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### **Strengthening local adaptive capacity: the key to resilience in the face of climate change**

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#### **Abstract**

Climate change poses countless challenges for smallholders, yet local initiatives in response to change offer entry points to sustainable processes of adaptation. Partners in PROLINNOVA – a global network for Promoting Local Innovation in agriculture and natural resource management – studied how crop farmers and pastoralists responded creatively to change. For example, pastoralists in Ethiopia observed longer and more frequent drought, but also population growth, less access to grazing and water because of irrigation schemes and national parks, and increased conflict. Their responses include cutting and carrying fodder from national parks, making private and community below-ground cisterns to store water and diversifying their herds to include more goats and camels that can withstand dry periods better than can cattle. Local adaptation in Niger included making more use of donkeys than in the past and collecting hay from communal land to use as dry-season fodder.

Such local innovations serve as entry points for farmer-led joint research – a process in which scientists and extensionists join with farmers to further develop the local ideas, integrating local and scientific knowledge. This approach to research and development focuses on the positive – on farmers' innovativeness; it builds mutual respect among all partners in joint research; it stimulates farmers to value their own knowledge and skills; it provides solutions that are less costly and more site-appropriate than many introduced technologies; it enhances the confidence of farmers and gives them greater control over their own development. Above all, it builds the adaptive capacities of rural communities to deal with change. Local people involved in this process are better able to analyse their situation, learn to pool their energies and knowledge, and become better linked with other actors with whom they can continue to take adaptive action to address emerging problems. They thus become more resilient to shocks and stresses in a constantly changing environment.

#### **Introduction**

Persistent drought, torrential downpours, flash floods, hurricanes – climate change poses countless challenges for farmers, pastoralists and others who depend on natural resources for their living. Poor rural communities bear the brunt of such climate-related disasters. Yet, the initiatives of these very communities to respond to change offer entry points to sustainable processes of climate-change adaptation (CCA).

The challenge of climate change calls for action to assist vulnerable communities to cope and adapt. In keen awareness of this, numerous international CCA initiatives have emerged. Most of them involve large-scale, “high-tech” infrastructure for physical protection. Such investments are often needed to deal with impacts of climate change, but the ways that rural people handle their land, water, crops and animals must also be adapted. Various “climate-smart” farming practices are being introduced but, in the process, local initiatives to deal with climate change in agriculture and natural resource management are often

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ignored. This may not only limit the success of introduced practices but also weaken local adaptive capacity.

Experiences already made in enhancing the innovative capacities of rural people – including experiences in increasing their governance over funding to support experimentation and innovation – provide important lessons for current efforts to strengthen community-based adaptation (CBA) to change (see <http://community.eldis.org/cbax>). A key lesson is: start the work with local communities by recognising how they are already adapting and build on these local initiatives together with them. Enhancing the local adaptive capacities strengthens resilience to climate change, reducing vulnerability so that rural communities can withstand shocks. The “grassroots” initiatives of affected communities to protect or enhance their livelihoods are often less costly, make better use of available resources and are more site-appropriate than introduced practices or large-scale technical interventions. Local adaptive capacity is key to sustainability in the face of climate change.

### **Local innovation to adapt to climate change**

In Ethiopia, Nepal and Niger – three of the 20 countries where PROLINNOVA, an international network promoting farmer-led innovation, is operating – studies were made of local people’s perception of climate change and their creative responses to it. The results of these and other studies revealed that many rural people have, on their own initiative, developed innovations to cope with perceived changes in rainfall, wind patterns or temperature, although often not consciously linking these to global climate change.

In Ethiopia, pastoralists in Afar Region perceive more frequent drought, but also see the impacts of population growth, immigration and increased conflict over land and water. Their responses include cutting and carrying fodder (see Box 1) and making private and community below-ground cisterns to store water. Some pastoralist groups in southern Ethiopia have replaced cattle with camels and goats (which can survive longer periods without water) or sold some stock to buy trucks for multiple uses, including water transport for their families and herds.

#### **Box 1: Pastoralists cut and carry fodder in Ethiopia**

Several decades ago, the Awash National Park in Afar Region took over large areas of prime grazing land formerly used by Afar herders. They did not benefit from tourism incomes, and their herds were denied access to the park. This caused frequent conflict with park (State) authorities. Recently, with increasing drought, some Afar herders have developed their own system of cutting hay from the park for supplementary dry-season feeding. They carry the hay on their heads or in carts drawn by horses or donkeys. Community groups rent carts using money contributed by members, and distribute the forage within the group. Besides providing a fodder reserve, this innovative way of managing forage resources also: a) reduces conflict between the pastoralists and the State; b) reduces the risk of transmitting disease between livestock and wildlife; and c) has stimulated the Afar to develop a collective financing mechanism that could serve as a basis also for other economic activities.

*Source: Yohannes GebreMichael & Mebratu Kifle (2009)*

In Niger, farmers perceive higher temperatures, more dust and windstorms, less rainfall and longer dry periods. Local adaptations include making more use of donkeys – a hardy and low-demanding species – than in the past (see Box 2); new arrangements between herders and farmers to graze animals on crop residues; and collecting hay from communal land to use as dry-season fodder.

#### **Box 2: Women give donkeys as dowry in Niger**

Drying up of water sources and lowering of the watertable have made it more difficult for women to fetch water in western Niger. They travel by donkey or on foot to distant water sources. Because of the hard work involved, young women are refusing to marry young men in villages with frequent water shortages. Older women in one such village therefore introduced an innovation into the marriage arrangements. They started buying donkeys as dowry for their daughters. Donkeys not only ease the work of drawing water from the wells and carrying the water home; they also play a social role in consolidating marriage ties within the communities.

*Source: Magagi et al (2010)*

Researchers elsewhere both within and beyond the PROLINNOVA network have likewise found innovation by smallholders to adapt to climate change, e.g. PROLINNOVA–Nepal (2010), Das *et al* (2009) in India, Spence (2008) in Jamaica and Scholtes and Hornidge (2009) in Indonesia, to name but a few.

### **A deeper look into local adaptation**

These various cases allow deeper insights into the role of local innovation in CCA:

- **Vulnerability to climate change is due to multiple factors.** Reasons for vulnerability are complex. The role of climate change often cannot be separated from other pressures on people’s livelihoods. For example, a root cause of herders’ vulnerability to climate change is their marginalisation from higher-level policymaking about use of land and water. When supporting CCA, attention should also be given to these other causes of vulnerability. Focusing only on climate change would ignore the more immediate challenges to local livelihoods and could undermine the local capacity to survive, let alone adapt.
- **“Traditional” practices emerge from dynamic innovation.** Over generations, rural people have acquired a wealth of indigenous knowledge in dealing with ecological and socio-economic change. It is not easy to distinguish the traditional practices (results of past local innovation) from more recent innovation. One advantage of the “climate-change alarm” is that scientists are starting to appreciate local practices – no matter how recently developed – that are, under uncertain climatic conditions, more suitable than many introduced technologies.
- **Women innovate in often invisible ways.** Innovation by women can easily be overlooked, especially if it involves socio-institutional innovation, such as changes in marriage customs. But these innovations may be more important for increasing community resilience than spectacular technical inventions by wealthy male farmers.
- **Adaptation to change never ends.** Adaptation is a process that needs to deal with both current and future vulnerability. Some forms of adaptation may be appropriate now but not forever. To strengthen resilience, it is not important to perpetuate any specific adaptation to climate change. Rather, one needs to strengthen local people’s capacity to continue to adapt to change – of whatever kind – in good collaboration with other relevant stakeholders.
- **Not all local innovations are positive.** Innovations by local people should not be romanticised. They may have longer-term environmental impacts or may benefit a few people but disadvantage many. For example, constructing water cisterns in drylands may encourage herders to settle close by, leading to land degradation. Farmers who cut hay from communal areas to sell or to feed to their stock may exclude herders who used to graze their animals there freely. Where local innovation involves privatising common-property resources, support to CCA may need to stimulate community reflection about the social impacts and about ways to make the new practices more equitable.

### **Intervention to enhance local innovation**

Experiences of PROLINNOVA partners (Wettasinha & Waters-Bayer 2010) have shown how innovation processes can be speeded up by building on the creativity of local people. In “participatory innovation development” (PID), development agents serve as facilitators, linking external and local knowledge, while recognising that local people need to be the drivers of their own change.

This approach goes to the extent that grassroots organisations manage Local Innovation Support Funds (LISFs) for farmer-led experimentation, including hiring technicians or scientists to support this. The PID approach strengthens farmers’ capacities to innovate by increasing their confidence and encouraging partnerships between them and other relevant actors. CCA interventions can learn from these PID experiences. Scientists’ expertise may be needed to validate or improve local adaptation mechanisms. Development agents can help spread successful ones. Carefully introduced new ideas can stimulate local creativity, leading to joint innovation processes that strengthen local adaptive capacity.

## Implications for CCA policy and development

- **Give local innovation due recognition in policy and planning.** Rural people perceive changes in their environment and are developing ways to adapt to them. These local adaptations need to be documented. They can provide valuable knowledge for other resource-poor communities struggling with similar issues and could encourage similar initiatives. Documentation in appropriate forms, including communities' own documentation, can make policymakers and planners aware of the role that local innovation can play in CCA. Policies and programmes that give due recognition to local creativity can make CCA interventions more effective by building on the motivation of local people. Funders should support training and provide means to recognise and document local creativity.
- **Promote farmer-led adaptation to climate change.** Recognising local innovation in dealing with climate change is only a first step. It provides an entry point for farmer-led participatory adaptation, in which CCA knowledge and suggestions from external experts are combined with the initiatives of local people in joint exploration of promising innovations – from whatever source. This approach to CCA can lead to solutions that really work and are cost effective and manageable by resource-poor communities. It strengthens local capacities for a continuing process of adaptation, as it empowers rural communities to plan for and cope with impacts of climate change both now and in the future.
- **Link CCA funding to local governance and innovation.** Policymakers should channel part of the global adaptation funds to community level – along the lines of LISFs – so that NGOs, farmer associations and community organisations can use the funds to support their own processes of experimentation and innovation to deal with climate change. Efforts to strengthen local adaptive capacities, including management of CCA funds, require a longer timeframe than conventional development projects. Initiatives to support community-led adaptation processes need to be linked with national adaptation policy and planning. This should lead to stronger downward accountability for the considerable amounts of CCA funding being made available to national governments and international agencies and will build the capacities of rural people to play a role in fund governance at higher levels.

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