Group Exercise 1: Developing a balanced portfolio of no-regrets adaptation actions[1] (Scarcity)

1. Learning objective for the exercise

The objective is to learn how to identify and select a range of preferably no/low-regrets actions to adjust or improve water management under a changing climate.
The actions should form a balanced portfolio of measures that include complementary elements such as infrastructural, policy, capacity, financial and information management responses. It should ensure (a) an effective reduction of climate change risks and (b) coherence with the development priorities.

2. Desired outcomes

- Range of adaptation measures identified and developed
- Agreed set of selection criteria and an agreed process of prioritization
- Adaptation options are critically identified and assessed
- List of prioritized and complementary adaptation measures, with preference given to no/low regrets action

3. Instructions

Step 1: Identify/Develop adaptation measures

- Your task as an advisory group, after having identified the need for action, is to ask: "what could be done to respond to the challenges?"
- Use Matrix 1 with some annotated examples to guide your work
- Identify 2-3 climate change impacts **in column B** based on the case study
- In **column C** devise adaptation options that can prevent, reduce or avoid the adverse biophysical and socio-economic impacts.
    - Use list of adaptation options in Annex 1 to help you identify proper measures
      Add by thinking through all categories of adaptation options.
    - Also think of adaptation options enhancing opportunities from climate change.
    - Also think of adaptation options enhancing the adaptive capacity of relevant actors.

Matrix 1: Develop adaptation options

A. System of interest	B. Selected climate change impacts with need for actions	C. Identified adaptation measures
Water supply	Falling ground water levels due to lower recharge and over-pumping Quality problems due to lower recharge and extreme rain events	
Agriculture		
Ecosystems		
Etc.		

[1] Adapted from the GIZ training manual ''Integrating Climate Change Adaptation into Development Cooperation''

Step 2: Assess and select no/low regrets adaptation measures

- Use Matrix 2 with annotated examples to guide your work:
- Transfer the potential adaptation options from Matrix 1 to column C.
- In **column D**
    - Choose and discuss the selection criteria and add other criteria if desired (e.g. see Annex 2).
    - Consider each option (C) using the criteria and scores them between 1 and 5, where 1 is 'poor' and 5 is 'excellent' in terms of the extent to which the adaptation measure meet the criteria.
- In **column E** evaluate the options.
    - If too many options have similar evaluations, you might think of introducing another criterion or weighing the criteria (*e.g. criterion 3 "feasibility" x2*).
- Using a 'bird's eye view' reconsider whether the results make sense.
    - Do they address the range of key risks?
    - Would they be effective together?
    - Do they overlap or complement each other?

Matrix 2: Select adaptation measures based on criteria

C. Identified adaptation measures	**D. Criteria score (1-5)**				**E. Overall evaluation**	**F. Comments**
	C1	**C2**	**C3**	**Etc.**		
1. Eg Installation of tube wells on individual plots	2	4	3		15	
2. Eg. Rainwater harvesting with provision of domestic water tanks						
3. Eg. Shift to dry systems of sanitation due to lack of water						
Etc.						

Annex 1: Adaptation options for scarcity management

Types of options: Infrastructure = I, Policy = P, Capacity = C, Good Practices = GP

Supply-based options

1 Install more wells (I)

2 Construct more diversion structures on river (I)

3 Construct on-stream storage dams (I)

4 Artificially recharge groundwater (I, GP)

5 Treat and reuse wastewater (I)

6 Desalinate brackish or saline water (I)

7 Re-allocate water among sectors or users (P)

Demand-based options

1 Shift to higher-value lower-water consuming crops (GP)

2 Promote drip irrigation technology (I, GP)

3 Line irrigation canals (I)

4 Develop and promote revised agronomic practices (mulching, minimum tillage, etc.) and new crop varieties (P, GP)

5 Improve the management of abstracted water (information systems, management practices, human resource capacity building) (GP, C)

6 Promote water conservation in urban areas, grey water use and sanitation (GP, P)

7 Physically ration water (P, GP)

8 Introduce water pricing/raise water rates (P)

9 Upgrade water infrastructure (I)

10 Reduce unaccounted for water (GP)

11 Introduce incentives (and disincentives) for careful water use (overuse) such as abstraction quotas, taxes, subsidies to drip irrigation (P)

12 Introduce payments for environmental services (P)

13 Control groundwater withdrawals, introduce fees (P)

Information-based options

1 Expand monitoring programmes for water supply and use, climate, agricultural output, water quality and ecosystem health (e.g. installation of meteorological stations) (C)

2 Develop capacities to model climate change effects on a regional scale (C)

3 Develop and apply models to assess potential impacts of climate change parameters on agricultural production and economic returns to agriculture (C)

Other options

1 Develop and distribute new seed varieties (GP)

2 Relocate vulnerable populations or infrastructures (P)

4 Set and enforce wastewater discharge standards (P)

5 Enhance watershed planning and management (GP)

Annex 2: Criteria for selecting adaptation measures

- Effectiveness: Does the measure provide adaptation in terms of reducing impacts, reducing exposure, enhancing resilience or enhancing opportunities??
- Robustness to uncertainty: is the measure effective under different climate change scenarios?
- 'No regrets' potential: Does the measure contribute to more sustainable water management and bring benefits even without any climate change?
- Efficiency: do the benefits exceed the costs? Considering also social and environmental costs and benefits
- Equity: does the measure adversely affect other areas or vulnerable groups?
- Flexibility: Can adjustments be made later if conditions change again or if changes are different from those expected today?
- Affordability: how much does the measure cost? Is it fundable/affordable?
- Sustainability: does the measure contribute to sustainability objectives, and are the investments themselves sustainable?
- Legitimacy: is the measure politically and socially acceptable?
- Urgency and practicality: how soon could the measure be implemented relative to constraining timescales?
- Synergies / coherence with other strategic objectives: does the measure help to achieve or conflict with other objectives?

Additional criteria may include, depending on the context, e.g. political and social acceptance: biodiversity friendliness, relative speed of implementation or benefits, avoid detrimental effects on other development goals, alignment with funding requirements or other eligibility criteria, alignment with policy priorities, etc.

Other relevant questions are "What happens if you don't take a specific action?"; "If the adaptation measure is already being implemented, would it need additional funding to improve or to do more of the same?".