Identification of adaptation measures and options for the Health Sector based on the impact and vulnerability assessment results

Coping better with *climate change*

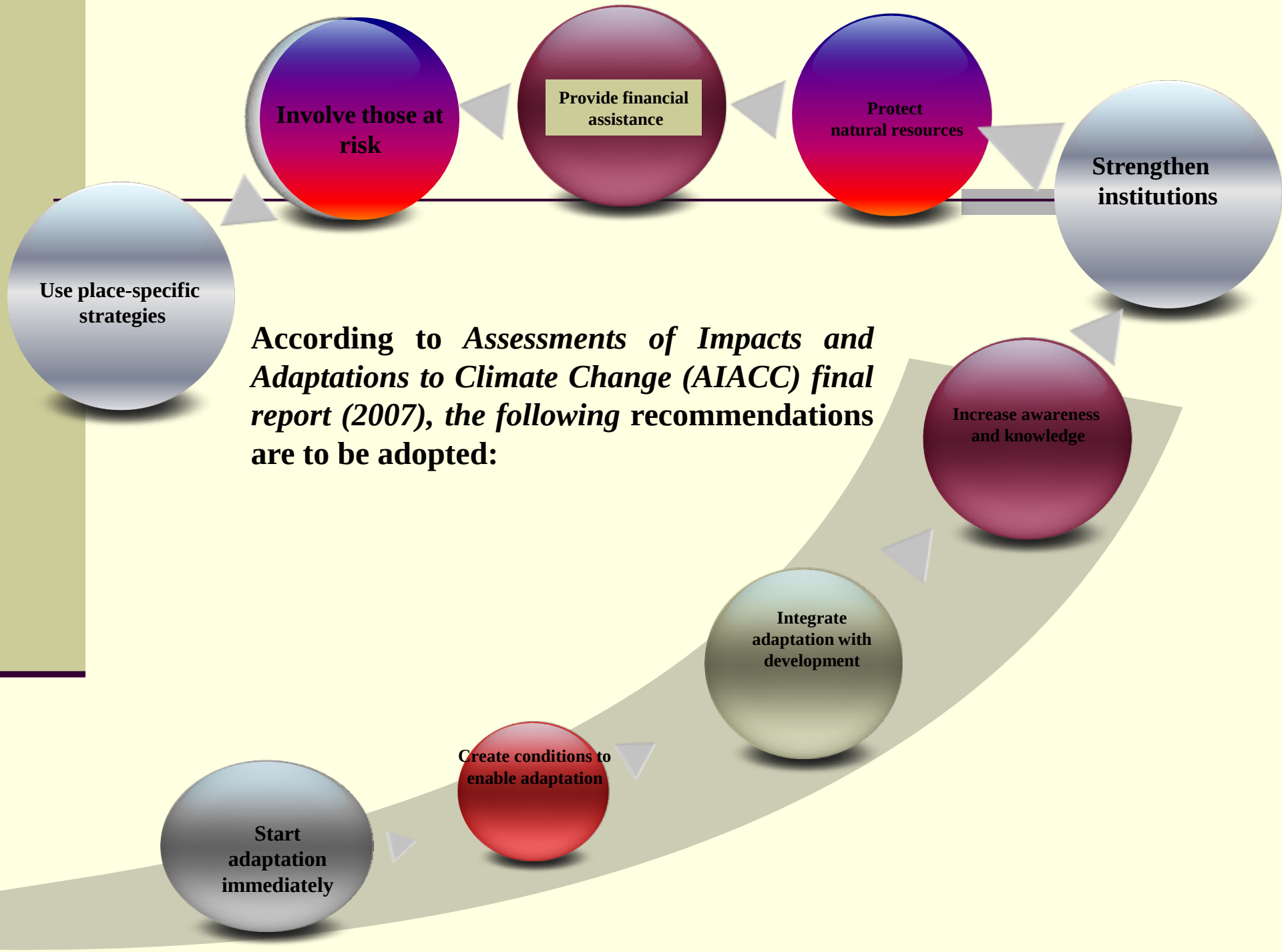
Integrated Water Resources Management (IWRM)

Water crisis – Facts

- 1.1 billion people still do not have access to safe water.
- Today, more than two billion people are affected by water shortages in over 40 countries.
- Four out of 10 people around the world still use sanitation facilities that do not meet basic requirements for health.
- Two million tonnes per day of human waste are deposited in watercourses.

Water crisis – Facts

- Each year, unsafe water and a lack of basic sanitation kill at least 1.6 million children below the age of five years.
- Half the population of the developing world are exposed to polluted sources of water that increase the incidence of disease.
- 90 percent of natural disasters in the 1990s were water-related.
- The increase in global population from 6 billion to 9 billion will be the main driver of water resources management for the next 50 years.



According to *Assessments of Impacts and Adaptations to Climate Change (AIACC) final report (2007), the following* recommendations are to be adopted:

AIACC final report (2007)

- According to Assessments of Impacts and Adaptations to Climate Change (AIACC) final report (2007), the following recommendations are to be adopted:
  - Start adaptation immediately
  - Create conditions to enable adaptation
  - Integrate adaptation with development
  - Increase awareness and knowledge
  - Strengthen institutions

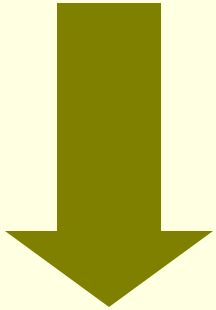
Stocktaking for available adaptation measure for national and regional needs

تقييم الوضع

- The literature provides **many priority interventions** that can be adopted by the health sector in order to adapt to the impact of climate change.

- The **national circumstances** should be reflected on the needed adaptation interventions depending on the strength and the resilience of the institutions of the different sectors and the health sector in specific.

Possible adaptation measures that can be considered towards the development of a national action plan to adapt to the impacts of climate change.



Stocktaking for available adaptation measure for national and regional needs

Adaptation measures to be considered for the development of a national action plan to adapt to the impacts of climate change.

- **Institutional and strategic Interventions**
- **Environmental Quality Monitoring and Control**
- **Health Institutions Enhancement**
- **Awareness and Capacity Development**
- **Early warning Systems**

Institutional and strategic Interventions

- Support **“healthy” development strategies** in other sectors that protects and promotes health and mitigates climate change
- Implement **adaptive strategies** at local and national level to minimize impacts of climate change on population’s health
- Enhancing intersectorial coordination and regional collaboration

Mainstream public health concerns and health protection from climate change in all national, regional and international action on climate change.

Environmental Quality Monitoring and Control

- Monitoring of air and drinking water quality
- Intensifying water pollution control activities and ensuring safe reuse of wastewater
- Enhancing environmental sanitation
- Securing minimum household water requirements to maintain health.

Awareness and Capacity Development

- Public awareness programs about proper food handling, storage, as well as governmental food monitoring actions and integrate them into an adaptation action plan.
- Capacity building of prevention and response to disease epidemic potential
- Strengthen the institutional capacity of the public health systems for providing guidance and leadership on health protection from climate change.

Health Institutions Enhancement

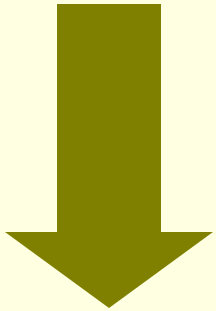
Maintenance and upgrading national public health infrastructure

Early warning Systems

- The development of early warning systems and control programs for infectious diseases
- The development of weather and seasonal forecasting and early warning systems, disaster planning and educational and public awareness programs
- Early warning for weather for the prevention of their effects on the population.
- Enhancing surveillance system

Evaluation and Prioritizing the Proposed Adaptation Measures and the selection criteria

- The **methodology** for identifying the needed adaptation measures for the water sector can be implemented through the following action plans and activities:



Evaluation and Prioritizing the Proposed Adaptation Measures and the selection criteria

a. **Consulting with stakeholders** is the first step towards identifying the adaptation measures.

b. **Review all possible adaptation measures** for water availability and water quality as well as the related health aspects adaptation measures in connection with water ones

c. **Evaluate all possible adaptation measures for in term of suitability and applicability** to the study area under consideration, and suggest and prioritize the best possible adaptation measures.

d. **Develop needed mechanisms and interventions** to integrate the proposed adaptation measures in national policies and action plans.

Evaluation and Prioritizing the Proposed Adaptation Measures and the selection criteria

- **a. Consulting with stakeholders is the first step towards identifying the adaptation measures.**

  The aim of such a consultation is to:

  - Have clear effective and useful opinions, comments, recommendations, and possible changes on the project work plans, actions, tasks, and methodologies adopted to fulfill the necessary objectives.
  - Foster stakeholder participation in research projects to bridge the gap between scientists, policy-makers and all other relevant parties.

Evaluation and Prioritizing the Proposed Adaptation Measures and the selection criteria

a. Consulting with stakeholders is the first step towards identifying the adaptation measures.

The aim of such a consultation is to:

- Engage stakeholders more could streamline the flow and sharing of information, and avoid duplication of work and undue delays in taking decisions.
- Improve understanding of local knowledge and practices and public awareness, which are essential for successfully implementing adaptation measures, avoiding mal-adaptation and unsustainable solutions.

Evaluation and Prioritizing the Proposed Adaptation Measures and the selection criteria

b. Review all possible adaptation measures for water availability and water quality as well as the related health aspects adaptation measures in connection with water ones

- The revision process can be achieved through detailed investigation for all possible adaptation measures outlined in **literature**.

The revision process will have to focus on the following issues:

- Review **all possible adaptation measures** for water availability for conventional and nonconventional water as wastewater reuse, water desalination, weather modification, industrial wastewater.

- Review **all possible adaptation measures** for water demand management, residential water supply, surface water development, groundwater recharge.

- Review **all possible adaptation measures** for water quality in terms of pollution, protection and management.

The revision process will have to focus on the following issues:

- Review **all possible adaptation measures** for water monitoring system, measures to improve system efficiency, watershed management, urban water use, flood control, research programs, institutional reform, and irrigation water.
- Review **all possible adaptation measures** related to socio-economic issues.
- Review **all possible adaptation measures** related to health issues in terms of the legislative, institutional, and plans and programs.

Based on this revision, all possible adaptation measures for the health and water sectors can then be listed

List of potential adaptation measures for health sector

	Prevention measures	Measures to improve resilience	Preparation measures	Response measures	Recovery measures
Institutional and strategic Interventions					
Environmental Quality Monitoring and Control					
Health Institutions Enhancement					
Awareness and Capacity Development					
Early warning Systems					

c. Evaluate all possible adaptation measures for in term of suitability and applicability to the study area under consideration, and suggest and prioritize the best possible adaptation measures.

In order to facilitate the evaluation process, the following method can be adopted:

- A multi criteria score based method should be used in order to derive an accurate evaluation. A set of criteria has to be selected (based on different sources like IPCC forth assessment guideline report).

An example of criteria for screening the appropriate adaptation for a region/country are shown in table 6.

Table 6: Criteria used for evaluating the suggested adaptation measures.

Criteria	Sub-criteria	Description	Weight	Sub-weight
Sustainability	Mitigation (adaptation) benefits	Changes in the level of greenhouse gas emissions created by the adaptation measure	25	10
	Ecosystem Impact	The degree of environmental impacts on biodiversity		7
	Equity	Number of people benefiting from the adaptation - if possible disaggregated by gender, age, class		8
Effectiveness	Robustness (ability to adopt under different scenarios)	Elaborate how effective this measure could be for a diverse range of plausible future scenarios	20	5
	Reliability	Identify if this measure is untested or the effectiveness of this measure is proven		5
	Cost Effectiveness (Low-regret)	Identify if this measure will bring high relative benefits to the costs		10

Criteria	Sub-criteria	Description	Weight	Sub-weight
Risk and Urgency	Urgency	Identify the time frame of impact occurrence from recent past, present until short- and long-term futures	15	5
	Degree of risk (potential extent of future risks)	Identify potential extent of future risks from minor and reversible until irreversible		5
	Uncertentity or Precautionary	Estimate how well the risks are understood		5
Opportunity	Ancillary benefits	Identify how this measure will contribute to other community goals	10	3
	No-regret option	Indentify if this measure has benefits regardless of actual climate change impacts		3
	Window of opportunity	Identify if there is currently a window of opportunity to implement this measure		4

Criteria	Sub-criteria	Description	Weight	Sub-weight
Implementation	Initial cost	Identify the approximate cost of implementation; you could compare these costs with cost of inaction over time	30	5
	Operating and maintenance cost	Identify the cost of operation and maintenance over time, compared to other budget expenditures		5
	Public acceptability	Elaborate on public support or opposition to this measure		5
	Funding sources	Identify availability and sources of potential funding		5
	Capacity (information, technical, staff, resources)	Estimate if current capacity is sufficient and, if not, what are lacking capacity gaps		5
	Institutional	Identify if implementation is within local control or it requires coordination with, or action by, other jurisdictions		5
Final Score	Sum of All Scores Multiplied by its Weight (Total Scores 500)	→	Divide the results by 5 to have the range out of 100	

Scoring

- The score represent the sum of the weights of each sub-criteria used in the evaluation multiplied by the ratio.
- Weights should be assigned by the experts based on the region conditions and in accordance with their importance in the evaluation, and sums up to 100%
- The ratio is the stakeholder judgment for each proposed adaptation under each sub-criteria (criterion) having a range from 1 to 5, where 1 represent the lowest level and 5 represent the high ratio level.

- It is suggested that, the most feasible immediate actions should be set first especially that deals with management of existing infrastructures and the institutional frameworks that deals with those entities.

- The “best” or “preferred” option involves the costs, benefits, and impacts of alternative strategies comparison.

- These criteria can also act as indicators of the success or failure to realize the objectives, and can be used by a monitoring-evaluation programme for the adaptation strategies, policies and measures. An excel sheet should be developed to facilitate this process through collecting the experts feedback.

The final scores can then be calculated based on averaging the scores obtained from the responded stakeholders

Table A-4: Evaluation results of suggested adaptation measures according to stakeholder participation.

Implementer	Stkhldr 1		Stkhldr 2		Stkhldr 3		Stkhldr 4		Stkhldr 5		Stkhldr 6		Overall	
Criteria	Score		Score		Score		Score		Score		Score		Score	
Sub-criteria														
Weight	Total		Total		Total		Total		Total		Total		Total	
Sub-weight	500	%	500	%	500	%	500	%	500	%	500	%	500	%
Adaptation Category														
Adaptation Measure1														
Adaptation Measure2														
Adaptation Measure3														
Adaptation Category														
Adaptation Measure1														
Adaptation Measure2														
Adaptation Measure3														

The prioritized adaptation measures based on this analysis should be summarized after including the results from all stakeholders

Table A-5: Prioritized adaptation measures based on multi criteria analysis.

Suggested Adaptation Measure	Score

d. Develop needed mechanisms and interventions to integrate the proposed adaptation measures in national policies and action plans.

- All over the world a variety of policy instruments and tools used aiming at integrating the proposed adaptation measures in national policies and action plans.

To develop the needed mechanisms and interventions to integrate the proposed adaptation measures into the national policies and action plans, the **following should be considered:**

- All international environmental standards, policy tools and instruments related to climate change have to be reviewed.
- The most suitable combination of these instruments and tools can then be suggested.
- The **Cap-Net Training Manual and Operational Guide on Integrated Water Resources Management Plans (Cap-Net, 2005)** presents the process in seven sequential steps.

Cap-Net Training Manual and Operational Guide

Integrated Water Resources Management Plans

- In the '**Initiation' step**, climate change impacts need to be integrated in the planning process. In advocacy towards policy makers, the argument can be brought up that this will be instrumental for decision makers to advance demand management strategies, which otherwise might be politically difficult to implement.
- During the **'vision/policy' phase**, climate change adaptation is an additional element, not a replacement of IWRM goals. The overall aims of IWRM will remain the same.
- In the **'situation analysis' step,** the use of climate information and impact analysis needs be incorporated.

Cap-Net Training Manual and Operational Guide

Integrated Water Resources Management Plans

- In the **'strategy choice' phase**, the anticipatory or 'precautionary' approach can be introduced as the basis for strategies for IWRM.
- Consider the roles of local authorities in adaptation strategies when drafting an IWRM plan.

Exercise

Climate driven phenomena	Agriculture, forestry and ecosystems	Water resources	Human health	Industry, settlements and society
- Heavy precipitation events - Frequency increases over most land areas				- Disruption of settlements, commerce, transport and societies due to flooding - Pressures on urban and rural infrastructure - Loss of property
- Drought-affected areas increase				- Water shortages for settlements, industry and societies - Reduced hydropower generation potential

1. For each climate driven phenomena, identify the impacts on human well-being?
2. Identify potential adaptation responses?
3. Select up to three key criteria that the group would suggest to prioritize selected adaptation responses.
4. Evaluate the chosen adaptation actions according to the selected criteria (use a simple ranking system).