

Planning adaptation for food and farming: lessons from 40 years' research

Local farmers and pastoralists in poor countries have long coped with droughts, floods and variable rainfall patterns. This first-hand experience is invaluable for those working on climate change adaptation policies, but how do we access it? The International Institute for Environment and Development (IIED) has 40 years' experience working alongside vulnerable communities to help inform regional, national and global policies. Our research has shown that measures to increase climate change resilience must view food, energy, water and waste management systems as interconnected and mutually dependent. This holistic approach must also be applied to economic analysis on adaptation planning. Similarly, it is vital to use traditional knowledge and management skills, which can further support adaptation planning. Taking these lessons into account, we can then address the emerging policy challenges that we face.

In the emerging field of climate change adaptation, some of the best information about how to deal with increasingly extreme and uncertain climate comes from generations of first-hand experience in poor countries. This is especially true in agriculture and pastoralism, where poor farmers and pastoralists have coped with droughts, floods and variable rainfall patterns long before climate change became topical.

Of course, some of this knowledge is inadequate for dealing with large or extreme changes, where no amount of knowledge based on past experience will help. There are also important differences between agendas that are focused on climate change adaptation and those on mainstream development, such as the UN Framework Convention on Climate Change (UNFCCC), and related political, institutional and financial mechanisms that provide frameworks and support for action.

IIED has 40 years' experience working in environment and development research. It has a strong tradition of linking work on vulnerable communities in some of the poorest countries on earth with much larger policies, planning arenas and processes. Many of the institute's

staff have worked with vulnerable communities; the organisations working with those communities; and in the regional, national and global policy arena in which the fates of those communities are determined.

Issues driving IIED research

IIED has long-standing bodies of work on dryland management, sustainable agriculture and rural livelihoods. The focus has been on long-term adaptive landscape management to ensure food security from resilient production systems incorporating food, water and energy systems as a whole. Climate change is just one component of this.

Decentralised governance, human rights and reclaiming or regaining control over these rights has also been a key focus of IIED's work. Research to improve our understanding of the threats to genetic resources and traditional knowledge, as well as developing tools and local networks to protect community rights over them, has helped strengthen the adaptive capacity of indigenous and local communities. Such work has tremendous relevance for debates on climate change adaptation. For example, work to protect community

Policy pointers

- **Policies and institutions** must support circular, not linear, systems for food, energy, waste and water in a holistic and integrated way to tackle poverty, ensure food security and enhance resilience to climate change (and other environmental changes).
- **Economic assessments can** be too narrow. Instead a more rounded analysis including a wider array of costs should be applied.
- **Policy makers must take** into account traditional knowledge about seed varieties, crops and land management to enhance adaptive management capabilities.
- **More joined-up** policymaking and institutional support across sectors is required to strengthen local organisations and federations, build on local knowledge and empower local people in poor countries.

First-hand experience is invaluable for those working on climate change adaptation policies

rights to traditional knowledge in China, India, Kenya, Panama and Peru has revealed that hybrid varieties are often less resilient than native ones to the climate change impacts communities are already experiencing.

For about 10 years, IIED has also helped the poor and vulnerable in climate change arenas and supported

community-driven solutions to climate change. Initiatives, such as the annual international community-based adaptation conferences,¹ have shown the

importance of agriculture in the context of dealing with climate change for the world's poorest.

In Least Developed Countries (LDCs), studies of the total economic value of pastoralism have sought to move beyond the costs and benefits of adaptation options to a more complex but comprehensive assessment in the local socioeconomic context, where, for instance, local livelihoods are dominated by mobile livestock systems and smallholder agriculture. Such information can better inform adaptation decision making and actions where resources are limited and where players have to address existing stresses such as competition for grazing land and water from other land uses like cultivation, and livestock diseases that amplify vulnerability to climate change.

In recent years, other groups within IIED — notably those working on forests, sustainable markets, biodiversity, cities and economics — have increasingly addressed climate change issues. One example is research on 'fair miles' (see Air miles or fair miles?) and also the examination of large-scale animal protein production on food security and livelihoods resilience in the face of climate change. Close collaboration with the Foundation for International Environmental Law and Development (FIELD) has also strengthened work at the international climate change negotiations on Reducing

Emissions from Deforestation and Forest Degradation (REDD) and other negotiating tracks.

Lessons learnt

What have we learnt that can inform climate change adaptation planning? When considering IIED's work on food and agriculture, several key lessons emerge:

1. Holistic approaches can increase resilience.

Measures to increase resilience to climate change must view food, energy, water and waste management systems as interconnected, mutually dependent and as part of circular, instead of linear throughput systems. For example, chemicals, such as pesticides and fertilisers, may temporarily boost agricultural productivity, but in the face of climate change impacts, such as drought, they may ultimately reduce local resilience by using up a disproportionate amount of household budgets that could otherwise be spent on education, health or other areas that boost resilience. Similarly, approaches that retain wealth locally will better safeguard long-term resilience (see Barter markets in Peru).²

Holistic approaches are also beneficial when tackling climate change adaptation and mitigation simultaneously. Mitigating climate change through REDD activities in developing countries will only be effective if continued productivity improvements are made in agriculture due to the expected increases in food demand. IIED research shows that national REDD strategies will be ineffective if they are also not coherent with agricultural development goals, agricultural mitigation and adaptation efforts. In most countries it will not be possible to expand forested areas to meet REDD demands, and expand agricultural areas simultaneously.

2. Economic assessments must be holistic. This holistic approach must also be applied to any economic analysis undertaken to inform adaptation planning, as opposed to the usual narrow analyses focused on more immediate and easily measurable costs and benefits. For example, the use of chemicals to control pests induced by climate change may mean: that insects and diseases develop resistance over time; non-target organisms expand into newly available habitats when their natural controls are removed; soil and water is contaminated by chemicals; crop pollinators decline; the health costs for agricultural labourers increase; agro-biodiversity that helps maintain ecosystem functioning is lost; and the costs of mitigating the greenhouse gases across the supply chain go up.²

Factoring in these effects can increase the costs several-fold. IIED's 'fair miles' research examines how assessments of greenhouse gas emissions caused by air-freighting usually fail to consider the full spectrum of such emissions from 'farm to fork' and the additional benefits of supporting livelihoods in developing countries (see Air miles or fair miles?).

Barter markets in Peru³

The Lares Valley is located in the south-eastern Andes in Cusco, Peru. The resident Quechua people live in some 50 communities throughout the 3,600km² region and grow tubers and potatoes in the highest zone; corn, legumes and vegetables in the middle areas; and fruit trees, coffee, coca and yucca in the lower parts. Every week a barter market is held in the middle area of the valley and nearly 50 tonnes of goods traded each market day.

These barter markets protect against the risks of agro-chemical supply price increases, falling production sale prices and increases in the purchase prices of agro-industrial foods. They also lead to better management of uncertainty by allowing peasants to diversify crops and varieties to reduce vulnerability to climatic and environmental change. Agricultural biodiversity (genetic, species and ecosystem) is conserved through continued use and exchange of food crops at the markets, thus providing more resilience against the severe blights that can affect crop monocultures.

Demand is high for estimating adaptation costs — from governments, donors and UNFCCC bodies — but IIED research reveals that distinguishing between local adaptation needs and existing livelihood and development needs is near impossible because they are fundamentally intertwined. Demands to identify the exact costs of adaptation in isolation can force distinctions and divisions that do not reflect local realities and, at worst, could lead to maladaptation.

3. Traditional knowledge and management skills are vital. IIED has a long history of supporting traditional knowledge and management strategies in sustainable agriculture to enhance productivity, alleviate poverty and secure sustainable livelihoods and income sources. This research shows that traditional knowledge about seed varieties, crops and land management can also support climate change adaptation as well as providing mitigation benefits.⁶

As agricultural biodiversity disappears, the genetic basis for agriculture to cope with changing environmental conditions weakens (see How adaptation in the Andes builds on local agrobiodiversity). Modern commercially produced seed varieties are often less resilient to climate change and undermine resilience by creating dependency on external agencies such as large agribusinesses. Intellectual property rights also have a negative impact on genetic diversity when expropriated by large companies because local incentives to develop native species and varieties are lost.

Work in India, Indonesia, Iran and Peru has demonstrated that supporting decentralised, farmer-led, biodiversity-rich farming strategies and strong local organisations are key to ensuring effective local responses to climate change.⁷

Three emerging policy challenges

Policies for adaptation planning that build on knowledge and experience gained by IIED on sustainable agriculture and dryland management could be informed as follows.

1. Integrated policy approaches must tackle climate change in a holistic way as one of many environmental and development challenges. Most policies, institutions, technologies and processes are based on the assumption that systems operate in a linear throughput manner. But complex, integrated systems require policies and institutions that simultaneously tackle poverty, improve productivity and enhance resilience in the face of climate change and other environmental changes. IIED research in Malawi shows that adaptation activities are more effective when they contribute to the capacity of the entire system rather than separate entities, such as commercial agriculture or subsistence farming. Likewise, the dichotomy between mitigation (dealt with partly under REDD) and adaptation in the international climate change arena is dangerous

Air miles or fair miles?⁴

'Local food is good' is a common mantra, but IIED's fair miles research challenges this assumption. It argues that food chains emit greenhouse gases at all stages and that transport typically only accounts for about 10 per cent of those emissions. Other emissions result from the energy used to drive machinery, manufacture fertiliser and keep greenhouses warm. Air-freighted produce from developing countries is typically transported in the spare belly hold capacity of scheduled passenger flights, which means the share of emissions caused by air-freighted food is relatively small. This means that food grown in developing countries tends to have much lower greenhouse gas emissions than food grown in developed countries. There are also benefits for poor farmers, such as increased incomes. Discriminating against such produce on environmental grounds is likely to hamper or reverse development gains.⁵

How adaptation in the Andes builds on local agrobiodiversity

Quechua farmers in the highlands and valleys of the Cuchumuela community, Cochabamba, Bolivia, are experiencing unpredictable rainfall, more extreme weather events and higher temperatures. This affects food security due to the emergence of new pests, such as the black corn weevil, and known pests, such as potato moths and Andean weevils. Increases in moth attacks mean potatoes can only be stored for one to three months rather than the typical seven months. This forces farmers to buy potatoes for the rest of the year.

In response to the new pests and resulting low harvests of certain varieties, some farmers have applied highly toxic chemicals, which increase production costs, compromise farmer health and lead to pest resistance. Other farmers have specialised in developing more resistant and flexible crop varieties. The diversity of local varieties, such as 'Doble H' that grows despite little rainfall, has enabled farmers to cultivate varieties that are best adapted to the new conditions.

when considering realities on the ground. If REDD restricts agricultural land expansion — on the basis that agriculture is a significant source of emissions — then the impacts on both mitigation and development need to be carefully assessed. But if agricultural expansion continues to feed and fuel the world's growing population, it will limit REDD's ambitions. Policies such as REDD need to be considered alongside those for agriculture — and all agricultural mitigation activities need to integrate lessons on pro-poor sustainable agriculture.

Securing funding for such integrated approaches is difficult, because donors and governments tend to operate in sectors despite there rarely being one single environmental or social driver for change. The use of Payments for Environmental Services (PES) provides an opportunity to help meet this challenge by supporting sustainable, resource-efficient agriculture food supply chains, which focus on the whole picture and not just climate change. For example, Brazil has a strong history of using instruments for conservation, like Fiscal Ecological Transfers, and has more recently implemented PES payments as a more direct approach to reach farmers. Bolsa Floresta, led by a public-private

NGO, is the first internationally certified project in Brazil to focus on improving the quality of life of traditional people for the maintenance of ecosystem services provided by tropical forests.⁸

2. Ensure that locally-led solutions and genuine community benefits are central to emerging international climate change agreements and scientific research. Market-based mitigation measures, including those under REDD, must avoid the mistakes made under the Clean Development Mechanism whereby most projects chase carbon finance benefits and sideline genuine local development. Lessons need feeding up from local and national levels to the UNFCCC — for example ensuring communities are involved in national policy processes such as the National Adaptation Programmes of Action. And assessments of the impact of livestock production on climate must not forget small producers. Current systems for accessing carbon funding, which require proof of ‘additionality’ and the capacity to measure carbon sequestration, are too expensive and complicated for such producers. Given the value of local knowledge for addressing adaptation, work with local communities must continue and agricultural research needs to get better at incorporating this local knowledge. Bringing together farmers and scientists will help break down the deadlock of language, geography and experience that exists between them.

3. Power balances must shift to ensure local people and the organisations that represent them can influence policy making. At present, many ‘common sense policies’ never see the light of day because of numerous ‘revolving doors’ between powerful interests and government, which effectively block alternative approaches. For example, expropriation of Intellectual Property Rights and Plant Breeding Rights by multinational corporations severely threaten local capacity to adapt by restricting the use of some varieties

and promoting a few modern commercial varieties at the expense of traditional crops and practices. Limiting the power of these actors is key. This could be achieved by recourse to legal action or by building coalitions, strengthening social movements — such as the increasing number of federations of the urban poor — and making improvements in evidence-based research. Broader economic analyses of the merits of pastoralism, which includes not just meat and milk, but health, education, environment and tourism, could well strengthen the argument against powerful agribusiness-oriented land-use alternatives. So too could a better understanding of the threats to traditional knowledge and links between this and landscapes, cultural values, customary laws, climate change and the need to protect biocultural systems as a whole.

When it comes to climate change adaptation, there is no need to reinvent the wheel. There are generations of first-hand experience in poor countries and a huge body of associated research, which can be used to better inform policies on a regional, national and global basis. Bearing in mind the lessons learnt and the policy challenges highlighted above, we can then be better prepared for an increasingly extreme and uncertain climate.

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Notes

■ ¹ See www.iied.org/cba6 ■ ² Jones, A., Pimbert, M., Jiggins, J. 2011. *Virtuous Circles: Values, systems and sustainability*. IIED and IUCN CEESP, London. ■ ³ Argumedo, A., Pimbert, M. 2010. Bypassing globalization: Barter markets as a new indigenous economy in Peru. *Development* 53(3), 343–349. ■ ⁴ Chi, K. R., MacGregor, J., King, R. 2009. Fair miles: Re-charting the food miles map. IIED, London. ■ ⁵ Muuru, J. G. 2009. *Kenya’s Flying Vegetables: Small farmers and the ‘food miles’ debate*. Africa Research Institute, Policy Voices Series, London. ■ ⁶ Swiderska, K. et al. 2011. *Adapting agriculture with traditional knowledge*. IIED Briefing. IIED, London ■ ⁷ See www.diversefoodsystems.org ■ ⁸ Viana, V. M. 2010. *Sustainable Development in Practice: Lessons learned from Amazonas*. IIED, London