

Community-based adaptation to climate change: an overview



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Introduction

Scientists are clear that climate change is happening, and that it is due to emissions of greenhouse gases produced largely by industrialised countries (IPCC, 2007). Those likely to be worst affected are the world's poorest countries, especially poor and marginalised communities within these countries. Ironically it is these poor countries and people who have contributed least to the problem of climate change, because of their very low greenhouse gas emissions, but who will suffer most from its consequences. Even if emissions are severely curbed, climate change will still occur. The industrialised countries have accepted they have a responsibility to help poor and vulnerable countries to adapt (UNFCCC). However, until recently, most adaptation efforts have been top-down, and little attention has been paid to communities' experiences of climate change and their efforts to cope with their changing environments.

This special issue of *Participatory Learning and Action* focuses on recent

approaches to adaptation to climate change which are community-based and participatory, building on the priorities, knowledge, and capacities of local people. Community-based adaptation draws on participatory approaches and methods developed in both disaster risk reduction (DRR) and community development work, as well as sectoral-specific approaches such as farmer participatory research (Berger *et al.*, this issue) and Farmer Field Schools (Sherwood and Bentley, this issue). Innovative participatory methods are also emerging to help communities analyse the causes and effects of climate change, to integrate scientific and community knowledge of climate change, and to plan adaptation measures.

In this overview paper to the issue, we describe how community-based approaches to climate change have emerged, and the similarities and differences between CBA and other participatory development and disaster risk reduction approaches. Whilst CBA is a relatively new field, some lessons and challenges are

beginning to emerge, and we analyse these, drawing on the experiences contained in the collection of articles for this issue. Many of the articles are concerned with natural resources, reflecting the preponderance of submissions we received in this area. However, climate change will affect many other aspects of communities' lives, and we would urge practitioners working in other sectors, such as human health and urban areas, to share their experiences of community-based adaptation.

Climate change and its impacts

Climate change refers to short-, medium-, and long-term changes in weather patterns and temperature that are predicted to happen, or are already happening as a result of anthropogenic emissions of greenhouse gases such as carbon dioxide. These changes include a higher frequency of extreme weather events such as drought and floods, as well as greater unpredictability and variability in the seasons and in rainfall. Overlying this increased variability are expected longer-term changes, such as temperature and sea-level rises, and lower (or in some cases higher) rainfall. Annex 1 shows in more detail how the climate is predicted to change over the medium- and long-term (Christian Aid, 2009, based on the IPCC 4th assessment report, 2007).

Why are poor people most vulnerable to climate change?

Poor countries and communities are more vulnerable to climate change because they tend to be located in geographically vulnerable areas, such as flood-prone Mozambique, drought-prone Sudan, or cyclone-prone Bangladesh, and in more vulnerable locations. For example, the slums and informal settlements surrounding many developing country cities are usually sited on land prone to landslips or to flooding and river bank erosion. Wealthy people, commerce, and industry can afford to situate themselves on safer land.

Many poor communities are heavily

dependent on natural resources for their livelihoods. Smallholder farmers have much experience of adapting to their complex, diverse, and risk-prone environments. However, farming is now becoming even more difficult and risky because of greater unpredictability in the timing of rainy seasons and the pattern of rain within seasons, making it more difficult to decide when to cultivate, sow, and harvest, and needing more resources to seize the right time for planting, and to maintain crops and animals through dry spells. Heat stress, lack of water at crucial times, and pests and diseases are serious problems that climate change appears to be exacerbating. These all interact with ongoing pressures on land, soils, and water resources that would exist regardless of climate change (Jennings and McGrath, 2009).

Vulnerability to climate change is not just a function of geography, or dependence on natural resources; it also has social, economic, and political dimensions which influence how climate change affects different groups (Action Aid, 2005). Poor people rarely have insurance to cover loss of property due to storms or cyclones. They cannot pay for the health-care required when climate change-induced outbreaks of malaria and other diseases occur. They have few alternative livelihood options when their only cow drowns in a flood or drought kills their maize crop for the year – and they do not have the political clout to ask why their country's early warning system did not warn them of likely flooding. Climate change will also have psychological and cultural effects, for example beliefs and traditions associated with the seasons being undermined by climate change (Jenning and McCrath, 2009).

Poor communities already struggle to cope with the existing challenges of poverty and climate shocks, but climate change could push many beyond their ability to cope or even survive. It is vital that these communities are helped to adapt.

Adapting to climate change

International climate change negotiations, multilateral and bilateral agencies, donors, and international governance and financial institutions such as the World Bank are paying increasing attention to adaptation and how best to help people to adapt. More and more funding is available for adaptation.¹ However, until recently, most efforts to help countries adapt focused on national planning and top-down approaches based on climate change modelling. Remarkably little attention has been paid to the ways in which poor people have been coping with climate variability and extremes for decades.

What is community-based adaptation?

Community-based adaptation to climate change is a community-led process, based on communities' priorities, needs, knowledge, and capacities, which should empower people to plan for and cope with the impacts of climate change. As Tanner *et al.* and others in this issue point out, climate change is only one of a range of natural, social, and economic problems that may face poor people (such as unemployment, the prices of food and other essentials, commodity prices, drugs, gambling, community conflict, and health). So it is unlikely that interventions focusing only on climate-related risks will reflect community priorities.

CBA needs to start with communities' expressed needs and perceptions, and to have poverty reduction and livelihood benefits, as well as reducing vulnerability to climate change and disasters. In practice, CBA projects look very like 'development as usual' and it is difficult to distinguish the additional 'adaptation components'. For example, in a drought year, we cannot divide water storage meas-

ures undertaken by local communities into those initiated as a response to 'normal' climate variability, and those initiated as a response to climate change. However, the difference is that CBA work attempts to factor in the potential impact of climate change on livelihoods and vulnerability to disasters by using local and scientific knowledge of climate change and its likely effects.

CBA may start by identifying communities in poor countries that are most vulnerable to climate change, or these communities may themselves ask for assistance (Kelman *et al.*, this issue). It may also follow on from work with communities to cope with a disaster, such as severe flooding. International development NGOs and donors funding CBA usually work through local partners, such as local NGOs or community groups which already have the trust of local communities.

Incorporating climate change information

CBA work needs to incorporate information on climate change and its impacts into planning processes. This includes:

- scientific information (e.g. long-term predictions from climate change models, seasonal forecasts, information on trends based on data collected at nearby weather stations); as well as
- local knowledge about trends and changes experienced by communities at a local level and strategies these communities have used in the past to cope with similar shocks or gradual climatic changes.

Both these sources contribute to an understanding of risk. Climate change science cannot say for certain, for example, how much rainfall a particular area will receive over any given time – but it can give some guidance on the probability that rainfall will increase or decrease and to what

¹ For example, funds have been established to support adaptation activities under the United Nations Framework Convention on Climate Change (UNFCCC) and its Kyoto Protocol such as the Adaptation Fund, and the World Bank's Pilot Program for Climate Resilience (PPCR). While such international funds are not always aimed specifically at community-based adaptation (CBA), some of them, such as the Adaptation Fund, are trying to target the most vulnerable communities.



Photo: Terry Cannon

Moveable cooking stove designed to cope with floods, 2007, near Khulna, Bangladesh.

extent. CBA builds in this notion of risk and uncertainty into activities, with the aim of building communities' resilience to both current climate variability and future climate change.

Drawing on participatory disaster risk reduction approaches

The lessons from disaster risk reduction (DRR) work are of tremendous value for climate change adaptation, because climate change is likely to change the magnitude, frequency, and timing of extreme events such as flooding, landslides, and storms, as well as generate new disaster events.

Disaster risk reduction is likely to be the entry point for communities suffering from severe shocks as a result of short-term climate variability (Christian Aid, 2009). Many of the papers in this issue use a participatory DRR framework (e.g. Tanner *et al.*, Warrick, and Gaillard and Maceda). Although different approaches and frameworks for participatory DRR exist, all involve working with local people to understand the types of hazards they face (e.g. earthquakes, droughts, floods, pests and diseases, human diseases), the factors which make them vulnerable to these hazards, and their causes. These together give an indication of how 'at risk' communities are and which groups are most vulnerable. They also help communities consider what capacities they have for reducing vulnerability, and aim to empower communities to take action themselves to reduce the risks they face.

Many organisations working with local communities to reduce poverty and disaster risks are now trying to incorporate the effects of climate change into their work with communities. Kelman and Mercer (this issue), for example, describe a disaster risk reduction framework developed with communities to facilitate DRR plan-

ning in small island developing states (SIDS), such as Papua New Guinea. They then show how the framework can be adapted to take into account the likely effects of climate change by drawing on external scientific information such as downscaled climate projections and satellite images, as well as local knowledge of hazards and vulnerabilities. Taking into account these longer-term impacts is one of the key differences between DRR and climate change adaptation.

Livelihoods, DRR, and climate change

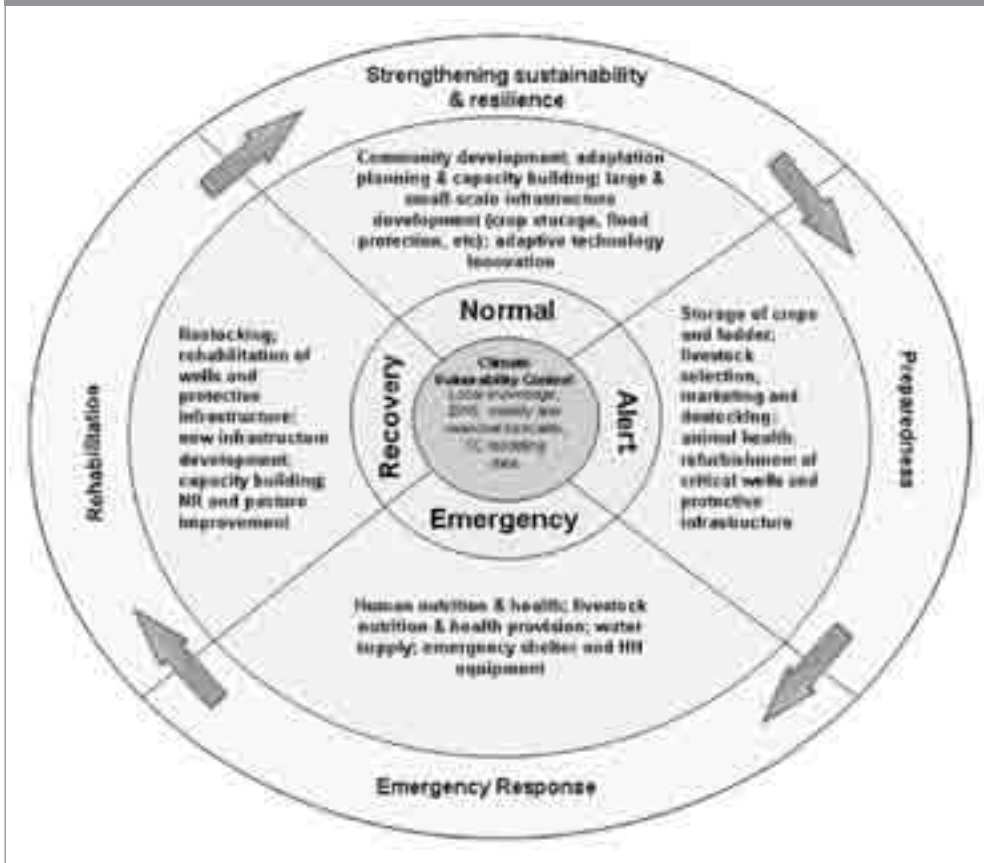
In practice, all disaster risk reduction and development work should take into account climate change impacts if development gains are to be sustained in the future. Whilst development agencies may differentiate between DRR, climate change adaptation, and poverty alleviation, at the household level the issues converge into one complex interrelated problem which boils down to the same thing – the security and wellbeing of people's lives, livelihoods, and assets (Oxley, 2009).² There is increasing recognition that, for many communities facing frequent hazards, poverty, disasters, and climate change adaptation are closely linked and cannot be viewed in isolation from one another.³

This points towards the need to find practical ways of integrating DRR, livelihoods, and climate change adaptation. Christian Aid, for example, has developed a climate risk cycle management approach to development planning which builds on the expertise and experience of existing DRR and livelihoods programmes, using existing tools wherever possible. In the model, predictable risks are anticipated, long- and short-term risk reduction activities are integrated into livelihood development, and the time spent in emergency or rehabilitation is minimised (Figure 1).

² ESRC-funded seminar, Integrating Approaches: Sustainable Livelihoods, Disaster Risk Reduction and Climate Change Adaptation, December 2009, organised by Practical Action (www.practicalaction.org.uk). See: <http://community.eldis.org/59cc7287/>

³ *Ibid.*

Figure 1: Climate risk cycle management



Source: Christian Aid (2009a)

These integrated frameworks are still largely untested and there are likely to be challenges in handling the array of factors to be considered, as well as in encouraging the different support institutions needed to tackle vulnerability to work together.

Participatory methods for CBA

Many of the participatory tools used in CBA (see Table 1 for some examples) will be familiar to DRR and development practitioners, but other innovative approaches are being developed for communities, development workers, and scientists to co-learn about climate change and adaptation, as well as for working with particular groups such as children (Tanner *et al.*, this issue).

Co-learning about climate change

Whilst local people are extremely aware of changes in their environment, they often have little knowledge of the global causes and effects of climate change. The papers in this issue describe a wide variety of participatory tools to help communities understand climate change and the impacts it may have. Many use co-learning approaches, drawing on both local and external scientific knowledge. Communication about climate change should be in the first language of the community approached and in terms it can understand.

In Ghana, for example, communities developed mental models showing drivers

Table 1: Some examples of participatory tools used in CBA

PARTICIPATORY TOOL/APPROACH	USES
Mental models	<ul style="list-style-type: none"> • Drivers and effects of climate change
Seasonal calendars	<ul style="list-style-type: none"> • Seasonality and links with livelihoods • Can be combined with timelines to show perceived changes in seasonality over time
Timelines	<ul style="list-style-type: none"> • Hazards and events • Trends in climate, e.g. temperature and rainfall
Community mapping and modelling	<ul style="list-style-type: none"> • Resources • Types and causes of risks and threats • Extent of vulnerable areas • Vulnerable households and individuals • Planning DRR/CC adaptation measures
Transect walks	<ul style="list-style-type: none"> • Vulnerability/risks • Land use • Resources
Ranking	<ul style="list-style-type: none"> • Vulnerabilities and hazards • Coping and DRR strategies, e.g. water management options, crop varieties
Dream maps and drawings	<ul style="list-style-type: none"> • Vision of community or farm and how to achieve
Theatre, poems, songs	<ul style="list-style-type: none"> • Awareness raising of risks and risk reduction measures • Advocacy
Participatory video	<ul style="list-style-type: none"> • Awareness raising • Farmer to farmer communication • Advocacy
Stakeholder analysis	<ul style="list-style-type: none"> • Institutions, relationships, power
Key informant discussions (e.g. <i>storian</i>) ⁴	<ul style="list-style-type: none"> • In-depth discussion of vulnerability, livelihood sources

and effects of climate change (Tschakert and Sagoe, this issue). During this process, they reinforced and expanded their own knowledge of climate change, with the input of external agents. In Indonesia, Climate Field Schools followed a participatory ‘learning by doing’ approach to help farmers increase their knowledge of climate change and observe climatic parameters themselves, such as rainfall, to help guide farming activities (Christian

Aid, this issue). Sherwood and Bentley (this issue) describe a similar process in the Andes.

Children can be very effective communicators of climate change causes and effects. They often have a better understanding of the science of climate change processes than adults in the community, through school lessons, and can draw out the implications for local livelihoods. Plush (this issue) shows how videos, produced in

⁴ *Storian* means to ‘chat, yarn, swap stories’ and is an umbrella term indicating semi-structured interview, informal interview, and opportunistic discussion as part of observation. See Warrick, this issue.

a participatory way by children, can be a powerful means of raising awareness of climate change and its impacts, especially where literacy rates in the community are low. In this case, the children were first taught about climate change using locally available materials (although Plush notes that there is a severe lack of material that is not too technical, or related to the urban mitigation context). They then used this knowledge to develop questions and carry out filmed interviews with other community members, to give a clear picture of the impacts of climate change at the local level.

Although it is important for communities to understand the drivers and processes of climate change, Warrick (this issue) warns of the dangers of disempowering communities, giving them a sense that they cannot take action to deal with climate change, even though they have often been dealing with highly variable climates for many years. To avoid this, she suggests discussing climate change in the context of how people have already responded to climate stress, how this has changed over time, and on communities' own capacities to adapt.

Local knowledge about climate change

Several papers in this issue look at ways in which familiar participatory tools can be adapted to document local knowledge about climate changes. For example, rain calendars were used in Malawi to analyse changes in rainfall over the past five years (Awuor and Hammill, this issue) whilst seasonal analysis charts showed changes in the seasons in West Bengal, India over a similar timescale (Christian Aid, this issue). Climate timelines in Sudan were used to record extreme weather events and temperature trends over the past 30 years (Christian Aid, this issue).

In the absence of historical local weather data, the memories of older community members are often the only source of information on climate trends (Berger *et al.*, this issue). Where scientific

data are unlikely to be available, one way forward may be to strengthen local people's ability to collect their own data (Sherwood and Bentley, this issue).

Using scientific climate change data

The science of climate change and predictions regarding future changes have a key role to play in adapting to climate change. Finding ways of making scientific data accessible to communities is crucial if they are to adapt and remain in control of the CBA process. There are potentially many different kinds of information that would be useful for community planning, such as remote sensing observations, satellite pictures, downscaled climate scenarios, and seasonal and long-range weather forecasts. Where these are available, communities need to learn how to interpret them. Christian Aid (this issue), for example, describe how participatory climate forecast workshops were held in Zimbabwe, in which forecasts for the coming season, expressed in terms of probabilities rather than firm predictions, were explained to farmers, and then downscaled using farmers' own historical rainfall data.

Integrating local and scientific knowledge

Many of the papers in this issue consider how to integrate scientific and local knowledge so as to build on the strengths of each. Although this can present challenges (see later), several papers suggest ways of bridging the gap between local communities and scientists (e.g. Gaillard and Maceda).

Identifying and planning adaptation activities

Participatory ways of documenting, prioritising, and sharing risk reduction and adaptation approaches are important if CBA is to fit with community priorities, and build on existing practices or those used in the past, for example traditional rice varieties which have better salinity tolerance than more recent varieties (Berger *et al.*, this issue). Commonly



Photo: Terry Cannon

Children take a class on the environment, 2007, near Khulna, Bangladesh.

mentioned on-farm adaptation options include diversification of the crops grown, changes in farming practices, better water management, and food storage. In extreme cases, for example, where droughts are likely to be of such magnitude that crops can no longer survive, then alternative livelihood strategies, or even migration may need to be explored.

There is much scope for approaches which encourage the sharing of adaptation practices. Sherwood and Bentley (this issue), for example, describe an approach to climate change adaptation in the Andes, in which farmers learn through visits to other farms and through experimentation. As farmers learn and take action at the farm level, the focus shifts to collective actions, such as sharing responsibility for collecting weather data, and implementing soil and water conservation measures.

Baumhardt (this issue) describes how

farmers made videos of the adaptation activities they found most useful, which were then screened in nearby villages with which they did not have contact. Whilst the videos were an important communication tool for raising awareness of adaptation options, there are likely to be differences in abilities to adopt adaptation measures, and additional support will often be needed if local people are to make these changes.

Molina *et al.* (this issue) describe how children in the Philippines developed theatres, songs, and dances to communicate the potentially destructive impacts of hazards such as flooding and river bank erosion, and were effective advocates for risk reduction activities, such as tree planting.

Gaillard and Maceda (this issue) describe how communities in a flood-prone part of the Philippines created extraordinarily detailed, scaled three-dimensional



Photo: Fernanda Baumhardt

Mphunga villagers filmmaking training. Mphunga village, Salima district, Malawi – July 21st 2008. See Baumhardt *et al.*, this issue.



Photo: Grace Molina

Children mixing cement for school retaining wall, Potrerillos, El Salvador. See Molina *et al.*, this issue.

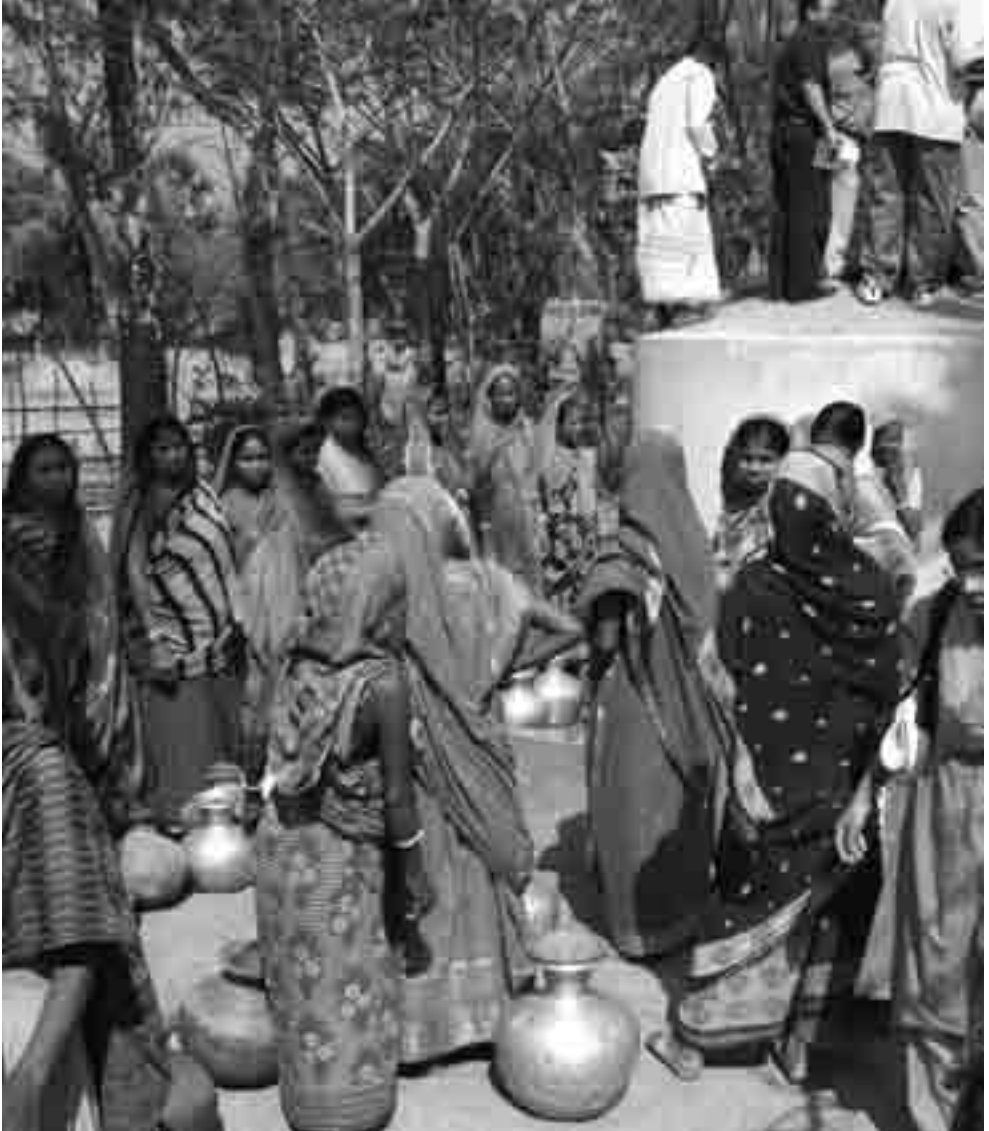


Photo: Terry Cannon

Women queue for drinking water from a filtered tank in area where salinisation is increasing due to sea-level rise.

models of their area, made from local materials such as cartons and paper, which they used for disaster risk reduction planning. They used the models to identify important areas for livelihoods, e.g. fishing and hunting grounds, areas prone to different types of flooding (river, tidal), different households, the material of their house (which affects how robust the houses are), household inhabitants, and the most vulnerable people in the community, e.g.

young children, elderly people, pregnant women, and those with disabilities. They then identified local resources to deal with hazards, e.g. boats, vehicles, and then planned disaster risk reduction activities, e.g. meeting points, evacuation routes, and shelters. The information from these models can also be input into GIS systems for use by local government or scientists (subject to the communities' permission), and can easily be updated.

Lessons and challenges in community-based adaptation

Although CBA is a very recent development, a number of lessons and challenges are already emerging, around the availability and credibility of climate change information and data, the quality of participatory processes in CBA, scaling up, and monitoring and evaluation.

Issues around knowledge

Good information on which to base climate change adaptation is vital, but it is not always available, accessible, or credible.

Scientific data

Christian Aid (this issue) highlight the difficulties communities often experience in accessing climate change data that they can use in planning. Whilst climate models can help identify which parts of the world are more likely to be physically vulnerable (see Annex 1), these predictions are often at a geographic resolution or timescale which are of little use to local communities. Better climate change models, which can make predictions that are more relevant for communities, are urgently needed.

There are also problems with weather forecasts. Meteorological stations are often woefully under-resourced and understaffed, data are not computerised, and data which would be useful for farmers are not collected. Jennings and McGrath (2009), for example, point out that the vast majority of analyses of meteorological records and climate model data focus on mean annual temperature and precipitation change rather than the timing of rains and intra-seasonal rainfall patterns, which are of much more interest to farmers.

Where data are available, communities are often not able to access them, for example, because they lack Internet access, or the data are not passed from meteorological departments to other government departments which can make use of them, such as agriculture. Finally, communities often have little confidence in the data.

Access to reliable, appropriate forecasts is essential in meeting the challenge of greater unpredictability and increased hazard events, and meteorological departments need to be strengthened to meet this need. Ideally, scientific data should be verified against local data, so that the scientific information has credibility with users (Christian Aid, this issue).

Local knowledge

Whilst communities often have little confidence in the reliability of information from scientists, scientists are often equally reluctant to trust local knowledge, which they regard as subjective and lacking in rigour (Gaillard and Maceda, this issue). However, in the absence of weather records and climate change data, CBA may be largely dependent on local knowledge of past climate trends for forecasting future trends.

Gill (1991) compared rainfall patterns recorded by Nepali farmers using rainfall calendars with the 'real' data recorded at the nearby weather station, and found a remarkably good fit when comparing modal rainfall. A more recent study was able to match farmer perceptions of changing timing and character of seasons against meteorological records and get a fit good enough to show that farmer analysis needs to be taken seriously (McGrath, pers. comm.). However, several authors (e.g. Warrick) note that, when analysing longer-term trends with communities, more recent events tend to overshadow more distant ones, and this needs to be taken into account when trying to extrapolate from past trends.

Many communities use traditional systems to forecast the coming season. Sherwood and Bentley (this issue) describe how farmers use wind patterns, cloud formations, the position of rainbows, and animal behaviour to predict the coming season. Berger *et al.* (this issue) describes a traditional weather forecasting system called *Litha*, based on lunar cycles, and

used by communities in southern coastal in Sri Lanka to predict rainfall patterns, and the best time to plant crops. However, there are fears that these traditional systems will become less effective as climate change impacts increase. Berger *et al.* observe that in recent years, the *Litha* system has been falling out of use, although whether this is because it is less effective or because scientific weather forecasts are more reliable is unclear, and this would merit further investigation.

Issues around participation

CBA activities demonstrate a variety of types and degrees of participation (see Table 1 for one typology). Participatory tools are sometimes used as a way of collecting local information about vulnerability and climate change to be used and analysed by outsiders (e.g. the case described by Wong, this issue). Often the priorities and interests of outsiders override those of communities, and there is still a lot of 'doing to' communities, rather than communities taking charge. Experience from many different fields, including those relevant to climate change adaptation, such as natural resource management and soil and water conservation, shows that if adaptation is to be effective and sustainable, it must draw on the knowledge and priorities of local people, build on their capacities, and empower them to make changes themselves. In this overview, we have argued that communities, scientists, and development workers need to learn, analyse, and plan action in partnership, but that communities need to be in the driving seat.

This has wide-reaching implications for professional behaviour, attitudes, and mindsets, and for institutional cultures and structures. Sherwood and Bentley (this issue), for example, point out that people-centred, community-based issues are in conflict with dominant professional behaviour and with dominant institutional designs. Outsiders are facilitators and co-learners, not 'teachers' or 'experts'. Participatory

processes need time to develop and they need flexible funding. They do not fit with the pre-determined calendars, budgets, and outputs demanded by government and other organisations.

The way in which adaptation activities are funded may be of help here. Poor nations argue that, as wealthy nations have caused the problems of climate change, any international funding streams for adaptation activities should be used as recipient countries and communities see fit, and that such funding should be more stable and long-term than development funding, which is subject to the conditions and priorities of donors. This provides an opportunity for flexible, long-term funding of participatory community-based adaptation processes.

In the rush to go to scale to respond to climate change adaptation and to spend newly available funds, there is a danger that, as with PRA in the 1990s, participatory CBA approaches will be abused and misused. At the end of this issue, in 'Reflections on practical ethics for participatory community-based adaptation,' we have reproduced a statement by a group of practitioners called 'Sharing our concerns' (Absalom *et al.*), which was published in *PLA* (then *PLA Notes*) in 1994. This statement is essentially an ethical code for participatory practitioners, and with a few amendments, it has stood the test of time. We have also included here an extract from an article in a more recent issue, *PLA* 54 (Rambaldi *et al.*, 2006) on practical ethics for participatory development practitioners.

Honest critical reflection – of the sort exemplified by Warrick (this issue) – is essential if CBA practitioners are to learn from each others' experiences. For example, what happens when, as Warrick cautions, climate change is not seen as a priority in communities, where a highly variable climate is regarded as 'normal', or where climate change impacts are not yet evident, even though scientists are confident that

Table 2: Types of participation

Type of participation	Characteristics
Passive participation	People participate by being told what is going to happen or has already happened. It is a unilateral announcement by an administration or project management without listening to people's responses. The information being shared belongs only to external professionals.
Participation in information giving	People participate by answering questions posed by extractive researchers using questionnaire surveys or similar approaches. People do not have the opportunity to influence proceedings as the findings of the research are neither shared nor checked for accuracy.
Participation by consultation	People participate by being consulted, and external people listen to views. These external professionals define both problems and solutions, and may modify these in the light of people's responses. Such a consultative process does not concede any share in decision-making, and professionals are under no obligation to take on board people's views.
Participation for material incentives	People participate by providing resources, for example labour, in return for food, cash, or other material incentives. Much on-farm research falls into this category as farmers provide the fields but are not involved in the experimentation or the process of learning. It is very common to see this called participation, yet people have no stake in prolonging activities when the incentives end.
Functional participation	People participate by forming groups to meet predetermined objectives related to the project, which can involve the development or promotion of externally initiated social organisation. Such involvement does not tend to be at early stages of project cycles or planning, but rather after major decisions have been made. These institutions tend to be dependent on external initiators and facilitators, but may become self-dependent.
Interactive participation	People participate in joint analysis, which leads to action plans and the formation of new local institutions or the strengthening of existing ones. It tends to involve interdisciplinary methodologies that seek multiple perspectives and make use of systematic and structured learning processes. These groups take control over local decisions and so people have a stake in maintaining structures or practices.
Self-mobilisation	People participate by taking initiatives independent of external institutions to change systems. They develop contacts with external institutions for resources and technical advice they need, but retain control over how resources are used. Such self-initiated mobilisation and collective action may or may not challenge existing inequitable distributions of wealth and power.

Table 2: A typology of participation⁵

there will be serious impacts? What happens when an external organisation's focus and funding does not match the priorities raised by communities? Without the flexibility to address communities' real concerns, it is difficult for the process of adaptation to be community-driven.

Difficulties with the concept of 'community'
Whilst CBA focuses on 'the community', it is very important to be aware of differences in priorities, needs, vulnerability, and capacities within communities. Tanner *et al.*, for example, show that there are marked differences in perceptions of the

⁵ Table sourced from Pretty *et al.* (1995), who adapted it from Adnan *et al.* (1992).

Box 4: Looking within the community

Climate change impacts have different effects on women and on men and have been well attested in many places. The need to find water as well as firewood and fodder is a well-known reason for girls to be kept out of school, and male migration has been linked to the spread of HIV and AIDS.

In Nepal, increasing crop failure has increased the strategy of men migrating. Women are left alone to look after families yet with the least access to resources to be able to adapt. They have less access to cultivable land to grow food and have to find water, wood, and fodder. Any worsening of livelihood options has to be made up in physical labour, one of the few resources women control. So to compensate for the decline in food production, women are doing more daily waged labour. This is often extremely onerous – such as portering construction materials – and badly paid – women are paid only three-quarters of what a man would earn for the same work.

Source: S. Jennings and J. McGrath (2009).

importance of different hazards by age and gender in the Philippines. Men, as the farmers in these communities, highlighted agricultural hazards such as pests and drought, whilst women were concerned with social hazards (gambling, drugs), and children had the most awareness of environmentally unsound livelihood practices and global environmental problems.

Different sections of the community also vary in their capacity to undertake adaptation activities. Women are particularly badly affected by the combination of climatic and environmental stresses, but their particular needs and wishes for adaptation are less likely to be heard or acted upon (Jennings and McGrath, 2009) (see Box 4). Children are affected by both current and future climate change impacts, yet their voices are rarely heard or considered in climate change adaptation activities (Plush, this issue).

In many National Adaptation Programmes of Action (NAPAs), agriculture and forestry feature heavily as priority projects. However, McGrath and Jennings (2009) point out that, in Malawi, women prioritised a crèche, family planning, access to loans, credit, training, and free health-care over support for agriculture. They argued that without childcare and support to start up small enterprises, they could not make adaptation changes.

Wong (this issue) highlights the

dangers of ignoring intra-community power differentials when planning adaptation activities. Local chiefs ensured that their family members were included as community representatives, excluding the voices and interests of poorer farmers from decision-making processes. Even though the project made special efforts to ensure gender balance, planned adaptation activities were both poverty insensitive and served to reinforce existing power inequalities.

Many articles in this issue use participatory approaches in a differentiated way to capture the perspectives of different groups. Some make particular efforts to ensure that more vulnerable households, and vulnerable individuals within households, are included, for example, the participatory modelling process described by Gaillard and Maceda, giving the opportunity to ensure that the voices of those people are heard. Less is said, however, about analysing power relations within communities, and how differences in needs and priorities can be reconciled. We need to keep asking: Who benefits? Who loses? Who is empowered? Who is disempowered?⁶

Monitoring and evaluation

Monitoring and evaluation (M&E) of CBA activities will also be a challenge. Good CBA should be truly participatory and

⁶ See 'Reflections on practical ethics for participatory community-based adaptation,' this issue. Source: Rambaldi *et al.*, 2006.



Photo: Terry Cannon

Houses raised on plinths to try and keep them above flood levels, 2007, near Khulna, Bangladesh.

devolve much of the decision-making down to the community level, but this makes any centralised reporting or evaluation activities more difficult to coordinate. This is an important issue, because it is the responsibility of industrialised nations to help poor countries adapt to climate change, so some means of evaluating the effectiveness of funded CBA programmes is required. But any move towards centralised tracking and evaluating systems must be sure not to lose sight of the need to facilitate genuine participatory processes that empower communities to adapt to climate change in ways which address locally identified priorities.

Policies and institutions for CBA

Whilst CBA is focused on the community level, it cannot be carried out in isolation from events and activities occurring at other levels, for example:

- CBA is affected by the services and support available (or more often not available) at district and national levels, for example, long-range weather forecasts, downscaled climate scenarios, satellite images, information on weather forecasting, and agricultural and other extension services, and the ability of support organisations to integrate their activities.
- Some adaptation activities have spill-over effects on other communities, for example,

if one community builds a dam to cope with drought, this will affect communities lower down the river. Wong (this issue), for example, describes how communities participated in transboundary river water governance in Burkina Faso and Ghana, which allowed for coordination and advance warning over the flow of water.

- Policy makers at district, national, and international levels need to know how communities are being affected by climate change, and to understand and respond to communities' priorities and needs. This might be through participation in 'invited' spaces, such as through participatory scenario development workshops (Bizikova *et al.* this issue)⁷, or through advocacy by communities (e.g. Plush describes how videos produced by children influenced policy makers in Nepal), or by communities organising and putting pressure on powerful local actors (Dodman, Mitlin, and Rayos, unpublished abstract).

Some CBA approaches explicitly build in a multi-level approach. Action Aid, for example, uses participatory vulnerability analysis (PVA), which starts by assessing vulnerability at the community level, but this feeds into the district, national, and international levels. They argue that there are multiple determinants/causes of vulnerability, and many of these fall outside individuals or communities. Hence analysis of vulnerability must go beyond the individual to micro- and macro-level political processes. Similarly, Practical Action have been developing a framework for understanding, analysing, and addressing the multiple factors – lack of resources; fragile livelihoods; hazards; climate change; political marginalisation; and, weak institutional support mechanisms – that contribute to vulnerability in an integrated and holistic manner (Pasteur, 2009).

Conclusion

The theory and practice of CBA are still in their infancy. Both are likely to grow very rapidly, however, as needs increase as a result of intensifying climate change impacts and as interest in and support for adaptation grows at national and international levels.

Although funding is increasingly available for adaptation activities, simply providing poor country governments with more money does not mean that it will reach the poor and those who are most vulnerable to climate change, let alone increase their ability to adapt. Such communities are often marginalised, remote, and receive limited services and little support from their governments even when they are able to articulate what support they need. Reaching these hundreds of millions of people and supporting their genuine participation in any decision-making about resource allocation for CBA will be an immense challenge for any international or national programme or funding mechanism focusing on adaptation.

Whilst CBA initiatives are increasing in number and information sharing on these activities is developing, translating these activities and documentation into improved policy responses and scaled up CBA initiatives worldwide remains a challenge. Power structures are at the heart of climate change vulnerability and it is important to find ways to allow poor vulnerable people to influence policy and be heard in key policy arenas, such as the UNFCCC negotiations.

To be successful, community-based adaptation programmes will need to ensure that communities are able to participate in identifying priorities, both local and regional, and in planning, implementing, monitoring, and reviewing adap-

⁷ Participatory scenario development workshops engage those most directly concerned (e.g. community members, local officials) in discussions about how the future may develop, and about possible adaptation pathways, and their pros and cons. The conclusions may feed into local, district, and national planning.

Box 3: Sharing information on CBA

The second and third International Conferences on Community-Based Adaptation were held in Dhaka, Bangladesh, in February 2007 and February 2009. This will become an annual event at which practitioners, policy makers and researchers can share information on methodologies for CBA, upscaling CBA, communicating CBA, CBA in different ecosystems, funding for CBA etc. The next will be held in Dar es Salaam, Tanzania in February 2010. The conferences involve field visits to CBA projects in different ecosystems and regions so people can see CBA activities on the ground.⁸

tation. Such programmes should provide support and link communities to relevant decision-making institutions. They will also need to build the capacity of local organisations and local governments to enable them to effectively take part in decision-making processes.⁹

CBA draws on a number of different fields, including disaster relief work, community development work, and climate science. These different areas of knowledge and expertise often employ different languages and concepts, and there is still much work to be done in developing a common understanding and language, and sharing experiences and good practice.

Continuing to document CBA processes in an honest and critical way is very important, both to improve practice and to share experience in little-documented areas, such as incorporating climate change adaptation into health policy. You will find a list of resources on CBA, including websites, later in this issue. Other important opportunities for experience-sharing include the International Conferences on Community-Based Adaptation (see Box 3), and the two-day Devel-

opment and Climate Days event, held each year during the Conference of Parties (COP) to the UNFCCC. This event has a dedicated CBA session to share information on CBA with negotiators and observers at the international climate change negotiations.¹⁰ CBA practitioners can also benefit from the rich literature that is available on participation.¹¹

Final thoughts

We face increasing pressure to meet the myriad challenges that a changing climate presents. As this new community of practice emerges and matures, the ethics and quality of participatory processes will be central to the success of community-based adaptation to climate change – and there are both opportunities and dangers. As Absalom *et al.* wrote in 1994,

The opportunities are to initiate and sustain processes of change: empowering disadvantaged people and communities, transforming organisations, and reorienting individuals. The dangers come from demanding too much, in a top-down mode, too fast, with too little understanding of participatory development and its implications.

⁸ The second and third conferences were run by the Bangladesh Centre for Advanced Studies. See www.bcas.net for more information. See www.iied.org for more information on the forthcoming 4th CBA conference in Tanzania.

⁹ ESRC-funded seminar, Integrating Approaches: Sustainable Livelihoods, Disaster Risk Reduction and Climate Change Adaptation, December 2009, organised by Practical Action (www.practicalaction.org.uk). See: <http://community.eldis.org/59cc7287>

¹⁰ These events are run by the International Institute for Environment and Development. For more information see: <http://tinyurl.com/iied-COP15-d-c>. Full URL: www.iied.org/climate-change/key-issues/climate-negotiations-capacity-building/cop15-development-and-climate-days

¹¹ See, for example, www.planotes.org for back issues of *Participatory Learning and Action*. Recent issues include *PLA 54: Mapping for change: practice, technologies, and communication*, and *PLA 55: Practical tools for community conservation in southern Africa*. *PLA 50: Critical reflections, future directions* looks at participation in a wide range of different fields, as well as focusing on good participatory practice and ethics. IIED's *Participatory Learning and Action: A Trainers Guide* is also an invaluable resource on participatory approaches, processes, and methods.

As we move forward with community-based adaptation to climate change, we hope that this issue of *Participatory Learning and Action* will contribute to learning and experience sharing around CBA – and help to promote good participatory practice.

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Annex 1: Predicted impacts of climate change, vulnerability, and adaptive capacity by region

Region	Likely regional impacts of climate change	Vulnerability, adaptive capacity
Africa	<ul style="list-style-type: none"> • By 2020, between 75 million and 250 million people are projected to be exposed to increased water stress due to climate change. Coupled with increased demand, this will adversely affect livelihoods and exacerbate water-related problems. • Agricultural production, including access to food, in many African countries and regions is projected to be severely compromised by climate variability and change. The area suitable for agriculture, the length of growing seasons and yield potential, particularly along the margins of semi-arid and arid areas, are expected to decrease. This would further adversely affect food security and exacerbate malnutrition in the continent. In some countries, yields from rain-fed agriculture could be reduced by up to 50% by 2020. • Local food supplies are projected to be negatively affected by decreasing fisheries resources in large lakes due to rising water temperatures, which may be exacerbated by continued overfishing. • Towards the end of the 21st century, projected sea-level rise will affect low-lying coastal areas with large populations. The cost of adaptation could amount to at least 5-10% of Gross Domestic Product (GDP). Mangroves and coral reefs are projected to be further degraded, with additional consequences for fisheries and tourism. 	<ul style="list-style-type: none"> • Most vulnerable due to multiple stresses and low adaptive capacity is low due to low GDP per capita, widespread poverty (the number of poor grew over the 1990s), inequitable land distribution, and low education levels. There is also an absence of safety nets, particularly after harvest failures. • More than one quarter of the population lives within 100 km of the coast and most of Africa's largest cities are along coasts vulnerable to sea-level rise, coastal erosion, and extreme events. • Individual coping strategies for desertification are already strained, leading to deepening poverty. • Dependence on rain-fed agriculture is high. • Adaptive capacity is likely to be greatest in countries with civil order, political openness, and sound economic management. Some adaptation to current climate variability is taking place; however, this may be insufficient for future changes in climate.
Asia	<ul style="list-style-type: none"> • Glacier melt in the Himalayas is projected to increase flooding, rock avalanches from destabilised slopes, and to affect water resources within the next two to three decades. This will be followed by decreased river flows as the glaciers recede. • Freshwater availability in Central, South, East, and South-East Asia, particularly in large river basins, is projected to decrease due to climate change which, along with population growth and increasing demand arising from higher standards of living, could adversely affect more than a billion people by the 2050s. • Coastal areas, especially heavily populated megadelta regions in South, East and South-East Asia, will be at greatest risk due to increased flooding from the sea and, in some megadeltas, flooding from the rivers. 	<ul style="list-style-type: none"> • Adaptive capacity varies between countries depending on social structure, culture, economic capacity, and level of environmental degradation. • As a region, poverty in both rural and urban areas has decreased in Asia. • Capacity is increasing in some parts of Asia (for example, the success of early warning systems for extreme weather events in Bangladesh), but is still restrained due to poor resource bases, inequalities in income, weak institutions, and limited technology.

Annex 1 (continued): Predicted impacts of climate change, vulnerability, and adaptive capacity by region

Region	Likely regional impacts of climate change	Vulnerability, adaptive capacity
<p>Asia (continued)</p>	<ul style="list-style-type: none"> • Climate change is projected to impinge on the sustainable development of most developing countries of Asia, as it compounds the pressures on natural resources and the environment associated with rapid urbanisation, industrialisation, and economic development. • It is projected that crop yields could increase by up to 20% in East and South-East Asia while they could decrease up to 30% in Central and South Asia by the mid-21st century. Taken together, and considering the influence of rapid population growth and urbanisation, the risk of hunger is projected to remain very high in several developing countries. • Endemic morbidity and mortality due to diarrhoeal disease primarily associated with floods and droughts are expected to rise in East, South and South-East Asia due to projected changes in the hydrological cycle associated with global warming. • Increases in coastal water temperature would exacerbate the abundance and/or toxicity of cholera in South Asia. 	
<p>Latin America</p>	<ul style="list-style-type: none"> • By mid-century, increases in temperature and associated decreases in soil water are projected to lead to gradual replacement of tropical forest by savannah in eastern Amazonia. Semi-arid vegetation will tend to be replaced by arid-land vegetation. There is a risk of significant biodiversity loss through species extinction in many areas of tropical Latin America. • In drier areas, climate change is expected to lead to salination and desertification of agricultural land. Productivity of some important crops is projected to decrease and livestock productivity to decline, with adverse consequences for food security. In temperate zones soya bean yields are projected to increase. • Sea-level rise is projected to cause increased risk of flooding in low-lying areas. Increases in sea surface temperature due to climate change are projected to have adverse effects on Mesoamerican coral reefs, and cause shifts in the location of south-east Pacific fish stocks. • Changes in precipitation patterns and the disappearance of glaciers are projected to 	<ul style="list-style-type: none"> • Some social indicators have improved over the 1990s, including adult literacy, life expectancy, and access to safe water. • Other factors such as infant mortality, low secondary school enrolment, and high income inequality contribute to limiting adaptive capacity. • Some countries have made efforts to adapt, particularly through conservation of key ecosystems, early warning systems, risk management in agriculture, strategies for flood drought and coastal management, and disease surveillance systems. However, the effectiveness of these efforts is outweighed by: lack of basic information, observation and monitoring systems; lack of capacity building and appropriate

Annex 1 (continued): Predicted impacts of climate change, vulnerability, and adaptive capacity by region

Region	Likely regional impacts of climate change	Vulnerability, adaptive capacity
Latin America (continued)	significantly affect water availability for human consumption, agriculture, and energy generation.	political, institutional, and technological frameworks; low income; and settlements in vulnerable areas, among others.
Small Island States	<ul style="list-style-type: none"> • The projected sea-level rise of 5 mm/yr for the next hundred years would cause enhanced soil erosion, loss of land, poverty, dislocation of people, increased risk from storm surges, reduced resilience of coastal ecosystems, saltwater intrusion into freshwater resources and high resource costs to respond to and adapt to changes. • Coral reefs would be negatively affected by bleaching and by reduced calcification rates due to higher carbon dioxide levels; mangrove, sea grass bed, and other coastal ecosystems and the associated biodiversity would be adversely affected by rising temperatures and accelerated sea-level rise. • Small islands, whether located in the tropics or higher latitudes, have characteristics which make them especially vulnerable to the effects of climate change, sea-level rise and extreme events. • Deterioration in coastal conditions, for example through erosion of beaches and coral bleaching, is expected to affect local resources, e.g. fisheries, and reduce the value of these destinations for tourism. • Sea-level rise is expected to exacerbate inundation, storm surge, erosion, and other coastal hazards, thus threatening vital infrastructure, settlements, and facilities that support the livelihoods of island communities. <p>Climate change is projected by mid-century to reduce water resources in many small islands, e.g. in the Caribbean and Pacific, to the point where they become insufficient to meet demand during low-rainfall periods.</p> <ul style="list-style-type: none"> • With higher temperatures, increased invasion by non-native species is expected to occur, particularly on mid- and high latitude islands. 	<ul style="list-style-type: none"> • Adaptive capacity of human systems is generally low in small island states, and vulnerability high; small island states are likely to be among the countries most seriously impacted by climate change. • Declines in coastal ecosystems would negatively impact reef fish and threaten reef fisheries, those who earn their livelihoods from reef fisheries, and those who rely on the fisheries as a significant food source. • Limited arable land and extensive soil salination make agriculture on small islands, both for domestic food production and cash crop exports, highly vulnerable to climate change. • Tourism, an important source of income and foreign exchange for many islands, would face severe disruption from climate change and sea-level rise.

Source: Adapted from IPCC (2007).

Glossary

Adaptation

Adjustment in natural or human systems in response to actual or expected climate stimuli or their effects, which moderates harm or exploits beneficial opportunities. Various types of adaptation can be distinguished, including anticipatory and reactive adaptation, private and public adaptation, and autonomous and planned adaptation (IPCC).

Adaptive capacity

The ability of a system to adjust to climate change, including climate variability and extremes; to moderate potential damages; to take advantage of opportunities; or to cope with the consequences (IPCC, 2007).

Climate change

A change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods (UNFCCC).

Climate change mitigation

Technological change and substitution that reduce resource inputs and emissions per unit of output. Although several social, economic, and technological policies would produce an emission reduction, with respect to climate change, mitigation means implementing policies to reduce greenhouse gas emissions and enhance sinks (see also **Greenhouse gas**) (IPCC, 2007).

Climate hazard

Potentially damaging physical manifestations of climatic variability or change, such as droughts floods, storms, episodes of heavy rainfall, long-term changes in the mean values of climatic variables, potential future shifts in climatic regimes, and so on (Brooks, 2003).

Climate impacts

Consequences of climate and climate change on natural and human systems.

Climate model

A numerical representation of the climate

system based on the physical, chemical, and biological properties of its components, their interactions and feedback processes, and accounting for all or some of its known properties. The climate system can be represented by models of varying complexity (i.e. for any one component or combination of components a hierarchy of models can be identified, differing in such aspects as the number of spatial dimensions, the extent to which physical, chemical, or biological processes are explicitly represented, or the level at which empirical parameterisations are involved (IPCC, 2007).

Climate trend

The general direction in which climate factors, such as average annual temperature or rainfall, tend to move over time.

Climate variability

The UNFCCC makes a distinction between ‘climate change’, attributable to human activities altering the atmospheric composition, and ‘climate variability’, attributable to natural causes.

Coping capacity

The ability of people, organisations, and systems, using available skills and resources, to face and manage adverse conditions, emergencies or disasters (UNISDR, 2009).

Disaster risk management

The systematic process of using administrative directives, organisations, and operational skills and capacities to implement strategies, policies, and improved coping capacities in order to lessen the adverse impacts of hazards and the possibility of disaster (UNISDR, 2009).

Disaster

An event, either natural or man-made, that causes great distress or destruction. It is a social crisis which occurs when a hazard coincides with a vulnerable situation, resulting in significant loss of life, severe life-threatening disruption, and substantial

physical damage (Tearfund).

Disaster risk reduction

The concept and practice of reducing disaster risks through systematic efforts to analyse and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events (UNISDR, 2009).

Early warning system

The set of capacities needed to generate and disseminate timely and meaningful warning information to enable individuals, communities, and organisations threatened by a hazard to prepare and to act appropriately and in sufficient time to reduce the possibility of harm or loss (UNISDR, 2009).

El Niño – or El Niño Southern Oscillation (ENSO)

A complex interaction of the tropical Pacific Ocean and the global atmosphere that results in irregularly occurring episodes of changed ocean and weather patterns in many parts of the world, often with significant impacts over many months, such as altered marine habitats, rainfall changes, floods, droughts, and changes in storm patterns (UNISDR, 2009).

El Niño and La Niña are defined as sustained sea surface temperature anomalies of magnitude greater than 0.5°C across the central tropical Pacific Ocean, El Niño being a warming and La Niña a cooling event. El Niño events are associated with wetter weather in Peru/Ecuador and East Africa and drier conditions in South-East Asia, northern Australia, and Southern Africa. La Niña events generally cause the opposite and are associated with increased Atlantic cyclones. Climate change may increase the strength and frequency of the oscillation.

Extreme weather event

An event that is rare within its statistical

reference distribution at a particular place. Definitions of 'rare' vary, but an extreme weather event would normally be as rare as or rarer than the 10th or 90th percentile. By definition, the characteristics of what is called 'extreme weather' may vary from place to place. Extreme weather events may typically include floods and droughts (IPCC, 2007).

Forecast

Definite statement or statistical estimate of the likely occurrence of a future event or conditions for a specific area (UNISDR, 2009).

Geographic information system (GIS)

A computer-based system designed to collect, store, manage, and analyse spatially referenced information and associated attribute data. **Participatory GIS (PGIS)** facilitates the representation of local people's spatial knowledge using two- and three-dimensional maps. These maps can be used to facilitate decision-making processes, as well as support communication and advocacy. Unlike traditional GIS applications, PGIS places control over access and use of culturally sensitive spatial data in the hands of those communities that generated it (Corbett *et al.*, 2006).

Greenhouse gas

A gas that absorbs radiation at specific wavelengths within the spectrum of radiation (infrared radiation) emitted by the Earth's surface and by clouds. The gas in turn emits infrared radiation from a level where the temperature is colder than the surface. The net effect is a local trapping of part of the absorbed energy and a tendency to warm the planetary surface. Water vapour (H₂O), carbon dioxide (CO₂), nitrous oxide (N₂O), methane (CH₄), and ozone (O₃) are the primary greenhouse gases in the Earth's atmosphere (IPCC, 2007).

Hazard impacts

Impacts related to dangerous phenomena,

substances, human activities or conditions that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage (UNISDR, 2009).

Indigenous knowledge

Also referred to as local knowledge, is the ancient, communal, holistic, and spiritual knowledge that encompasses every aspect of human existence (Brascoupé and Mann, 2001).

Institutions

Institutions are humanly created formal and informal mechanisms that shape social and individual expectations, interactions, and behaviour. They can be classified as falling into public (bureaucratic administrative units, and elected local governments), civic (membership and cooperative organisations), and private sectors (service and business organisations) (Uphoff and Buck, 2006). Understanding how local institutions and their organisational forms shape the adaptation practices of poor communities is important for strengthening communities' adaptive capacities.

Livelihoods

A livelihood comprises the capabilities, assets (stores, resources, claims, and access), and activities required for a means of living. A livelihood is sustainable when it can cope with and recover from stress and shocks, maintain or enhance its capabilities and assets, and provide sustainable livelihood opportunities for the next generation; and which contributes net benefits to other livelihoods at the local and global levels in the long- and short-term (Chambers and Conway, 1992).

Maladaptation

Actions that increase vulnerability to climate change. This includes making development or investment decisions while neglecting the actual or potential impacts

of both climate variability and longer-term climate change (Burton, 1998).

Maladaptation feedbacks

Consequences of actions taken to reduce short-term vulnerability which then accelerate medium or long-term vulnerability to climate change.

National Adaptation Programmes of Action (NAPAs)

Documents prepared by least developed countries identifying urgent and immediate needs for adapting to climate change. The NAPAs are then presented to the international donor community for support (UNFCCC).

Remote sensing

The process of gathering information about the Earth from a distance. Such data is commonly gathered by satellite or air (aerial) photography (IAPAD).

Resilience

The ability of a system, community or society exposed to hazards to resist, absorb, accommodate, and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions (UNISDR, 2009).

Risk

Expected damage or loss due to the combination of vulnerability and hazards.

Scenario

A plausible and often simplified description of how the future may develop, based on a coherent and internally consistent set of

assumptions about driving forces and key relationships. Scenarios may be derived from projections, but are often based on additional information from other sources, sometimes combined with a narrative storyline (IPCC, 2007).

Triangulation

The verification of information gained from one source or methodology with that gained from one or more other sources or methodologies.

Vulnerability

The extent to which a natural or social system is susceptible to sustaining damage from hazards caused by climate change, and is a function of the magnitude of climate change, the sensitivity of the system to changes in climate, and the ability to adapt the system to changes in climate. Hence, a highly vulnerable system is one that is highly sensitive to modest changes in climate and one for which the ability to adapt is severely constrained (IPCC, 2007).

SOURCE

Christian Aid (2009a). 'Module I: Framework and Approach.' *Christian Aid Adaptation Toolkit: Integrating adaptation to climate change into secure livelihoods*. Christian Aid: UK

Definitions and figures that are unattributed were generally based on original material, multiple information sources, and/or adapted substantially to ensure they relate to the Christian Aid context (or a combination of these).

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