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# Identifying and appraising measures to build climate resilience of a specific water supply system

## Slide pack with examples from Sandy Bay St Vincent

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# Background

This lessons learned report focuses on **Identifying and appraising measures to build climate resilience of a specific water supply system.** It has been produced as knowledge product component of the *'Climate proofing the Sandy Bay water services improvement project, St. Vincent'*

## Aim

- It is intended to provide guidance and awareness on the measures which can enhance the climate resilience of water supply systems, focussing on examples from the Sandy Bay project.

## Audience

- It is intended for use by those persons scoping projects involving water supply systems.

# Introduction

## This slide pack is module two of four:

### Module 1
- Understanding climate risks and vulnerabilities for a specific water supply system.

### Module 2
- Identifying and appraising measures to build climate resilience of a specific water supply system

### Module 3
- Identifying and appraising the costs and benefits of building the climate resilience of a specific water supply system

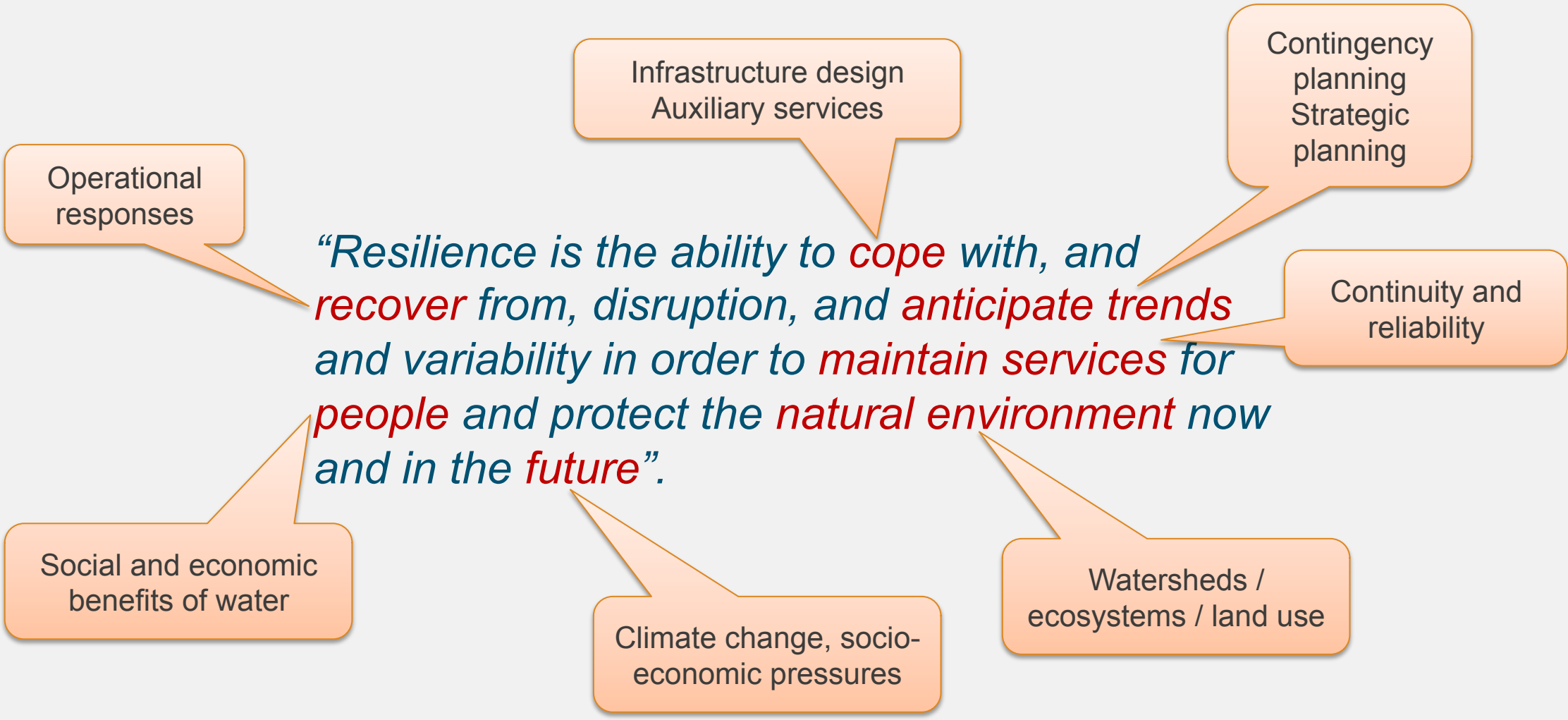
### Module 4
- Identifying and attracting potential climate funds for building the climate resilience of a specific water supply system

# Structure

1. What is climate resilience?
2. Examples and questions to identify resilience measures
3. Process for identifying resilience measures

# What is climate resilience? – One definition for water services

(note this is resilience in general terms not specifically climate)




*"Resilience is the ability to cope with, and recover from, disruption, and anticipate trends and variability in order to maintain services for people and protect the natural environment now and in the future".*

UK's Office of Water regulator, definition of resilience 2015

# Challenges and opportunities with thinking about resilience

## Some of the key challenges

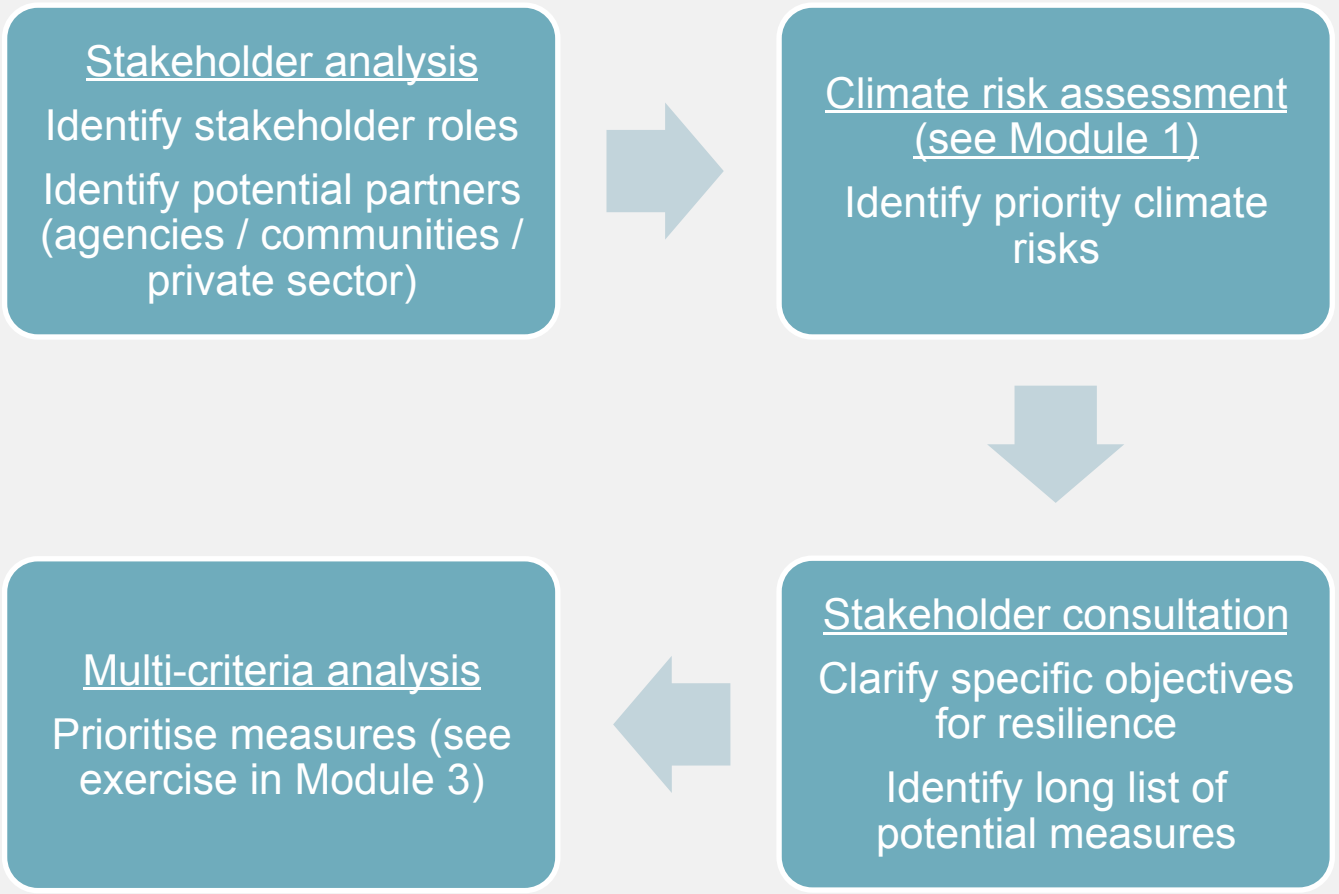
- How should climate resilience be defined operationally?
  - Levels of service? Unplanned outages? Damage costs to assets?
- How to decide what level of climate resilience is worth investing in?
  - Addition costs of ‘over design’ versus performance benefits?
- Funding is scarce, often there is not the luxury of resilience
  - Opportunity costs? Continual repair of damaged systems?

## Some of the key opportunities

- External finance (especially climate finance) may be accessible for climate resilience projects
- Taking a broad view of resilience may identify low cost changes, or partnerships which can bring multiple benefits over a business as usual approach (innovative approaches)

# Identifying resilience measures

## Identifying measures is typically a participatory process



# Identifying resilience measures

## Examples from each step

### Example stakeholders:

- Government agencies (NEMO / Forestry / Agriculture / Tourism / Health)
- Catchment land users (farmers / forestry)
- Communities / customers
- Financing agencies (Mo Finance / Development partners)

**Stakeholder analysis**
Identify stakeholder roles
Identify potential partners (agencies / communities / private sector)

**Climate risk assessment (see Module 1)**
Identify priority climate risks

### Example risks:

- Flood / landslide damage to infrastructure
- Water Quality
- Turbidity
- Sedimentation / erosion
- Leakage and NRW
- Drought and water scarcity

**Stakeholder consultation**
Clarify specific objectives for resilience
Identify long list of potential measures

### Example objectives:

- Reduce outages
- Reduce infrastructure damages
- Control erosion in watersheds
- Manage abstraction of water
- Reduce leakage
- Reduce pollution in catchment
- Reduce and manage turbidity

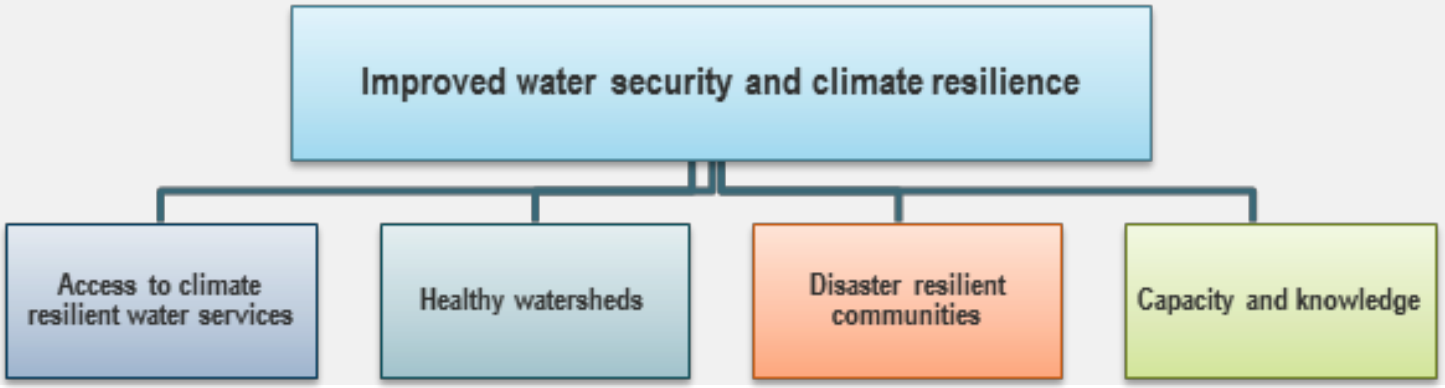
**Multi-criteria analysis**
Prioritise measures (see exercise in Module 3)

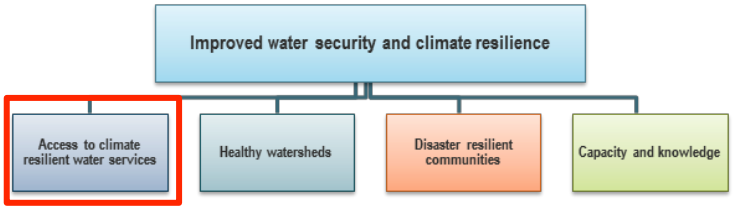
### Example criteria (see Module 3):

- Costs and benefits
- Technical feasibility
- Political and public acceptance
- Urgency for action
- Environmental impacts

## What is a resilience measure?

- Any investment or action which supports climate resilience
- Can be ‘business as usual’ water investment, or considering additional measures. In the Sandy Bay example the following themes were used:
  - Climate resilient water services: Redundancy / Strength / Reliability / Future Proof
  - Healthy watersheds: Working with stakeholders to maintain water quality and availability
  - Disaster resilient communities: Disaster risk planning / response and recovery
  - Capacity and knowledge: Staff capacity / data and information / working in partnership






# Identifying resilience measures

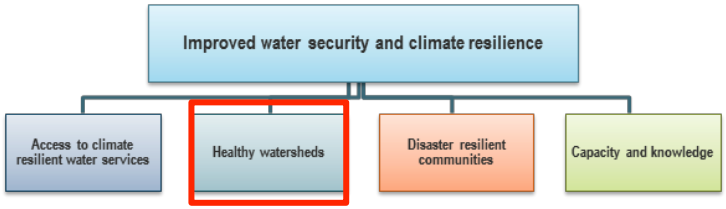
## Climate resilient water services

Some considerations:

- Infrastructure location / design / technology appropriate for natural hazards?
- Design can be modified in future to cope with changing climate and demand?
- Reliance on power, access, specialist supply chains?
- Back up systems available?
- Long term changes in source yield / demand considered?
- Contingency planning in place?

| Examples of measures considered at Sandy Bay | | | |
|---|---|---|---|
| Solar PV as a back up / green power source | Improving accessibility of water intake | Back up groundwater supply for disaster situation | Increase water storage volume to maintain supplies |

- Resilience is only one consideration! Cost / feasibility / public and political support / environmental impacts



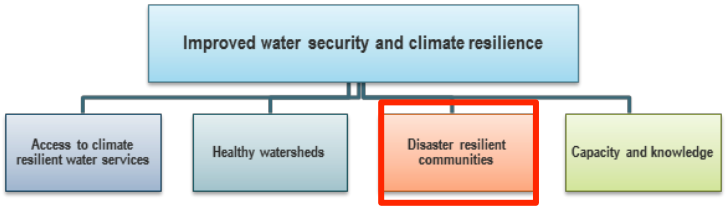

# Identifying resilience measures

## Healthy watersheds

Some considerations:

- Which stakeholders influence source water quality and quantity?
- How do natural hazards and weather impact on source water quality?
- How can the quantity and quality of source water be maintained in future?

| Examples of measures considered at Sandy Bay | | | |
|---|---|---|---|
| Reforestation of upper watersheds to maintain water quality | Awareness raising in community | Training farmers in techniques to minimise erosion | Partnership between utility and forestry and agriculture agencies |



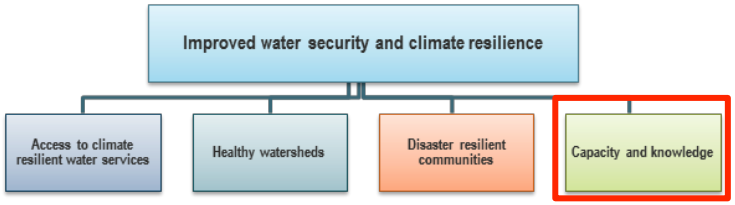

# Identifying resilience measures

## Disaster resilient communities

Some considerations:

- How do communities access water during periods of outage and other disasters?
- What is the status of emergency planning and early warning?
- How are water and disaster management stakeholders working together?

| Examples of measures considered at Sandy Bay | | |
|---|---|---|
| Training communities in water purification | Working with emergency management agencies on contingency planning | Strengthening community disaster response committees and planning |




# Identifying resilience measures

## Capacity and knowledge

Some considerations:

- Do water policies and legislation support climate resilience?
- Are engineering design standards appropriate for natural hazards?
- How is data collected and used to understand performance and inform planning?
- Are there opportunities for improving staff capacity?
- Are there opportunities to develop partnerships?

| Examples of measures considered at Sandy Bay | | |
|---|---|---|
| Regional knowledge sharing and capacity development | Install monitoring equipment on water supply system | Specific staff training needs |

# Group exercise – Identify resilience measures

## Group exercise (20 minutes + presentation)

## Working in groups of 4-6 undertake the following:

1. Identify a water supply system you are familiar with which is a priority for investment (if not all the group is familiar, those who are should outline the system and investment needs)
2. Identify the main risks facing the system
3. Identify measures which could improve the resilience of the system to these risks, over and above the proposed investment (this can include engineering and infrastructure measures, data / knowledge / planning or working with other stakeholders)
4. Discuss the pro's and con's of the additional measures focussing on whether they could be justified on the basis of cost, feasibility and public acceptability. This might differ if domestic or external funding sources are being considered.
5. Present your findings to the group.

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# Thank you!