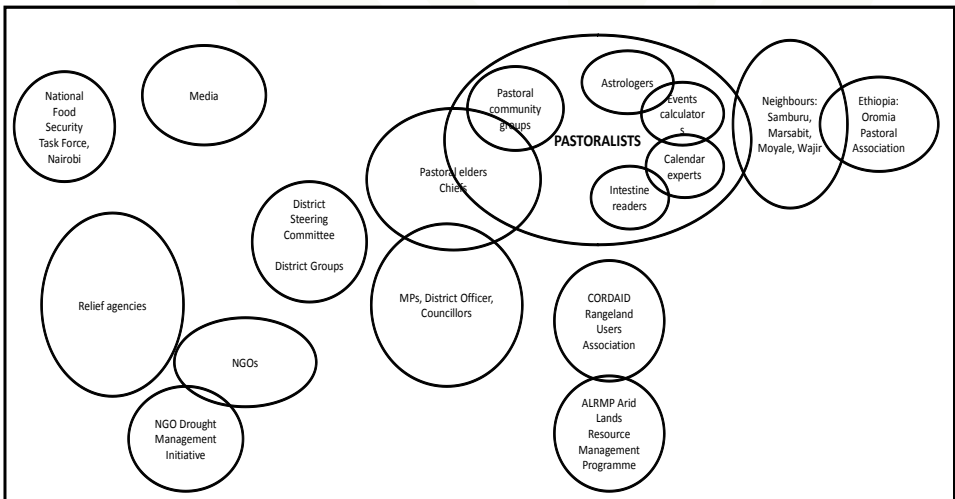
The local innovation system is based on a network of people, overseen by elders. Clan connections – even across the border into Ethiopia – help to make this system effective, allowing, for example, reciprocal negotiations over grazing. Local respected specialists are also involved, including those who can 'read' the entrails of dead animals and predict the future, calendar experts who can interpret seasonal changes and event predictors who use the stars or other astrological indications to foresee the future.

But the formal aid/development/ government system is separate, and often in conflict with the traditional, indigenous system. This brings tensions and confusion. The solutions identified were largely institutional. The group reflected that they knew what to do in order to respond to drought and climate change. This included more effective management of grazing and water resources, including the opening up of new areas; the judicious extension of borehole water resources to improve grazing and water availability; and the continued pattern of reciprocal exchange of grazing based on a mobile lifestyle. The problem was that pastoral

elders, and their communities, were not involved in the discussions of the aid delivered in response to perceived 'crises'.

The key recommendation was to establish an elders' forum that was recognised by government and aid agencies, and was the first port of call for any external intervention. Such a forum would be able to reject, adapt and recommend interventions, and guide external assistance and wider innovation processes towards more useful ends. A particular example of this would be the opening up of drought reserve grazing in a particular part of their grazing area which is currently unused. This would require some minimal investment in providing new water points, and the use of the area would be managed according to local rules established by the elders' forum.

Overall, the innovation mapping across all the groups - and the wider discussion of pastoral innovation systems that followed – highlighted a number of key issues:

- Innovation often emerges out of a challenge; problems can be productive. However, key preconditions for successful innovation are peace and political stability in pastoral areas.

- Formal innovation through the government and aid system and informal innovation through elders and the local community are often very separate, and sometimes are in conflict.

- Informal innovation can often be hidden from view, and is rarely recognised by outsiders. There is often an assumption that new and modern solutions are best, and the only ones available.

- A view of development and modernity (and so sources and directions of innovation) as being from outside

the system, and not based on local, indigenous skills and expertise can be reinforced by inappropriate educational systems.

- Innovation is about change, but change need not undermine senses of cultural belonging and identity. Pastoral elders need to engage with the younger generation, defining innovation (and development pathways more broadly) in ways that are appropriate to pastoral areas.

- The presence of formal research – from government or international agencies – is vanishingly small in pastoral areas. Many participants, for example, had not heard of KARI (the Kenyan Agricultural Research Institute), EARI (the Ethiopian Agricultural Research Institute), ILRI (the International Livestock Research Institute) or FAO (the United Nations Food and Agriculture Organisation).

- External interventions – especially in 'emergency' and 'food aid' mode - can be highly disruptive of pastoral systems, and the innovation capacities that underpin them.

- Non-government organisations have been important facilitators of innovation in pastoral areas, providing new ideas and support. But they are poorly connected with formal research systems, and questions of sustainability arise.

- Successful innovation often occurs through collective action. When people are organised, they can plan, innovate and demand change. Pastoral gatherings allow sharing of ideas and information and a reaffirmation of identity and solidarity. Politics and organisation is very much part of the innovation process.

These findings of course echo wider discussions around innovation systems[vi]. Moving beyond the focus on 'hard' technological solutions to complex problems towards a wider appreciation of the 'soft' infrastructure of culture, social relations, institutions and politics is critical. In the same vein, appreciating the diversity of 'hidden innovation' which exists 'below the radar' is also essential. But there are other features that are less emphasised in the general innovation

literature that are particularly pertinent in the context of pastoral areas. These include the important preconditions of peace and effective pastoral organisation, in order to demand inputs, services and appropriate assistance. The wider governance context, and political conditions, was emphasised repeatedly in the seminar discussions, as was the significance of culture and identity in processes of innovation.

Ways forward?

Throughout the seminar, participants added impassioned pleas for a focus on innovation in pastoral areas. For example:

"We are forgotten by the researchers and the government. Nothing comes to us. We must make use of our own knowledge and expertise – and bring the researchers in" (Turkana, Kenya)

"Most of the innovation comes from the highlands – from the agricultural areas. They don't understand the pastoral conditions. We need our own innovation, designed for pastoral areas" (Borana, Ethiopia)

"The pastoralists are in trouble now. All the land is being taken by the investors. The rest is allocated as a park. We clash with the Mursi because of these problems. Going to school, getting new ideas, helps us challenge the government and find a way through" (Nyangatom, Ethiopia)

"Pastoralists have been innovating for hundreds of years. How has pastoralism survived? We cannot let our current problems overcome us. We must innovate, and change" (Borana, Ethiopia).

"Pastoralism is a dynamic system… As pastoralists we must accept that things change. We are part of this change. We must adapt to these changes. We must make use of new kinds of education that others have… We will always be oppressed if we do not have education" (Pokot, Kenya).

At the close of the seminar, a number of ways forward were identified. All participants recognised that pastoralists are knowledgeable, skilful and resourceful. But conditions are changing, and adaptation and innovation is critical. This may require bringing in new technologies or adapting old ones; it may mean changing institutions and organisations and it may only be realised with the right political and policy conditions.

The links between technology and politics were highlighted repeatedly: technological change – and innovation more broadly – is a fundamentally political process, so attention to voice, accountability and wider governance issues is vital. The example of Borana well systems was given. Here was a highly specialised technology developed hundreds of years ago, but, it

was argued, it had not moved on, despite the new challenges of water access. Instead, hundreds of boreholes were being proposed, imposed from outside. So why, had the local innovation system not resulted in new technologies and developments on the indigenous systems? The answer, it was suggested, was politics – and the lack of attention, until very recently, on pastoral areas and priorities.

Distilling down an extended discussion on the last day of the seminar, participants identified four key factors that are essential for successful innovation in pastoral areas:

- Education – but it must be relevant, appropriate and accessible, compatible with mobile pastoral lifestyles.

- Investment – but it must be locally driven and controlled.

- Organisation – but it must not be inward-looking, and facilitate networking and linkages outside pastoral communities to gain access to new ideas and support.

- A supportive political and policy context – but it requires local organisation and leadership to ensure pastoral voices are heard.

In terms of a practical response, one participant identified the 'Honey Bee Network'[6] – an example shared in a previous session – as a way forward:

"We need to disseminate our ideas using the Honey Bee model. Each of us here can share rich indigenous knowledge. So far it has not been captured, documented and shared. Let's promote our knowledge by combining local and scientific aspects.

By combining we will find solutions more than we can now. We can then network among ourselves" (Borana pastoral elder).

Another elder from Ethiopia continued:

"We used to be passive. But today things are changing. We have our own organisations. We need to be dynamic in a dynamic world. We need to find solutions to our complex problems. Let us use our networks and fora to advance our interests. Let's us not give up demanding our rights. We should not be passive. We must look at solutions from outside, but be proactive and realise our dreams through our own efforts"

Together with partners in Ethiopia and Kenya, the Science, Technology and Innovation theme of the Future Agricultures Consortium is committed to continuing the conversations started at the University of the Bush. A next step will be to bring together pastoralists and their informal innovation networks with those formally charged with research and development and science and technology

policy working in the respective countries and internationally. The on-going work on pastoral innovation systems aims to bridge some of the gaps identified in the seminar, and forge new alliances and networks generating innovation in pastoral areas which really makes a difference to pastoralists themselves.

End Notes

i.   World Bank (2006). Enhancing Agricultural Innovation: how to go beyond the strengthening of research systems. ARD, World Bank: Washington. http://siteresources.worldbank.org/INTARD/Resources/Enhancing_Ag_Innovation.pdf

ii.   See the STEPS Centre's Innovation, Sustainability, Development: A New Manifesto: http://www.steps-centre.org/manifesto/index.html#3D. Also, Leach, M. and Scoones, I. (2006). The Slow Race. Making Technology Work for the Poor. Demos: London. http://www.demos.co.uk/publications/theslowrace

iii.   http://en.wikipedia.org/wiki/Innovation

iv.   World Bank (2006). Enhancing Agricultural Innovation: how to go beyond the strengthening of research systems. ARD, World Bank: Washington. http://siteresources.worldbank.org/INTARD/Resources/Enhancing_Ag_Innovation.pdf; Rath, A. and Barnett, A. (2005) From Research to Innovation Systems. Learning from the Renewable Natural Resources Strategy. Research Into Use, NRI: Chatham. http://www.research4development.info/pdf/ThematicSummaries/Brief6_From_research_to_innovation_systems.pdf; Arnold, E. and Bell, M. (2001). Arnold, E., and Bell, M. (2001). Some new ideas about research for development. In: Partnership at the leading edge: A Danish vision for knowledge, research and development. Danish Ministry of Foreign Affairs: Copenhagen, Denmark.

v.   See, for example, Hall (2009) Challenges to strengthening innovation systems: where do we go from here?, in Scoones, I. and Thompson, J. (eds.). Farmer First Revisited. Innovation for Agricultural Research and Development. Practical Action Publications; NESTA (2006). The Innovation Gap. Why policy needs to reflect the reality in the UK. NESTA Research Report http://www.seeda.co.uk/Innovation/files/Nesta%20the%20innovation%20gap.pdf; , Chataway, J, Clark, N et al (2009). Below the Radar. What does innovation in the Asian Driver economies have to offer other low income economies? Innogen Working Paper, 69. http://open.academia.edu/documents/0010/6805/BRI_Innogen_Working_Paper_69.pdf

vi.   http://www.sristi.org/honeybee.html. See Gupta, A. (2009). Network, institution and movement: the case of the Honey Bee network, in: Scoones, I. and Thompson, J. (eds.) Farmer First Revisited: Innovation for Agricultural Research and Development. Practical Action Publishers: London.

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