
UNIT 4 ADAPTIVE STRATEGIES AND CAPACITIES

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4.1 INTRODUCTION

Adaptive capacity is an important element of long term adaptation to climate change. Interest is growing in supporting vulnerable people and communities to adapt to the impacts of a changing climate. Nevertheless, the impacts that development interventions have on adaptive capacity at the local and state level remains limited. Most development interventions are not designed with a climate change adaptation strategy. There is an increasing emphasis on integrating (mainstreaming) adaptation into current policy and development, rather than implementing measures as a standalone activity. Climate change is a global issue that requires worldwide cooperation and negotiations for developing the necessary actions to combat its effects. This requires the integration of adaptation into existing policies and processes, taking into account the broader policy objectives and wider costs and benefits.

Adaptive capacity is “the property of a system to adjust its characteristics or behaviour, in order to expand its coping range under existing climate variability or future climate conditions”. In practical terms, “adaptive capacity is the ability to design and implement effective adaptation strategies, or to react to evolving hazards and stresses so as to reduce the likelihood of the occurrence and/or the magnitude of harmful outcomes resulting from climate-related hazards”. The adaptation process requires the capacity to learn from previous experiences to cope with current climate, and to apply these lessons to cope with future climate, including surprises. In this unit, we would be discussing the characteristics and determinants of adaptive capacity, and the adaptive strategies against climate change.

4.2 OBJECTIVES

After studying this unit, you should be able to:

- explain the characteristics and determinants of adaptive capacity; and
- explain the adaptive strategies from the perspective of climate change.

4.3 FROM ADAPTATION TO ADAPTIVE CAPACITY

Capacity is a combination of all the strengths and resources available within a community, society or organization that can reduce the level of risk, or the effects of a disaster. Capacity may include physical, institutional, social or economic means as well as skilled personal or collective attributes such as leadership and management. “Adaptation in the context of human dimensions of global change usually refers to a process, action or outcome in a system (household, community, group, sector, region, country) in order for the system to better cope with, manage or adjust to some changing condition, stress, hazard, risk or opportunity. Numerous definitions of adaptation are found in climate change literature, mostly variations on a common theme” (Smit and Wandel, 2006). Adaptation is described as “adjustments in a system’s behaviour and characteristics that enhance its ability to cope with external stress” or “adjustments in ecological-socio-economic systems in response to actual or expected climatic stimuli, their effects or impacts.” It is also defined as the “adjustments in individual groups and institutional behavior in order to reduce society’s vulnerability to climate.” Based on their timing, adaptations can be anticipatory or reactive, and depending on their degree of spontaneity, they can be autonomous or planned. The concepts of adaptation, adaptive capacity, vulnerability, resilience, exposure and sensitivity are interrelated and have wide application to global change science (Smit and Wandel, 2006).

The final core concept of climate change adaptation is that of capacity: ‘the ability of a system to adjust to climate change’. Adaptive capacity does not refer to short-term coping strategies but encompasses continuous and permanent change in the system. To highlight this subtle difference, the IPCC (2001) defines the “coping range” as the ‘variation in climatic stimuli that a system can absorb without producing significant impacts’. As such, there is an implied limit to coping which may be well addressed within existing natural resource management. What makes adapting (the capacity to adjust) unique is that it is permanent and requires a change in the system rather than pushing the limits of the current system.

As mentioned above, the adaptive capacity is 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, 2001). Adaptive capacity relates to the capacity of systems, institutions, humans and other organisms to adjust to potential damage, to take advantage of opportunities, or to respond to consequences (IPCC, 2014). The expression of adaptive capacity as actions that lead to adaptation can serve to enhance a system’s coping capacity and increase its coping range thereby reducing its vulnerability to climate hazards. The adaptive capacity inherent in a system represents the set of resources available for adaptation, as well as the ability or capacity of that system to use these resources effectively in the pursuit of adaptation. Adaptation can be

spontaneous or planned, and can be carried out in response to or in anticipation of changes in climatic conditions.

“Adaptive capacity is in line with other concepts like adaptability, coping ability, management capacity, stability, robustness. Further, the ability to undertake adaptations is influenced by managerial ability, access to financial, technological and information resources, infrastructure, the institutional environment within which adaptations occur, political influence, kinship networks, etc.” (Smit and Wandel, 2006). At the heart of any local-level adaptation intervention is the need to increase the individual or community’s adaptive capacity. There is still much debate around the definition and practical applications of the term adaptive capacity. A key component of the adaptive capacity is ensuring that individuals, communities and societies are actively involved in processes of change. Importantly, this relates to changes in behaviour, as well as in resources and technological pressures associated with development.

4.4 CHARACTERIZING ADAPTIVE CAPACITY

In order to understand how adaptive capacity can be influenced at the local level, it is important to characterize it. Unfortunately, direct assessments of adaptive capacity are not feasible, and so it becomes necessary to identify the characteristics or features that influence it. Nevertheless, understandings of adaptive capacity are still very much in their infancy and there is no agreement about its characteristics and determinants at national, community or household level. The Intergovernmental Panel on Climate Change (IPCC) identifies economic wealth, technology, information and skills, infrastructure, institutions and equity as the principal determinants of adaptive capacity (IPCC, 2001), though no distinction is made between determinants at national and local level. In these social factors, in particular power relations e.g. ‘social capital’, governance structures and the role and functions of institutions have been underplayed. “The vulnerability of any system is dependent on the exposure, sensitivity of that system and the ability of the system to cope, adapt or recover from the effects of those conditions”. It must be noted that the capacity to adapt is function of resource availability, social structure and networks, governance structure and technology. Within the society also, the vulnerability to climate change or capacity to adapt differs with individuals and groups. For instance, women are more vulnerable than the men to climate change.

There are substantial limits and barriers to adaptation. High adaptive capacity does not necessarily translate into actions that reduce vulnerability. For example, despite a high capacity to adapt to heat stress through relatively inexpensive adaptations, residents in urban areas in some parts of the world, including in European cities, continue to experience high levels of mortality. There are significant barriers to implementing adaptation. These include both the inability of natural systems to adapt to the rate and magnitude of climate change, as well as technological, financial, cognitive and behavioural, and social and cultural constraints. There are also significant knowledge gaps for adaptation as well as impediments to flows of knowledge and information relevant for adaptation decisions. New planning processes are attempting to overcome these barriers at local, regional and national levels in both developing and developed countries. For example, least-developed countries are developing National Adaptation Programmes of Action and some developed countries have established national adaptation policy frameworks.

4.5 DETERMINANTS FOR ADAPTIVE CAPACITY

The adaptive capacity is determined by a web of factors, which may be local, socio-economic and political factors. For instance, the local factors like kinship greatly influence the ability to cope up with stress. As regards the political factors, measures like state sponsored crop insurance can be great relief to the farmers' and it increases the adaptive capacity of the farmers'. Adaptive capacity is dynamic as it varies with time, individuals, community and country, (Smit and Wandel, 2006). Principal determinants of adaptive capacity according to the IPCC (2001) include economic wealth, technology, information and skills, infrastructure, institutions and equity. Others include social capital and good governance as additional key components. Determinants for adaptive capacity are also depicted through the availability of resources and their distribution across the population. Research on adaptive capacity in climate change is very limited and is a key research need. However, substantial literature in other fields (economic development, sustainable development, resource management) can provide insights into the likely key determinants of adaptive capacity. These represent conditions that constrain or enhance adaptive capacity and hence the vulnerability of regions, nations and communities. Consideration of these determinants provides another pathway to the overarching goal of protecting and enhancing human health.

4.6 STRENGTHENING ADAPTIVE CAPACITY

An enabling policy and legal framework that strengthens community adaptive capacity should be able to facilitate the ability of communities to adjust to potential damage, to take advantage of opportunities, or to cope with the consequences of climate change. This would entail promoting innovation, institutions and entitlement, information and knowledge sharing, asset base development, and governance. Adaptive capacity refers to individual and or collective strength and resources that can be accessed to allow individuals and communities to reduce their vulnerability to the impact of hazards. These capacities can either prevent or mitigate the impact of a given hazard, or prepare the community to respond to the impact better (readiness).

Box 4.1: Examples of Adaptive Capacity Indicators

Often adaptive capacity is generalised without clear indicators. It is dependent on a variety of social, economic, political, technological and institutional factors: varying in weight depending on the scale of analysis. The relationship between these indicators at the national level changes when the focus turns to the community level. The Local Adaptive Capacity Framework by the Africa Climate Change Resilience Alliance (ACCRA), outlines the main determinants of adaptive capacity, which include the asset base of a community, institutions and entitlements, knowledge and information, innovation and governance (ACCRA, 2010).

Asset Base

The various financial, physical, natural, social, political and human capitals necessary to best prepare a system to respond to a changing climate. This category incorporates the importance of various capitals, often informal, non-monetary and reliant on various social networks.

Institutions and Entitlements

The ability of system to ensure equitable access and entitlement to key resources and assets is a fundamental characteristic of adaptive capacity. Given that entitlements to key resources needed to adapt can be differentiated along age, ethnicity, class, religion and gender (to name but a few), an institutional environment that allows equitable opportunities to all groups, particularly the marginal, and most vulnerable to the impacts of climate change is essential to building the capacity to adapt.

Knowledge and Information

Successful adaptation requires information and understanding of future change, knowledge around adaptation options, the ability to assess them, and the capacity to implement the most suitable interventions. In the context of climate change, it is important to ensure that systems are in place to distribute relevant information at both national and region scales.

Innovation

Innovation can be planned and high-tech. It can be autonomous, local-level initiatives that help innovate or adapt to changes to the local climate. An enabling environment that promotes and allows for experimentation and the exploration of niche solutions is required to take advantage of new opportunities and to confront challenges presented by climate change.

Governance

Informed decision-making, transparency, and prioritisation form indeed key elements of adaptive capacity.

Source: ACCRA (2010). The ACCRA Adaptive Capacity Framework. <http://community.eldis.org/.5a284f21>

Check Your Progress 1

- Note:** i) Use the space given below for your answers.
ii) Check your answers with those given at the end of the unit.

1. What is adaptive capacity?

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2. What are the determinants of adaptive capacity?

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3. What are the indicators of adaptive capacity according to Africa Climate Change Resilience Alliance (ACCRA)?

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4.7 ADAPTATION PLANNING FOR RESILIENCE

Adaptation planning requires a long-term and system-wide perspective, accounting for uncertainty about the future. The risks from climate change arise from the interaction of socio-economic trends and climate impacts, both of which are inherently uncertain. Adaptation measures undertaken in isolation may lock-in vulnerability in the longer term, preclude the use of more cost-effective options, or increase the vulnerability of neighboring communities. Adaptation plans that do not account for uncertainty may lead to costly mistakes when projections diverge from reality. There is a need to package and sequence interventions in ways that account for systemic interactions and are robust to uncertainty. The five-step process below provides a simplified framework for how countries can use a process of iterative risk management to support flexible adaptation planning (OECD, 2015):

- *“Assess risk from climate change*
- *Determine acceptable levels of risk*
- *Develop policy responses*
- *Implement adaptation measures*
- *Monitor and evaluate”*

The aim of the adaptation planning process is to ensure that climate-related risks are identified, assessed and then reduced to an acceptable level. In general, it becomes increasingly technically difficult and expensive to achieve higher levels of resilience. The cost-effectiveness of adaptation and the benefits of higher levels of resilience must be balanced. Given uncertainty about the future, planning should favour the use of strategies that are flexible, that deliver co benefits and avoid lock-in. A continuous process of monitoring and evaluation can then assist with changing course in response to new information and changing circumstances

4.8 ADAPTATION STRATEGIES

Adaptive capacity encompasses coping ability and strategies, policies and measures that can expand future coping ability. Adaptive capacity is a theoretical construct because it is not possible to know with certainty whether a country will invest resources to expand its coping ability, how technology and other factors will change, or what adaptations actually will be implemented, until a perturbation or stress occurs. For example, access to clean water and adequate sanitation is part of the coping capacity for developed countries and some economies in transition but part of the adaptive capacity of less developed countries. While not certain, it is hoped that both clean water and sanitation will become part of the adaptation baseline for all countries. Decisions about public health measures unrelated to climate change, such as sanitation and water treatment, may have a profound influence on health

consequences associated with climate change. In fact, adaptation strategies frequently are described as risk management and public health programmes can be characterized as reducing climate change health risks. Improved weather warning and preparedness systems, buildings and infrastructure, all can be considered measures to reduce human health risks in the event of a changed frequency of weather disasters. However, there is concern that the adaptive capacity to address changes in the magnitude or frequency of extreme climatic conditions may not be very high even though the adaptive capacity to gradual changes in climate may be relatively high. Highly-managed systems, such as agriculture and water resources in developed countries are thought to be more adaptable (assuming resources to adapt are available) than less-managed or natural ecosystems. Similarly, systems that have coped successfully with historical and/or existing stresses are expected to adapt well to stresses associated with future climate change.

Poor communities in poor countries are most vulnerable to climate change and are already feeling its impacts, but have contributed least to the problem. Helping them to adapt to climate change is vital, but identifying steps to take and ensuring that this information reaches communities at risk is a major challenge. Community-based adaptation (CBA) and ecosystem based adaptations are tools for achieving this.

4.8.1 Community-based Adaptation

Climate change has left communities and countries vulnerable to various kinds of hazards on an unprecedented scale. There is an urgent need to evolve community-based approaches, mechanisms and strategies that can safeguard the interests of communities against climate change. CBA is a bottom-up approach that places the community at the centre of determining how to respond to the impacts of climate change. CBA emphasises community participation that builds on the priorities, knowledge and capacities of local people. These include aspects relating to the development and transfer of technology to improve adaptive capability and the ascertainment of community vulnerability through assessments of risks that communities face, amongst many others. It has been reported that community based climate change adaptation (CBA) can be as simple as switching from one crop variety to another, or diversifying a farmer's livelihood. Further, CBA can be as complex as diversifying livelihood patterns against climate risks on a regional scale, or the incorporation of institutional reforms to create incentives for better localized natural resource management. The aforementioned should give the impression that CBA actions are not isolated to the local level/ the community (Reid et al. 2009). The framework for community based adaptation encompasses "Climate resilient livelihoods", "Climate smart disaster risk reduction", "Enhancing adaptive capacity" and "Addressing the causes of poverty and vulnerability".

4.8.2 Ecosystem-based Adaptation (EbA)

Ecosystem-based Adaptation (EbA) is the use of biodiversity and ecosystem services as part of an overall adaptation strategy in order to help populations to adapt to climate change. It aims at maintaining and improving resilience, and at reducing the vulnerability of ecosystems and individuals in the event of harmful climate change effects. EbA is an approach for addressing climate change impacts, focusing on the benefits humans derive from biodiversity and ecosystem services, and how these benefits can be utilized in the face of climate change. EbA is an approach to sustainable development that contributes to three outcomes: socio-economic benefits, climate change adaptation and ecological benefits.

EbA offers a response to climate change that has multiple co-benefits for people and biodiversity, contributing to sustainable development. These co-benefits of EbA can contribute towards a broader set of socio-economic and development goals, including job creation, poverty reduction and rural/peri-urban development. In effect, EbA interventions are “participatory, inclusive, and transparent”, and are construed to “support resilient and functional ecosystems” immensely. Further, it is considered as knowledge and evidence-based approach.

The risks from climate change are diverse, and the challenges and opportunities for adaptation vary by sector and policy area. Climate change adaptation are in dire need in the areas of infrastructure, gender, human health, agricultural system and livelihood.

Check Your Progress 2

Note: i) Use the space given below for your answers.

ii) Check your answers with those given at the end of the unit.

1. Explain the community-based adaptation.

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2. Explain the ecosystem-based adaptation.

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4.9 LET US SUM UP

It is beneficial for countries to integrate long-term adaptation planning into development planning. Such integration offers development benefits in the short-term while reducing vulnerability in the longer term. To contribute to sustainable development and to ensure an adequate adaptation response, it is important to integrate adaptation with the Sustainable Development Goals (SDGs), as well as with long-term national development plans. There are various approaches to adaptation planning and actions, ranging from ecosystem based adaptation (EBA), community-based adaptation (CBA) approaches, to risk based approaches that countries can use individually, in combination, or utilize elements of several approaches for a particular situation. There are important connections between short, medium and long term adaptation planning and implementation. In short, adaptation can become more about transformational change when considering longer-term climate scenarios and building enhanced resilience. Mainstreaming adaptation into long term development planning and cycles and connecting short, medium and long-term adaptation planning will ensure effective results. In this unit, we have discussed the characteristics and determinants of adaptive capacity, and the adaptive strategies against climate change.

4.10 KEY WORDS

- 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.
- Climate Change Adaptation (CCA)** : Adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities.
- Community-based Adaptation (CBA)** : Climate change adaptation activities developed in partnership with at-risk communities, in order to promote local awareness of, and appropriate and sustainable solutions to current and future climatic conditions.
- Disaster Risk Reduction (DRR)** : 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, water and the environment, and improved preparedness for adverse events
- Ecosystem** : A system of living organisms interacting with each other and their physical environment.

4.11 SUGGESTED FURTHER READING/ REFERENCES

OECD (2015), National Climate Change Adaptation: Emerging Practices in Monitoring and Evaluation, OECD Publishing, Paris, <https://dx.doi.org/10.1787/9789264229679-en>.

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Department of Environmental Affairs and South African National Biodiversity Institute. *Guidelines for ecosystem based adaptation (EbA) in South Africa*. Department of Environmental Affairs, Pretoria, South Africa, 2017.

ACDI (2019). Aronson, J., Shackleton, S., and Sikutshwa, L. *Joining the puzzle pieces: Reconceptualising ecosystem-based adaptation in South Africa within the current natural resource management and adaptation context*. Issue Brief

IUCN French Committee (2019). *Nature-based Solutions for climate change adaptation and disaster risk reduction*. Paris, France.

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Web Links

<https://www.climatehotmap.org/global-warming-glossary/a.html>

<https://www.shareweb.ch/site/DRR/Documents/Related%20Sectors/CBD-EcoCCA-DRR-volontGuidelines-2018.pdf>

<https://docplayer.net/amp/57708118-Master-s-thesis-natural-resources-management-and-development.html>

<https://www4.unfccc.int/sites/NAPC/Country%20Documents/General/apf%20annexes%20a%20and%20b.pdf>

<http://www.ipcc.ch/report/ar5/wg1/>

<http://www.ipcc.ch/report/ar5/wg2/>

<http://www.ipcc.ch/report/ar5/wg3/>

<http://www.ipcc.ch/report/ar5/syr/>

<https://www.ipcc.ch/sr15/>

<https://www.globalchange.gov/climate-change/glossary>

CARE Community Based Adaptation Toolkit, http://www.careclimatechange.org/files/toolkit/CARE_CBA_Framework.pdf

CARE Community Based Adaptation Toolkit, http://www.careclimatechange.org/files/toolkit/CARE_CBA_Toolkit.pdf2

4.12 ANSWERS TO CHECK YOUR PROGRESS

Check Your Progress 1

1. Adaptive capacity is “the property of a system to adjust its characteristics or behaviour, in order to expand its coping range under existing climate variability or future climate conditions”. The adaptive capacity is the ability to design and implement effective adaptation strategies, or to react to evolving hazards and stresses so as to reduce the likelihood of the occurrence and/or the magnitude of harmful outcomes resulting from climate-related hazards.

2. The adaptive capacity is influenced by factors namely local, socio-economic and political factors. Principal determinants of adaptive capacity include economic wealth, technology, information and skills, infrastructure, institutions and equity. Others include social capital and good governance as additional key components. The determinants for adaptive capacity are also depicted through the availability of resources and their distribution across the population.
3. The Local Adaptive Capacity Framework by the Africa Climate Change Resilience Alliance (ACCRA) figure out the main determinants or indicators of adaptive capacity as the asset base of a community, institutions and entitlements, knowledge and information, innovation and governance.

Check Your Progress 2

1. “Community Based Adaptation” (CBA) is a bottom-up approach that places the community at the centre of determining how to respond to the impacts of climate change. CBA emphasises community participation that builds on the priorities, knowledge and capacities of local people. These include aspects relating to the development and transfer of technology to improve adaptive capability and the ascertainment of community vulnerability through assessments of risks that communities face, amongst many others. The framework for community based adaptation encompasses “Climate resilient livelihoods”, “Climate smart disaster risk reduction”, “Enhancing adaptive capacity” and “Addressing the causes of poverty and vulnerability”.
2. Ecosystem-based Adaptation (EbA) is the use of biodiversity and ecosystem services as part of an overall adaptation strategy in order to help populations to adapt to climate change. It aims at maintaining and improving resilience, and at reducing the vulnerability of ecosystems and individuals in the event of harmful climate change effects. EbA is an approach to sustainable development that contributes to three outcomes: socio-economic benefits, climate change adaptation and ecological benefits. In fact, EbA interventions are “participatory, inclusive, and transparent”, and are construed to “support resilient and functional ecosystems” immensely. Further, it is considered as knowledge and evidence-based approach.