

More than climate change: pressures leading to innovation by pastoralists in Ethiopia and Niger

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More than climate change: pressures leading to innovation by pastoralists in Ethiopia and Niger

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Abstract

An exploratory study was made in Ethiopia and Niger into pastoralists' responses to climate change. It identified a wide range of technical and institutional innovations that pastoralists developed to adapt to new conditions, while seeking food security, sustainable resource management and improved governance within their socio-political units. Many of these innovations are related to maintaining mobility, an important basis for pastoralist resilience. Some innovations are location-specific and cannot be scaled up easily to other areas. However, they offer starting points for joint action by pastoralists, researchers, development agents and government authorities to support pastoralists' efforts to deal with change.

The study revealed that pastoralists have considerable knowledge and experience in dealing with climatic variability, which can be expected to increase with climate change. However, various other factors, such as their marginalisation in decision-making about resource use, exert pressure on pastoralists and increase their vulnerability to climate change, as these pressures restrict their room to adapt. Local innovation in adaptation to climate change needs to be assessed also in the light of these other economic and socio-political pressures.

The focus in pastoralist development should be not so much on specific innovations, but rather on recognising local innovation as a process and stimulating its continuation, in interaction with other stakeholders. Local adaptive capacities can be reinforced through joint experimentation, investigation and action led by the pastoralists themselves, including action to address the pressures coming before climate change.

1. Facing climate change

Today, climate change and its consequences receive much attention in the public debate. It is thought that weather extremes (drought, floods, storms) will occur more frequently in the future. Rising temperatures will favour agents of tropical diseases, or will speed up their development, and probably also contribute to their spread into new areas (Henson 2006). Countries in the tropics that depend primarily on rainfed farming and/or on pastoralism are thought to be particularly vulnerable to the effects of climate change. For example, the Intergovernmental Panel on Climate Change (IPCC 2007) predicted that, in some of these countries, agricultural production could decline by as much as 50% by 2020. Similarly, UNEP (2006) has estimated that, by 2025, about 480 million people in Africa could be living in water-stressed areas. However, in a variable environment such as in the pastoral areas of Africa, trends of climate change are hard to detect. In this conference, rainfall data from Somali Region, measured at numerous stations, show a great variability but no upward or downward trend (Catley *et al* 2011).

2. Living with climatic variability

Pastoral areas in Africa are situated primarily in low-rainfall areas and, as a rule of thumb, the lower the average annual rainfall, the higher the variability of rainfall and forage availability (see Nicholson 1981 for data from West Africa). Pastoralists in semi-arid areas therefore cannot plan with a fixed stocking rate and a long-term grazing plan. They have to adapt to the highly variable climatic and forage conditions.

Adaptation strategies include:

- Keeping animals that can endure seasonal feed shortage and long intervals between drinking;
- Keeping large herds in the hope that some animals will survive a period of feed shortage;
- “Following the rains” within the semi-arid areas; this includes reciprocal arrangements with other pastoral groups (i.e. one group in need can use areas and water that are customarily used by another group, and if the other group is in need, they may be granted access to resources of the first group);
- Seasonal movements between the dry areas that cannot be cropped and better-endowed areas that may offer more forage, e.g. in the form of crop residues;
- Acquisition of land in better-endowed areas that can be used for cropping; in the past, this was done by dominating other groups (e.g. the Fulani in West Africa) or – also practised by the Fulani as well as many other pastoral groups – by making arrangements with farmers (e.g. exchanging manure for crop residues or milk for cropping rights on the farmers’ land);
- Diversification into cropping, trade etc.

These strategies have been used for centuries and have been discussed in detail in the literature since at least decades (e.g. Monod 1975, Galaty *et al* 1981, Sandford 1983, von Kaufmann *et al* 1986, Galaty & Johnson 1990, Scoones 1995, Niamir-Fuller 1999).

The above-mentioned strategies are designed to handle climatic variability, but – at times of extreme drought (over several years) – they sometimes do not work and high livestock mortality and famine among pastoralists occur. Serious droughts having been experienced in the African drylands long before climate change was an issue in public debate. For example, from 1540 to 1800 AD, 26 major droughts and famines were recorded. The “great Ethiopian famine” happened in the period 1889–92 (McKee 2008, Pankhurst 1985). In West Africa, droughts were reported since the Middle Ages and, before the much-publicised Sahelian drought in the late 1960s and early 70s, at least two major droughts occurred in the Sahel in the first half of the 20th century (Kotschi 1986).

However, recurrent droughts are not the only pressures on pastoral systems. Excessive rainfall can cause flooding, leading to crop failure and livestock mortality. Epidemics, such as rinderpest in the late 19th and early 20th century caused widespread livestock (and wildlife) mortality and human suffering. In many countries, expansion of cropping into pastoral areas is “eating up” the best dry-season pastures. Also invasive plants, such as *Prosopis* species, are reducing grass growth and forage availability. Conflicts often prevent access to pastures. Disease outbreaks and related trade bans can reduce income and viability of pastoral production, as can population growth and an associated decline in size of the average herd, i.e. in the ratio of number of animals per person, to a level below subsistence.

3. Innovation by pastoralists in adaptation to climate change

Within the framework of the multistakeholder network for research and development called PROLINNOVA (**P**ROMoting **L**ocal **I**NOVation in ecologically oriented agriculture and natural resource management), two studies were carried out in Ethiopia and Niger to identify innovations by pastoralists in the face of climate change.

The term “innovation” broadly refers to discovering new and better ways of doing things or modifying an existing way of doing things. It encompasses both radical and incremental changes in thinking, products, processes and/or organisation (Scoones & Adwera 2009). PROLINNOVA (2009) makes the following distinction:

- **Local innovation** = process of developing new and better ways of doing things;
- **Local innovations** = the new ways of doing things (in terms of technology or socio-economic organisation or institutional configuration) that result from the innovation process.

In Ethiopia, the study was coordinated by the Pastoralist Forum Ethiopia (PFE), a local umbrella organisation that brings together local and international non-governmental organisations (NGOs) dealing with pastoral development in the country, in close collaboration with the Geography Department of Addis Ababa University. The study was carried out in Gashamo District in Somali Region, Awash Fentale District in Afar Region and Dasanach District in South Omo Zone in the Southern Region of Ethiopia. It focused specifically on innovation by pastoralists in the face of climate change. In Niger, the study was coordinated by the Regional Centre for Agricultural Education (CRESA), a body of the Faculty of Agronomy of the University of Niamey, and was implemented jointly with the National Agricultural Research Institute (INRAN), two NGOs and the Directorate of Agricultural Development in Maradi Region. The study was carried out in Tahoua and Maradi Regions and looked at local innovation in both mixed (crop-livestock) farming and agropastoralism. The results of the initial study in Ethiopia were published in Yohannes and Mebratu (2009) and those of the initial study in Niger in Magagi *et al* (2010).

3.1 Pastoralists' innovation in response to changing conditions

In Ethiopia and Niger, the study teams explored pastoralists' perceptions of climate change and their responses to what they perceived as climate change. The pastoralists gave numerous examples; only a few are mentioned here:

- **Developing their own cut-and-carry feeding system:** Several decades ago, the Awash National Park in Afar Region of Ethiopia took over large areas of prime grazing land and water points formerly used by Afar pastoralists. These people gained no benefit from the income from tourism, and their herds have no official access to the park during dry seasons and droughts. Therefore, frequent violent conflicts between Afar pastoralists and park (State) authorities have taken place. Recently, however, some Afar pastoralists have developed their own cut-and-carry system of collecting forage from the park and transporting the forage on the head or in carts drawn by horses or donkeys. This innovation includes collective action by community groups that rent carts jointly, using money contributed by group members, and then distribute the forage within the community. This innovative way of managing forage resources has several benefits: 1) it reduces conflict between the pastoralist community and the State; 2) the cut-and-carry system reduces the risk of disease transmission between livestock and wildlife; 3) the pastoralist community has come to regard the park as a reserve pasture area; and 4) the community has developed a collective financial management mechanism that could serve as a basis also for other economic activities.
- **Settlement around waterpoints:** In some parts of Somali Region of Ethiopia, man-made water sources in the form of below-ground cisterns ("*birkas*") are increasing in number and are often privately owned. Many pastoralists have to sell some of their animals to be able to pay for water, which becomes very expensive during drought. However – sometimes with the help of NGOs and government agencies and sometimes on their own initiative – some pastoralist communities have developed communal sources of water (by harvesting run-off water, digging deep wells or establishing community *birkas*). This has encouraged some pastoralists to settle at least part of their family – often the women and children – close to the water sources, to have free access to water and short travelling distances for the animals kept near the home, while other segments of the herd are still moved temporarily to more distant grazing areas. It remains to be seen whether settlement around waterpoints is an innovation in the sense of a better way of doing things, as problems with water pollution and degradation of land around the waterpoints may arise over time.
- **Changing herd composition:** Because of problems with water, bush encroachment into pastures and recurrent drought, pastoralists in both Niger and Ethiopia are increasingly replacing cattle with sheep, goats and camels. In West Africa, high prices for small ruminants – especially sheep – also encourage a change in species composition of the herds. There is also an increase in the number of donkeys kept by agro-pastoralists. This is because of the multiple functions of donkeys for drawing water from deep wells, transporting water and transporting

goods to and from markets. Older women in Niger have started to give donkeys as marriage gifts to encourage young women to marry pastoralists living in areas far from waterpoints (see Box 1). Another advantage is that donkeys are less demanding in their feeding than are other livestock.

Box 1: Donkey as marriage gift: an innovation by pastoralist women in Niger

The drying up of water sources and the lowering of the water table has made it more difficult for women to fetch water. Women travel by donkey or on foot for several kilometres to fetch water for the household. Because of the work involved, young women had started to refuse to marry young men in villages that frequently experience water shortages. Older women in one such village therefore introduced an innovation into the marriage ceremony. They started to buy donkeys for their daughters to facilitate the work of drawing water from the wells (donkeys are used for this task) and carrying the water to the family home. The donkeys are given to the young women on the basis of village generosity. In some cases, the husband uses the wife's donkey for transport merchandise to the markets. The donkey thus plays a social role in securing water availability and consolidating marriage ties within the rural communities.

- **Settlement on islands in dryland lakes:** In Southern Ethiopia close to the border to Kenya, it was found that, because the local people are experiencing longer dry seasons, some Dasanach agropastoralists now prefer to stay on islands in Lake Turkana. This gives them easy access to water, pasture and fish, and they face less risk of livestock raiding by other ethnic groups.
- **Diversification of livelihood sources:** Also in Southern Ethiopia, some ethnic minorities, often called hunter-gatherers, who used to depend almost solely on fishing for their own consumption, have started marketing fish, using modern fish traps they have brought in from the Turkana area in Kenya. They have also begun to rear small ruminants. This is a case of people who were originally non-pastoralists gradually tending towards more pastoralist-like activities.
- **Fodder conservation:** As a complement to grazing of natural pasture, many pastoralists in Niger have started to make hay and to purchase crop residues from farmers and agropastoralists. Some of the hay is also sold to animal keepers in towns. Depending on how this activity is governed by the community, making hay from communal pasture can be a form of privatisation of previously common goods; this could lead to greater disparities between richer and poorer pastoralists.
- **Use of motor vehicles:** In many parts of Ethiopia, some richer pastoralists have sold some of their livestock in order to purchase trucks, which they use in a flexible way to transport livestock for grazing or marketing and to transport marketable commodities for buying and selling. Trucks are also being used even to transport camels from Moyale, a large market on the border to Kenya. The trucks are also used to load water tanks when the truck owners need water for their own families and herds. They also generate income by transporting water to *birka* owners. As a result on these activities, the rich pastoralists are becoming even richer.
- **Empowerment of traditional institutions:** In Afar Region, the community underlined that the root cause of their vulnerability is closely linked to the lack of good governance in their local sociopolitical institutions. Their perception was that the traditional pastoral leaders have – with the attractions of modern and individualistic lifestyles – become corrupt and are no longer accountable to their communities. Accordingly, some pastoralists “elders” (a term that refers to married men both young and old) have taken their own initiative to build up pressure within the communities to penalise and/or overthrow corrupt leaders. They also work intensively on conflict resolution and have sometimes become successful in negotiating with other ethnic or clan groups to use resources in different geographic locations, at least temporarily during drought and on a reciprocal basis. Generally, these efforts have contributed to improving governance at the grassroots level. This reduces vulnerability of the communities to external threats, including climate-related ones.

3.2 Some features of local innovation by pastoralists

In general across both Ethiopia and Niger, it was found during the PROLINNOVA partners' studies that innovation by pastoralists has the following features:

- **Wide range of different types of innovation:** A wide range of different types of innovation was found among the different types of groups depending partly or wholly on pastoralism for a living: by pastoralists and agro-pastoralists that were – depending on context – either minority or majority ethnic groups; this status of relative dominance and power in their home areas affected their freedom to innovate.
- **Several group innovations:** Many of the innovations, e.g. the cut-and-carry feeding systems in Ethiopia, the efforts to improve access to water sources and the efforts to reinforce traditional institutions, have been developed by groups, not by individuals. This might be attributable to the strong tradition of collective action in pastoralist communities.
- **Trend toward privatisation of common property resources:** On the other hand, a potentially negative feature of some innovations by individuals, such as collecting water in private-owned *birkas* and selling hay from communal pasture, is that common-property resources are being privatised. This could lead to increased socio-economic differentiation among pastoralists. Here, the pastoralist communities and supporting organisations will need to reflect on these changes, consider whether they indeed represent improvements for the majority of the pastoralists and, if not, develop mechanisms to prevent further impoverishment of the already disadvantaged.
- **Multi-functionality of innovations:** Some of the innovations (e.g. using donkeys, using trucks, empowering traditional institutions) have multiple functions that encompass ecological, economic and social parameters.
- **Diversification of livelihoods:** Many of the pastoralists' innovations are geared to diversifying sources of livelihood and spreading risk.

What was striking – and is possibly due to the fact that all of the researchers involved in the actual fieldwork were men – is that relatively few cases of innovation by women pastoralists were recorded. There is obviously a need for deeper-going investigation in order to recognise this important aspect of pastoralist adaptation and innovation. In other pastoralist areas, programmes such as PARIMA (Pastoral Risk Management) have recorded inspiring examples of how women pastoralists, when faced with climate change and other pressures that threaten the lives of their families, have taken the initiative to form mutual-help groups and to diversify into petty trading, small-ruminant marketing and other forms of income generation (Coppock *et al* 2009).

3.3 Challenges in understanding local innovation

During the process of trying to recognise and understand pastoralist innovation in adaptation to climate change, the following challenges were encountered:

- **Difficulties in separating climate-change impacts from other pressures on pastoral systems:** The root causes of pastoralists' vulnerability to climate change lie in their marginalisation in decision-making and in the unfavourable government policies. In attempts to address adaptation to climate change, primary attention should be given to these root causes of vulnerability. Focusing only on technical adaptation to climate change would be blind to the still greater and more immediate challenges to the livelihoods of pastoralist communities and could exacerbate the vicious cycle of impoverishment, completing undermining their capacity to survive, let alone adapt.
- **Distinguishing between indigenous practices and local innovation:** Pastoralists have generations of collective knowledge and experience in adapting to ecological and socio-economic changes and have developed an immense wealth of indigenous knowledge and practices to deal with these changes. Their indigenous knowledge system is dynamic. It is characterised by flexibility and adaptability and is strongly integrated into their socio-cultural

system. It is not easy to distinguish these practices from more recent processes of local innovation, which is equally a reflection of flexibility and adaptability.

- **Recognising small but possibly important changes:** Because of the heterogeneity of the communities and ecologies in the pastoral areas, it is extremely difficult for outsiders to recognise local adaptation, as these may be only small incremental changes in what appear to be “traditional” practices. Moreover, some innovations may have been developed by only a few individuals or small groups and may therefore remain unrecognised, even though they could be potentially important for a larger number of pastoralists. On the whole, however, it is not important to differentiate between local innovations *per se* and the application of traditional practices. One advantage of the “climate-change alarm” is that external actors (scientists, extension workers, academics etc) are now starting to accord more value to some long-standing local practices that are, under uncertain climatic conditions, more suitable than many introduced technologies. Some are trying to gain a better understanding of the current efforts of local communities to cope with and adapt to climate change or climatic variability and are trying to build on these practices. This is a step forward toward more partnership in research and development.
- **Keeping a longer-term perspective:** Adaptation is a process that deals with both current and future vulnerability and strengthening of resilience. Some forms of adaptation may be good at the current time but not necessarily for the future. This implies that regular assessment needs to be made of the adaptation mechanisms. What will be important is not trying to perpetuate any specific form of adaptation (innovation) to climate change or other pressures that have been developed at a given point in time, but rather:
 - i) strengthening the innate capacity of pastoralists to continue to adapt, in good collaboration with other relevant stakeholders, and;
 - ii) stimulating pastoralist communities to assess the possible longer-term socio-economic consequences of the local innovations.
- **Keeping pace with fast change:** Very rapid ecological, socio-economic and political changes are taking place at the grassroots level in pastoralist systems. Many organisations working at this level are not giving sufficiently close attention to these rapid changes and may therefore be focusing on interventions that have already become outdated, while pastoralists have moved ahead using their own creativity and innovation.

4. Lessons learnt and the way forward

Local innovation in adaptation to climate change needs to be assessed together with other environmental, socio-economic and policy changes. This helps avoid the trap of romanticising locally developed practices as if they were evidence of deliberate adaptation to climate change. The initial scanning of pastoralist innovation in the framework of the PROLINNOVA studies has only partially addressing the complex and diverse issues of adaptation to climate change. Vulnerability is complex, being determined by a combination of different factors (demographic changes, macro policies, market changes etc). Consequences of climate change cannot be clearly separated from those other impacts on the livelihoods of rural people.

It is important to give attention to local innovations, regardless of whether they are in response to climate change or other changes, because they are sources of valuable new knowledge based on the deep-rooted experience of pastoralists. Pastoralists live in areas full of uncertainties and risks to their livelihoods and have therefore always had to experiment and to adapt. Their innovations can bring insights into hitherto unexpected possibilities to adapt.

There is a clear need to continue investigating how pastoralists are responding to the new challenges and opportunities they are facing, in order to inform policymakers and other stakeholders of the potential role that local capacities can play in local adaptation, and to trigger a process of recognition and reflection. The focus should be not so much on specific innovations, but

rather on documenting local innovation as a process. To be sure, at the local level, pastoralists may be able to benefit from knowing what other pastoralists are doing, and then adapting the innovations and practices to their own situations. Disseminating information about pastoralist innovation could stimulate appropriate adaptation by others, as these examples raise their self-confidence and motivation to adapt. Although documentation of innovations is not an end in itself, it does remain important as a symbol of the local capacity to react creatively to local problems and new prospects.

The current international attention to climate change attracts people in agricultural research and development to focus on this topic. In the case of pastoralists – and possibly in the case of other users of natural resources – the immediate pressures are so great that these deserve priority attention (to be sure, with attention also to the possible future impacts of climate change). It is important to put more efforts into recognising how pastoralists are responding to new pressures – as well as to opportunities, such as in marketing – and explore together with them how these innovations can be improved. In the process, all the stakeholders involved, and especially the pastoralists, will develop better linkages, partnerships and capacities to be able to address future challenges. Moreover, the results of such joint innovation processes, starting with local capacities and ideas, would have a higher likelihood of sustainability than would external interventions foreign to the pastoralists. Thus, recognising local innovativeness by pastoralists provides an entry point for a bottom-up approach to supporting adaptation to much more than only climate change.

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