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Deutsches Institut für  
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# Learning and Understanding Adaptive Mechanisms

## National Stakeholders Workshop

Towards development of a National Adaptation Strategy and Plan of Action

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1. Introduction
2. Adaptation
3. Vulnerability and Resilience
4. Adaptive capacity
5. Criteria for assessing adaptation



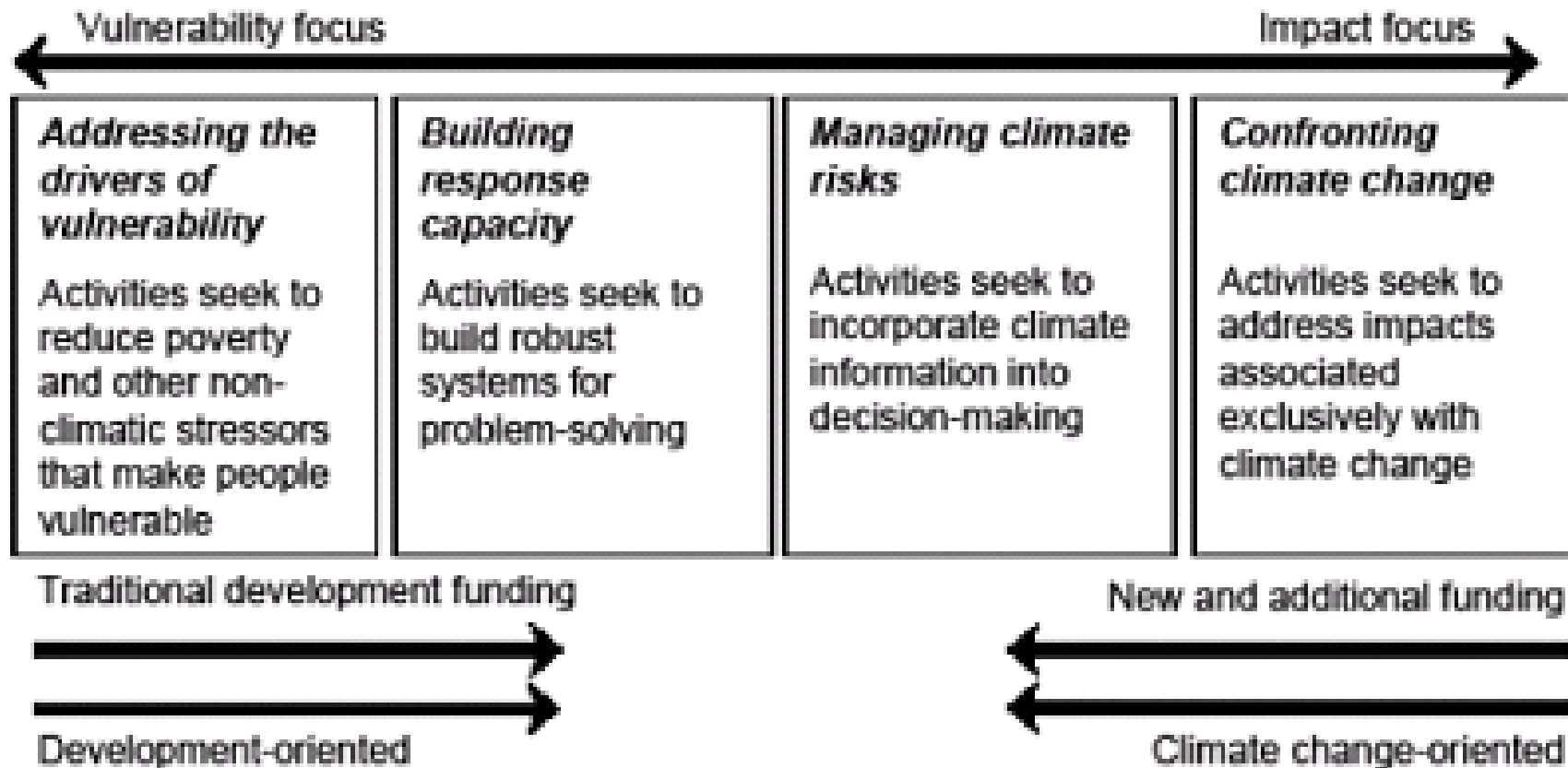
- Uncertainty as to the future temporal and spatial manifestations of climate change
- (a) Adaptation to what? (b) who or what adapts? and (c) how does adaptation occur?
- *Adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities (IPCC 2007).*
- Various types of adaptation: anticipatory, autonomous and planned adaptation
- Mal-adaptation

# Adaptation as a Continuum I



"pure" development activities

very explicit adaptation measures



Source: McGray et al., 2007



- **Additionality** - CC as an additional burden with additional costs that need additional funding
- **But**
- Close link between adaptation and development
- Difficult to differentiate development activities from adaptation actions
- Hence, difficult to prove additionality
- Although vulnerability reduction and capacity building are at the heart of enabling effective adaptation, such adaptation activities may not qualify for adaptation funding under the "additionality principle"
- Yet, in many cases adaptation actions will be the same as development action
- In this tension between development and adaptation, it is prudent to build adaptations on robust foundations
- This is why **adaptation essentially has to be developmental**
- Still useful to distinguish development goals, like reducing poverty and improving health from adapting to CC impacts
- To qualify for funding, adaptation projects have to meet the funding criteria



- Sensitivity is the degree to which a system is affected, either adversely or beneficially, by climate variability or change. The effect may be direct (e.g., a change in crop yield in response to a change in the mean, range or variability of temperature) or indirect (e.g., damages caused by an increase in the frequency of coastal flooding due to sea-level rise).
  
- Sensitivity includes exposure which considers
  - the nature and magnitude of cc
  - whether a system will be affected or not
  - the extent to which a system can be affected by cc

# Vulnerability in the climate change discourse

- IPCC (2001) defines vulnerability as ‘the degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extremes.
- Vulnerability is a **function** of the character, magnitude, and rate of climate variation to which a system is exposed, its sensitivity, and its adaptive capacity’.

# Vulnerability from a development perspective

- **Vulnerability, in its simplest denotative sense, means the capacity to be harmed, to experience some loss.**
- Vulnerability as a concept refers to the likelihood of adverse consequences because of various external and internal factors
- Example: The likelihood of experiencing food insecurity
- The degree of vulnerability depends on the environmental, social, economic and political characteristics of an area, population, activities, or the environment and is measured by the ability to anticipate, cope with, resist, and recover from an event, process, or a phenomenon like a drought hazard.

# Perspectives of Vulnerability



- Vulnerability **increases** as the magnitude of climate change or sensitivity **increases**
- Vulnerability **decreases** as adaptive capacity **increases**
- **Two competing interpretations of vulnerability:**
- Vulnerability as ‘a starting point’ and
- as ‘an end point’ of analyses /policy making.
- Each perspective has implications for both research and policy

# Principal Components of Vulnerability



- *Component 1 external: **Risk exposure***: Vulnerability to X closely relates to characteristics and timing of X.
- *Component 2: Internal (**adaptive**) **capacity***: The capacity of people exposed to X to cope with and adapt to X and its outcomes
- *Component 3 multiple processes (**vulnerability context**)*: Vulnerability is generated by multiple processes such as political and economic marginalisation, weakening social networks. These multiple processes are context-specific and in continuous flux as the biophysical and social processes that shape local conditions and ability to cope also change (Eriksen and O'Brien 2007).

# Definition of Risk



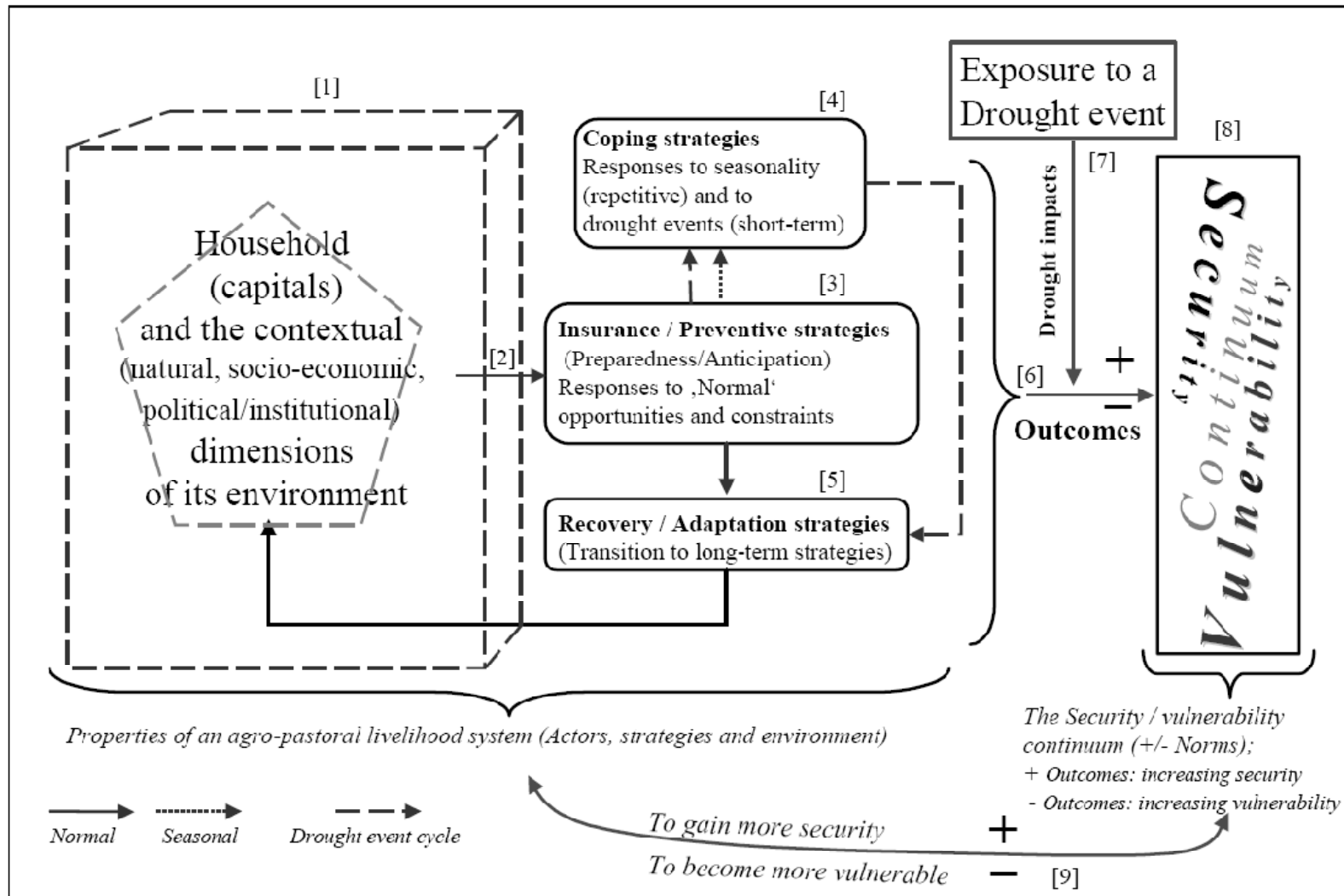
- **Risk** refers to the probability (chance) of hazard occurrence and its adverse consequences. A **hazard** is defined as the threat of a naturally occurring (in this case, a drought) or human-induced process or event which has adverse consequences on human life, property, or activity and the environment within a given time period and area.
- Risk is represented as the sum/product of hazard and vulnerability, either as  $R = H + V$
- or  $R = H \times V$
- Since people also have capacities to reduce their vulnerability and the impacts of hazards, capacity was integrated into the function:  $R = H \times V/C$

# Different Perspectives of Risk



- Risk generally denotes expected losses due to a particular hazard, but the term risk is used in different senses:
- In terms of probability of loss indicating the possibility of suffering harm, loss or danger.
- In terms of a hazard - a danger or risk, a source of danger/risk.
- In terms of loss or adverse consequences
- In terms of perceptions – the perception of a risk/source of a risk.
- Objective risk in terms of probabilities and loss quantification or
- Subjective risk in terms of perception, capacities and loss.
- These meanings show that risk does not only arise from physical processes but is also socially constructed in terms of risk perception, risk avoidance and acceptable risk.

# Coping and Adaptation



Source: Ifejika Speranza 2006

# Coping and Adaptation



- **Insurance strategies** can be understood in terms of investing now with the aim of reaping the returns in future. Insurance strategies are those activities, which are implemented with the objective of
  - avoiding or minimising livelihood stresses and insecurities such as food shortages,
  - creating buffers to cushion loss (as in the processing of farm produce, preservation and storage; investment in livestock and social networks etc.) and
  - diversifying livelihoods in anticipation or knowledge of livelihood risks.

# Coping and Adaptation



- In daily life, insurance strategies are translated into coping/response measures.
- **Coping strategies** are fallback mechanisms to deal with short-term livelihood stresses in the face of an adverse event like drought and the failure of normal livelihood practices to ensure household welfare. They can also be repetitive responses to seasonality of prices and production.
- **Recovery strategies** are those coping strategies, which households adopt to reactivate their livelihoods to enable them bounce back to their former or similar welfare status.
- **Adaptation strategies** are those that lead to a considerable or complete change in livelihoods as a result of a shock. Sometimes livelihood strategies are no longer periodically or occasionally applied but become permanent in response to changes in the livelihood context. This is called **adaptation**, individuals adapting to new situations to maintain or improve their livelihoods.

# Adaptive Capacity



- **Adaptive capacity** (in relation to climate change impacts) 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 2007).
- **Adaptive capacity** is the ability to plan, prepare for, facilitate, and implement adaptation options.
- AC - a function of the relative level of availability, access and distribution of resources
- Positive correlation between adaptive capacity and the level of development
- Having adaptive capacity is no guarantee that it will be used effectively

# What Constitutes Adaptive Capacity?

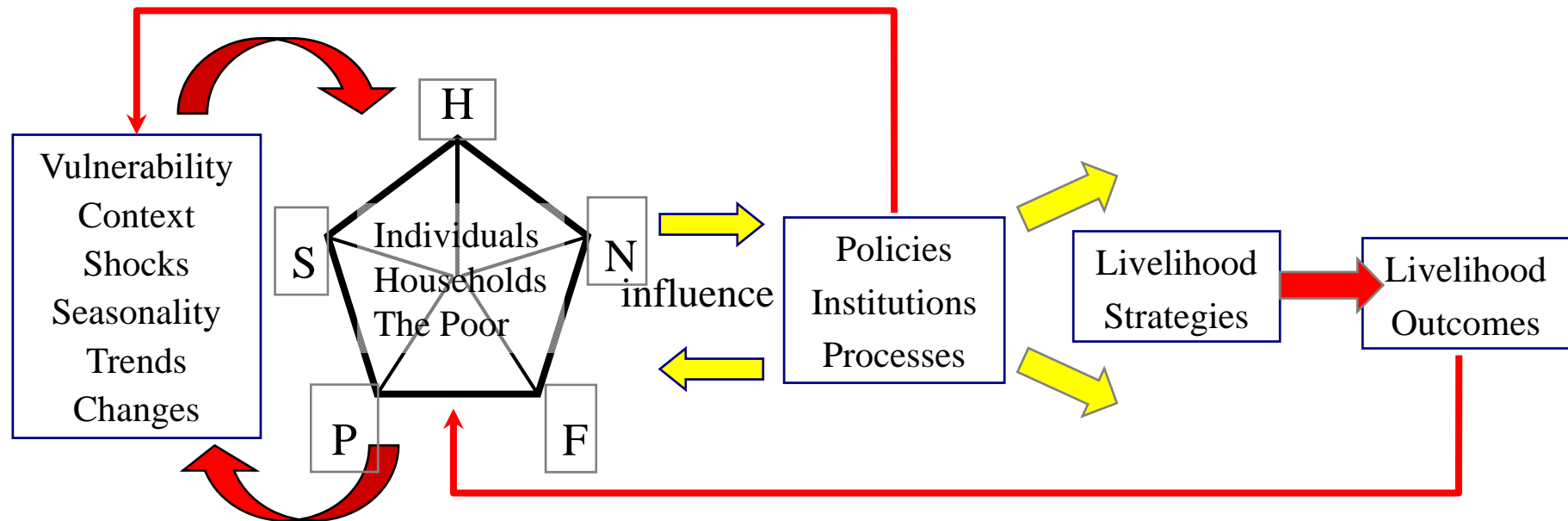


- What determines the ability of a system/an individual
  - to adjust to climate change?
  - moderate potential damages?
  - to take advantage of opportunities?
  - or to cope with the consequences?
  
- AC - a function of the relative level of **availability**, **access** and **distribution** of resources
  
- Brings us back to development problems / gaps

# The Sustainable Livelihoods Framework



As one way of assessing adaptive capacities





- **Social-Ecological Resilience (SER)** refers to the capacity (ability) to absorb (withstand) disturbances (e.g. climate change or drought impacts) while retaining the same basic structure and ways of functioning, the capacity for self-organisation, and the capacity to adapt to stress (e.g. climate change) and change (cf. Carpenter et al., 2001, Berkes et al., 2003, Folke 2006, IPCC 2007).
- It is the magnitude of disturbance that can be tolerated before an SES moves to a different state controlled by a different set of processes or to a different domain of attraction (Resilience Alliance 2002).
- Building resilience **helps address the uncertainty** about the temporal and spatial manifestations of climate change impacts

# Social and Ecological Resilience



- **Social resilience** is the ability of groups or communities to cope with external stresses and disturbances as a result of social, political and environmental change (Adger 2000)
- **Ecological resilience** is a characteristic of ecosystems to maintain themselves in the face of disturbance (Adger 2000) .
- Unlike sustainability, resilience can be **desirable** or **undesirable** (Carpenter et al., (2001):
  - System states that perpetuate poverty and food insecurity
  - Encrusted (rigid) institutional frameworks that need de-crusting
- The **strength of the resilience concept** is that it focuses on variables that underlie the capacity of the SES to function, to provide ecosystem services and to deal with disturbances, uncertainties and change.

# Features of Resilience



- The resilience ‘of social-ecological systems has three defining characteristics (Quinlan 2003) :
- the amount of change the system can undergo and still **retain** essentially the same structure, function, identity, and feedbacks on function and structure,
- the degree to which the system is capable of **self-organisation**, and
- the degree to which the system expresses **capacity for learning and adaptation**

# Vulnerability and Resilience



- In some studies, **resilience** is regarded as the opposite of vulnerability (Folke et al., 2002), while in others this distinction is not so clear (cf. Adger 2000).
- A **vulnerability approach** – focuses on negative aspects, on loss; does not explicitly address increasing adaptive capacity to deal with change and uncertainty.
- A **resilience approach** focuses on the long-term capacity to deal with change (implicitly including the risks and uncertainties that come with change).

# Adaptation Actions



- Adaptation thus involves
- **Reducing vulnerability**, by addressing the drivers of vulnerability to climate change.
- **Building adaptive capacity**, thereby increasing the ability to adapt to changes (e.g. communicating climate change information, building awareness of potential impacts, investing in livelihood capital), and
- **Implementing adaptation decisions** – transforming the capacity into action.

# Components of Adaptation



- Reducing the sensitivity of the system/household to a hazard (climate change/drought/food insecurity)
- Altering the exposure of the system to the hazard, and
- Increasing the resilience of social and ecological systems to cope with changes (Adger et al., 2005)



- Effectiveness
- Flexibility
- Efficiency
- Equity
- Institutional compatibility / legitimacy
- “Implementability”
- Net benefits independent of climate change / ‘no regrets’ or ‘win-win’ measures



- **Effectiveness relates to the capacity of an adaptation action to achieve its expected objectives.**
  - Difficult to measure or assess
  - Depends on other actors
  - Depends on the future which is unknown
- Two key indicators of effectiveness
- Robustness to uncertainty
- Flexibility - ability to change in response to altered conditions (Adger et al., 2005)

# Efficiency of an Adaptation Action



- **Efficiency: Economic efficiency** of adaptation actions
- The distribution and costs of the benefit of the action
- The costs and benefits of changes in those goods that cannot be expressed in market values, and
- The timing of adaptation

# Equity and Legitimacy of an Adaptation Action



- Adaptations can reinforce existing inequalities and do little to alleviate underlying vulnerabilities
- **Equity and legitimacy** – Equitable adaptations can be evaluated from the perspective of outcome (Adger et al., 2005)
- Who wins and who loses from the adaptation?
- Who decides which adaptations to take?
- Institutional compatibility tests whether adaptations are consistent with existing institutional structures (laws and institutions) and jurisdictional authority, as these are more likely to be adopted than those that require changes to existing structures.
- No universal rules that guarantee the legitimacy of policy because cultural expectations and interpretations define what is or is not legitimate, or socially acceptable (Adger et al., 2005)

# “Implementability” of an Adaptation Action



- **“Implementability”** refers to a lack of complexity, compatibility, "triability" and observability (Dolan et al. 2001).
- Complexity - the degree to which new knowledge and skills are needed for implementation,
- Compatibility - the ease with which an innovation can be integrated into a current (farming) system (Dolan et al. 2001, 9-10).
- “Triability” - the degree to which an innovation may be experimented with prior to full adoption
- “Observability” the degree to which the results of an innovation are visible to others

# Net Benefits of an Adaptation Action



- **Net benefits independent of climate change** refers to adaptations that provide benefit regardless of whether or not climate change effects occur.
- Adaptation options are preferred if they will result in no net losses (or damages),
- if they are ‘no regrets’ or ‘win-win’ measures (Dolan et al. 2001, 10).



**Vielen Dank für Ihre Aufmerksamkeit!**