



# National Cooling Plan

## The Gambia

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1. Purpose of the Workshop
2. Introduction to National Cooling Action Plan (NCAP)
3. Structure of the NCAP Report for the Gambia.
4. NCAP Development process
5. NCAP Data Assessments
6. NCAP Data Requirements
7. Breakaway sessions
8. Way Forward

**To facilitate the data collection process for the creation of The Gambia's National Cooling Action Plan, which will address important cooling sectors, such as:**

- Space Cooling in Buildings
- Food Cold Chain
- Healthcare Cold Chain,
- Mobile Air Conditioning (Transportation)
- Industrial Process Cooling

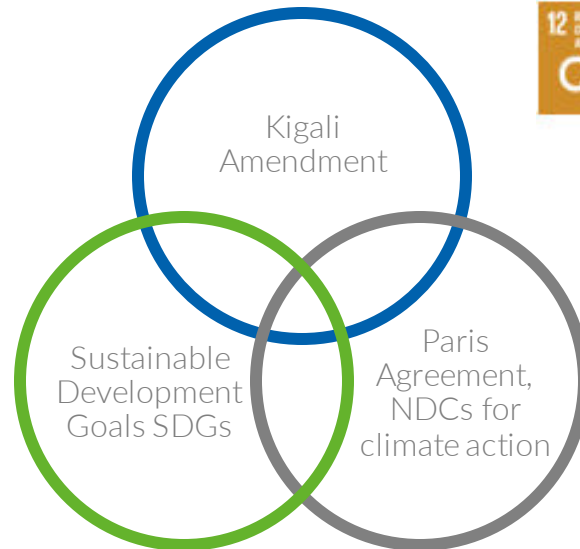
# Introduction to National Cooling Action Plans (NCAPs)

## Connecting sectors and international commitments



*"We need all countries to develop National Cooling Action Plans to deliver efficient and sustainable cooling and bring essential life-preserving services like vaccines and safe food to all people."*

- Antonio Guterres, UN Secretary General  
World Ozone Day 2019



# Why Cooling Action at the National Level

## Cooling sector is characterized by:

- **Cross-cutting nature**, requires multiple public and private sector engagements
- **Diverse stakeholders**, with different interests and agendas
- **Scattered institutional responsibility**
- **Focus on the equipment-side of the issue**, rather than needs for cooling



## Challenges of delayed action on Cooling:

- Impact to the **energy system** due to the growing demand
- **Economic impacts** on government and users. Inefficient practices and technologies are **costly** and **reduce competitiveness**
- Impact on **Climate**. GHGs contributions from the subsector
- Impacts on **health, nutrition** and **productivity**

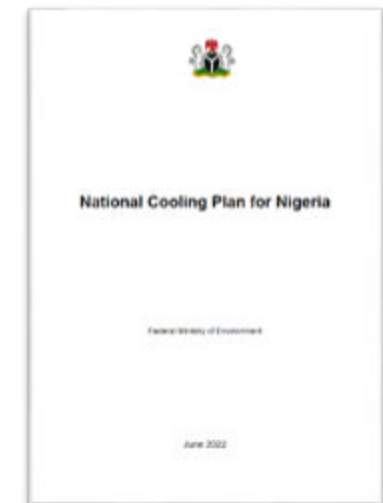
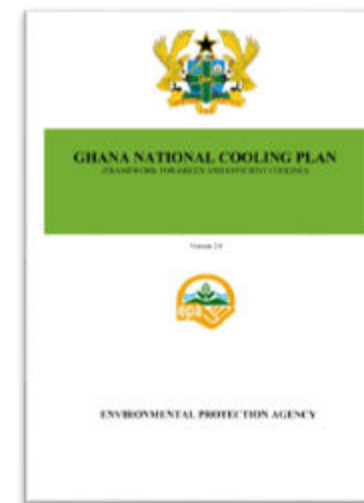
# NCAPs for joint coordinated action



## Country's can better plan their cooling action with NCAPs

- Diagnose the national situation and define limitations and scope (priority sectors)
- Understand the National Context and ongoing efforts to improve inter-ministerial coordination
- Recommendations-based: to respond to key gaps and opportunities
- Supporting tools and programme development to help drive implementation
- Coordination for implementation of priority actions, manage international funding and reduce duplication

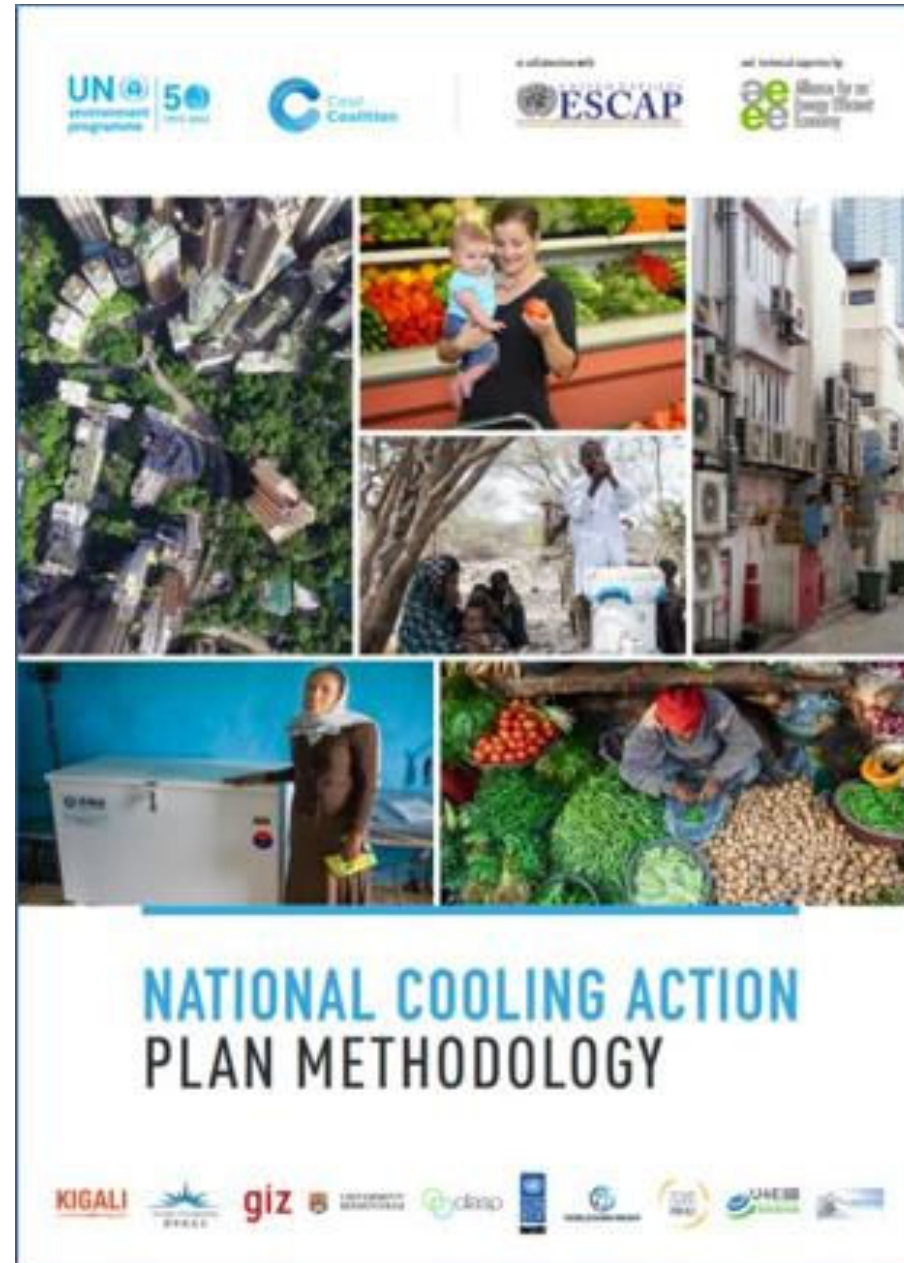
Some examples already published





# Structure of the NCAP Report for the Gambia.

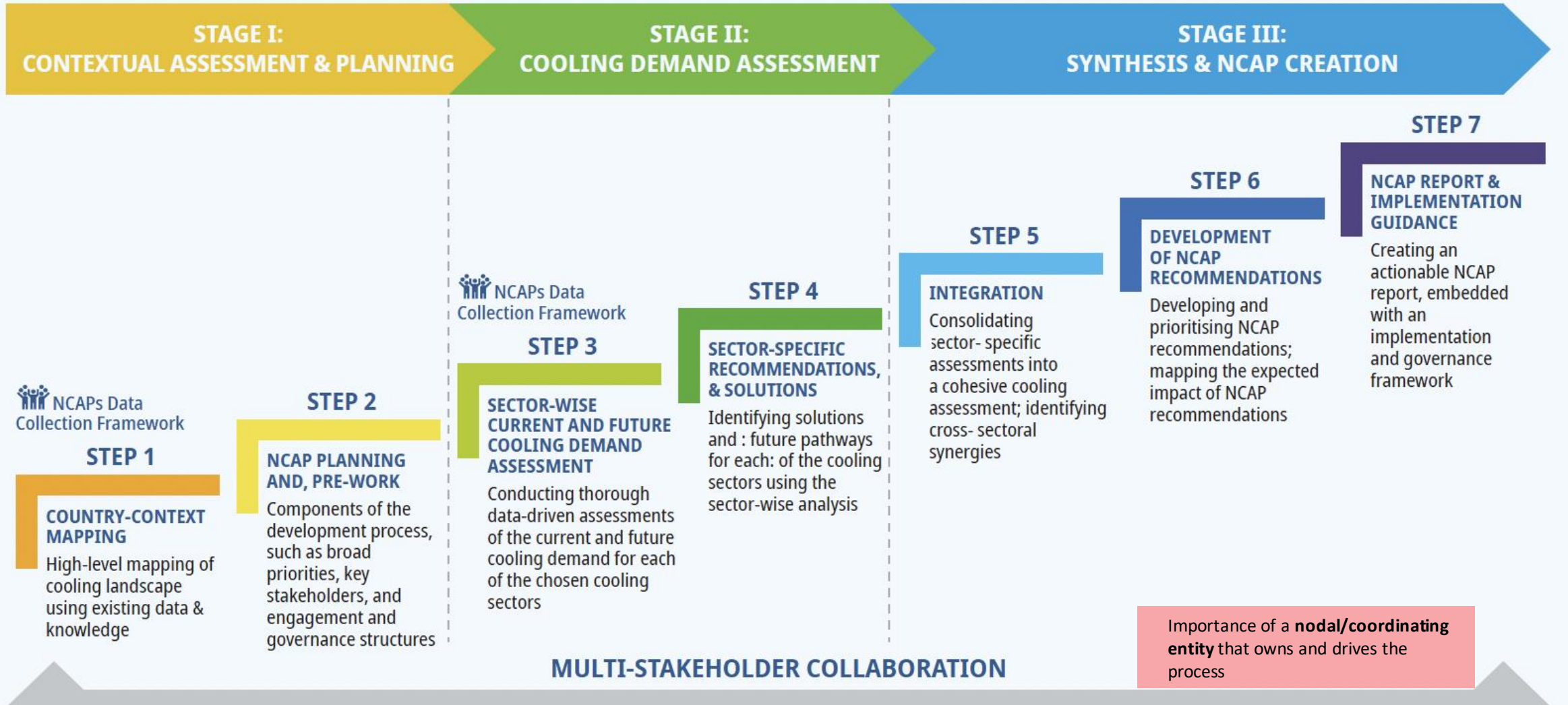
1. Executive summary
2. Introduction
3. Country Background
  - Geographical Information and Climatic Conditions of The Gambia
  - Demography and economic situation
  - Socio-economic context
  - Energy Efficiency context
  - Project framework and importance of cooling in The Gambia
  - Overview of the Market Assessment
4. Existing policy and legislative frameworks that impact the cooling sector.
  - Policies
  - Legislations
  - Plans and strategies
  - Standards
  - National and international commitments
5. Implementation Framework and Governance
  - Identification of stakeholders for the NCAP development process
  - Institutional Arrangement
6. NCAP Development Process
  - Provides the overall NCAP framework.
    - Stage I: Contextual Assessment and mapping,
    - Stage II: Cooling Demand Assessment
    - Stage III: Synthesis and NCAP Creation
  - Identification of cooling sector with focus on the Gambia.
    - Building Space Cooling
    - Food cold chain
    - Healthcare
    - Mobile air condition
    - Industrial process cooling
7. Overview of Cooling in the Gambia. This chapter essentially serves as an aggregated summary of the current situation on cooling, focusing on Drivers for cooling and access to cooling by sector.
8. Cooling Demand Assessment
  - Sectorial cooling demand
  - Impact on Electricity Consumption
  - Impact on Refrigerant Consumption
  - Impact on Greenhouse Gas Emissions
9. NCAP Recommended Strategic Actions
10. NCAP Implementation guidance and summary of interventions:
11. Conclusions
12. References
13. Annexes



**GLOBAL EFFORT:** Developed with leading global organizations in cooling sector (e.g., UNDP, UNESCAP, UNEP, OzonAction, GiZ, WBG, CLASP, CCC, AEEE, Energy Foundation China, SEforALL, UNEP-U4E and University of Birmingham)



# The NCAP Development Process



  
NCAP development team

  
Government entities

  
Researchers & analysts

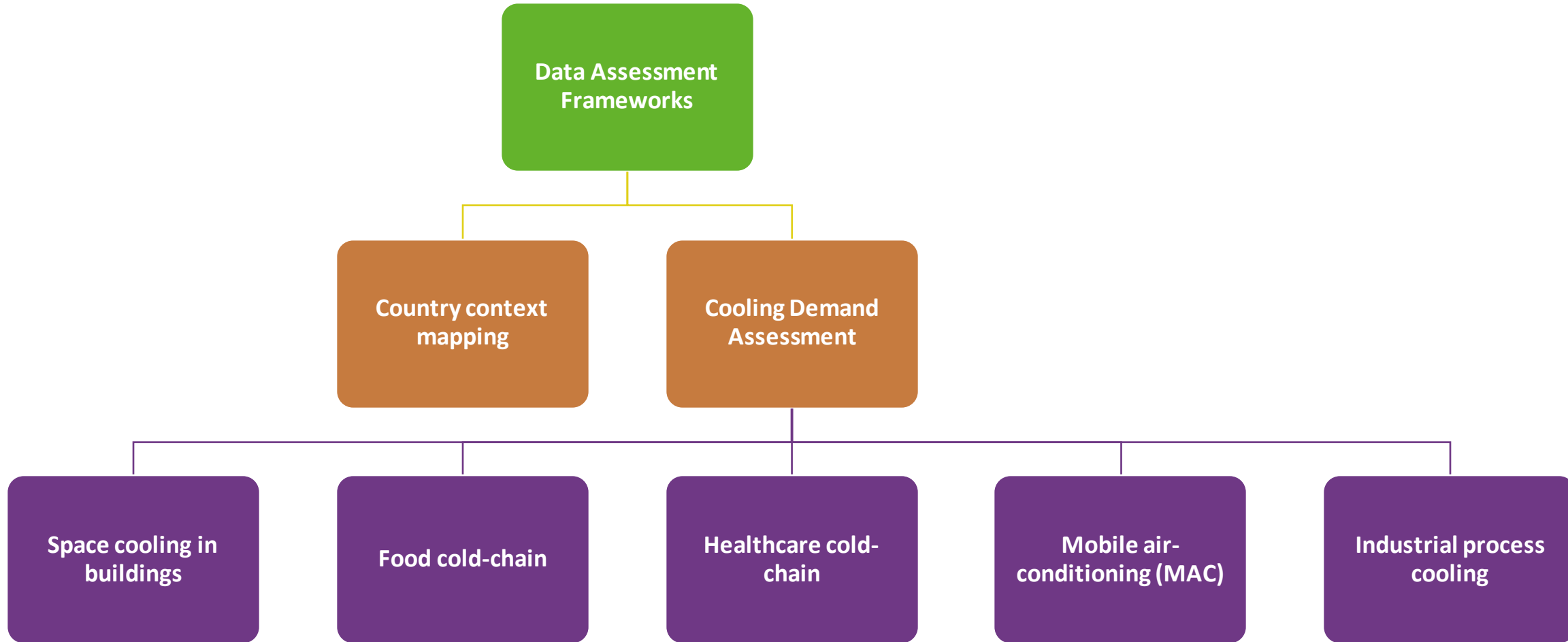
  
Private sector & industry



# List of Key Stakeholders NCAP Development

Government	Private Sector & Industry	Researchers and Analyst
<ul style="list-style-type: none"> <li>• Ministry of Petroleum and Energy (Nodal)</li> <li>• Ministry of Finance and Economic Affairs (NDA)</li> <li>• Ministry of Trade, Industry, Regional Integration and Employment</li> <li>• Ministry of Environment Climate Change and Natural Resources</li> <li>• Ministry of Gender, Children and Social Welfare</li> <li>• Ministry of Health (MoH)</li> <li>• Ministry of Transport, Works and Infrastructure</li> <li>• National Environment Agency</li> <li>• The Gambia Standards Bureau (TGSB)</li> <li>• Department of Fisheries / Ministry of Fisheries and Water Resources.</li> <li>• The Gambia Revenue Authority (GRA)</li> <li>• Gambia Bureau of Statistics</li> <li>• Ministry of Agriculture</li> <li>• Central Bank of The Gambia</li> <li>• The Gambia Police Force</li> </ul>	<ul style="list-style-type: none"> <li>• National Water and Electricity Company Ltd.</li> <li>• Refrigeration and Air-conditioning Technicians Association</li> <li>• Kairaba Shopping Centre</li> <li>• Right Choice</li> <li>• Heewal Supermarket</li> </ul>	<ul style="list-style-type: none"> <li>• The Association of Non-Governmental Organisation</li> <li>• The Gambia Competition and Consumer Protection Commission (GCCPC)</li> <li>• University of Science, Engineering and Technology</li> <li>• National Electrotechnical Committee</li> <li>• Mbollo Fandema Association</li> <li>• National Consumer Association</li> <li>• Food and Agriculture Organization</li> </ul>

# Data Assessment Frameworks



- Tool to provide valuable guidance on data collection and analysis
- Identifies key data input parameters
- Suggests different analysis methods

# 1. Space Cooling in Buildings

**Space cooling in buildings:** This includes **refrigerant** and **non-refrigerant based space cooling** for enhancing thermal comfort in indoor spaces of residential and commercial buildings.

Technology category	Examples
<b>Vapour compression cooling Technologies – refrigerant based</b>	<b>Room Air Conditioners:</b> (window, split, standing, cassette, fixed-speed, inverter technologies, etc.), <b>Chiller systems</b> (screw, scroll, centrifugal systems, etc.), <b>Variable Refrigerant Flow (VRF)</b> systems.
<b>Non-refrigerant-based cooling technologies</b>	<b>Fans</b> (regular, brushless DC, etc.),  <b>Evaporative air coolers</b>

## Application

<b>Residential buildings</b>	Demography: Urban, rural
	Demography: Urban, rural
<b>Commercial buildings</b>	Building function: Healthcare, hospitality, offices, education, retail, etc.

## 2. Health Care Cold Chain

**Healthcare cold-chain:** consists of a series of storage and transport links, all of which are designed to keep the vaccine and other **healthcare products** (*including blood products and other medical devices*) at the **recommended temperature from the manufacturer** until it reaches the **targeted beneficiary**.

Category	Examples of technologies
<b>Warehouse Cold Storage</b> ( <i>bulk storage of vaccines for a long duration</i> )	<b>Cooling system in Cold storages:</b> <ul style="list-style-type: none"> <li>• Walk-In Coolers (WIC) / Walk-In Freezers (WIF) (HCFC/HFC/Ammonia-based modular DX units,</li> <li>• central plants with air-cooled/water-cooled heat rejection)</li> </ul>
<b>Distribution Centres</b> (Rural/Urban Health Centres)	<b>Deep Freezers or Ice Lined Refrigerators</b> (HCFC/HFC based cooling units)
<b>Transportation</b>	<b>Mobile HFC based cooling system</b> in Refrigerated transport, Reefer vehicles, and Refrigerated containers.  <b>Passive Cold Vaccine Boxes</b>



# 3. Mobile Air Conditioning

**Mobile Air Conditioning** implies air conditioning for **comfort cooling of commuters in cars, buses and railways, etc.** *Cooling in refrigerated trucks or reefer vehicles to carry perishable food and healthcare products are accounted for in the cold-chain sector.*

## Transport Modes:

- Passenger Light Duty Vehicle (LDV)
- Passenger Heavy Duty Vehicle (HDV)
- Freight vehicle (passenger cooling only)
- *Railway*
- *Urban metro system*

# 4. Industrial Process Cooling

**Industrial process cooling** includes any cooling solution deployed for:

- a) making a product through physical, chemical or biological processes, or a combination of these;
- b) controlling temperature and humidity for desired functioning of electronic or mechanical or electromechanical systems.

**The typical industrial process cooling systems:**

- Chilling
- Freezing (Low and ultra-low temperature freezing)
- Drying (Vacuum Freeze drying or Lyophilization)
- Air conditioning
- Humidification/ Dehumidification

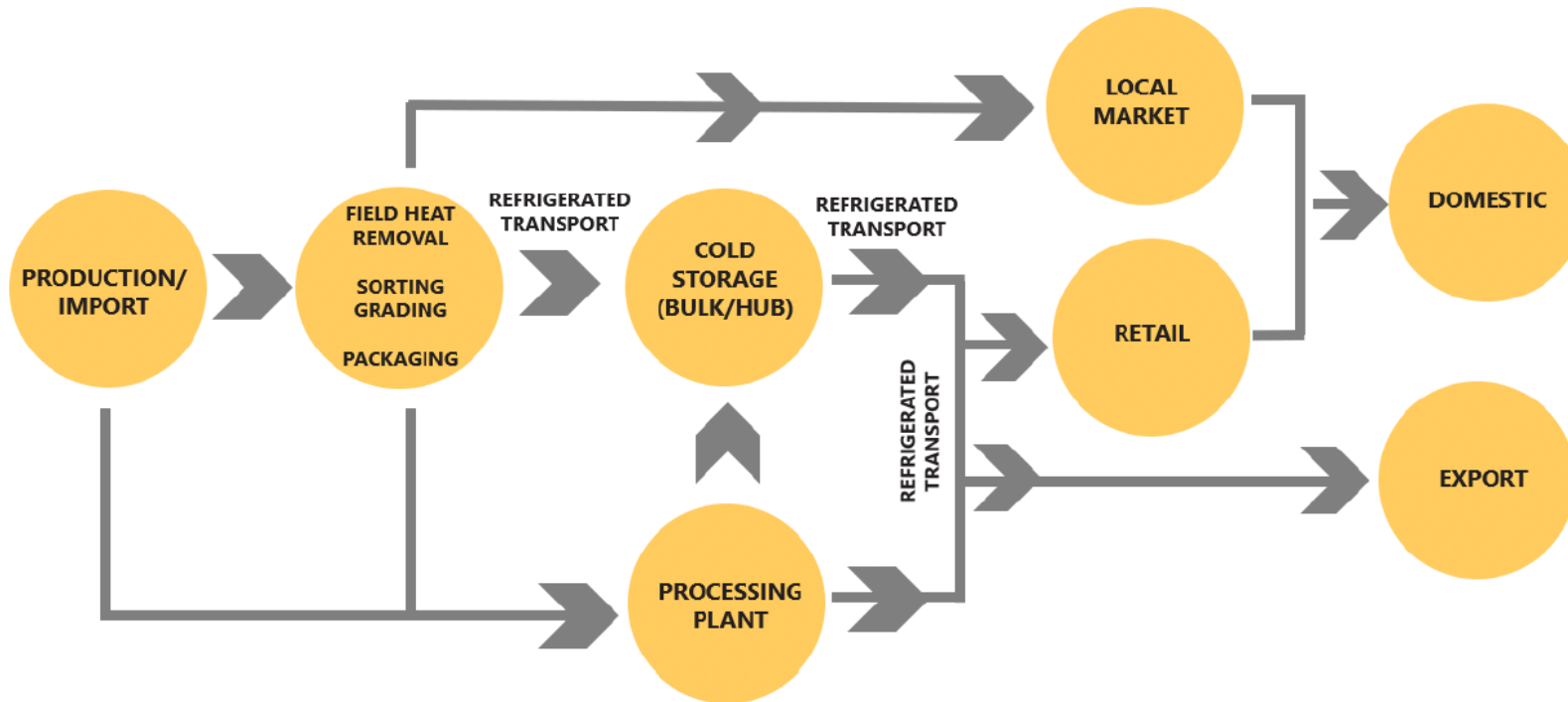
**Examples of applications**

- Data Centres
- Pharmaceutical Industry
- Textile Industry
- Others (Chemical, Plastics, Detergent Industries)

# 5. Food Cold Chain

**Food cold-chain** is a chain of logistics activity to service the market connectivity of perishable products from the production stage to consumers (including residential refrigeration).

## Food Cold Chain Network



## Product considerations

- **Agricultural Produce**
  - Vegetables
  - Dairy products
  - Meat
  - Seafood
  - Fruits

## 5. Food Cold Chain.....*continue*

Category	Examples of technologies
<b>Production/Import</b>	Hydro cooling, Ice cooling
<b>Sorting/Grading/Packaging</b>	<p>HFC / HCFC based precooling units and cooling system (Modular DX units, central plants with air-cooled/water-cooled heat rejection)</p> <p>Milk cooling units (Modular DX units)</p>
<b>Processing</b>	Cooling system in Processing Plants (Modular DX units, central plants with air-cooled/watercooled heat rejection)
<b>Cold Storage (Bulk/Hub)</b>	<p>Cooling system in Cold storages (HCFC/HFC/Ammonia-based modular DX units, central plants with air-cooled/water-cooled heat rejection)</p> <p>Cooling system in Ripening chambers (Modular DX units, central plants with air cooled/water-cooled heat rejection)</p> <p>Cooling system in Controlled Atmosphere (CA) rooms (Modular DX units, central plants with air cooled/water-cooled heat rejection)</p>
<b>Transportation</b>	Mobile HFC based cooling system in Refrigerated transport, Reefer vehicles, Refrigerated containers, Insulated milk tanker vans
<b>Commercial and Domestic Refrigeration</b>	<p>Deep freezer, Visi-cooler, Remote condensing unit, Centralised cooling system</p> <p>Domestic Refrigerators, Freezers</p>

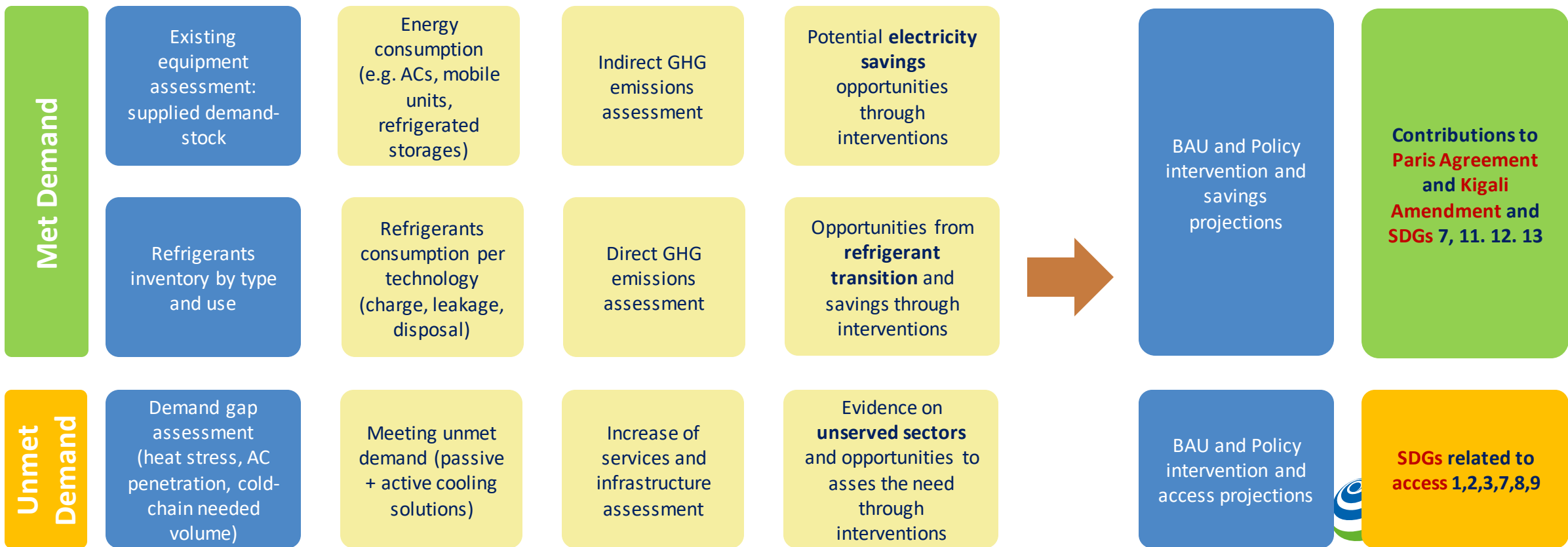


# Linking Climate Action, Kigali Amendment and SDGs

## through NCAPs

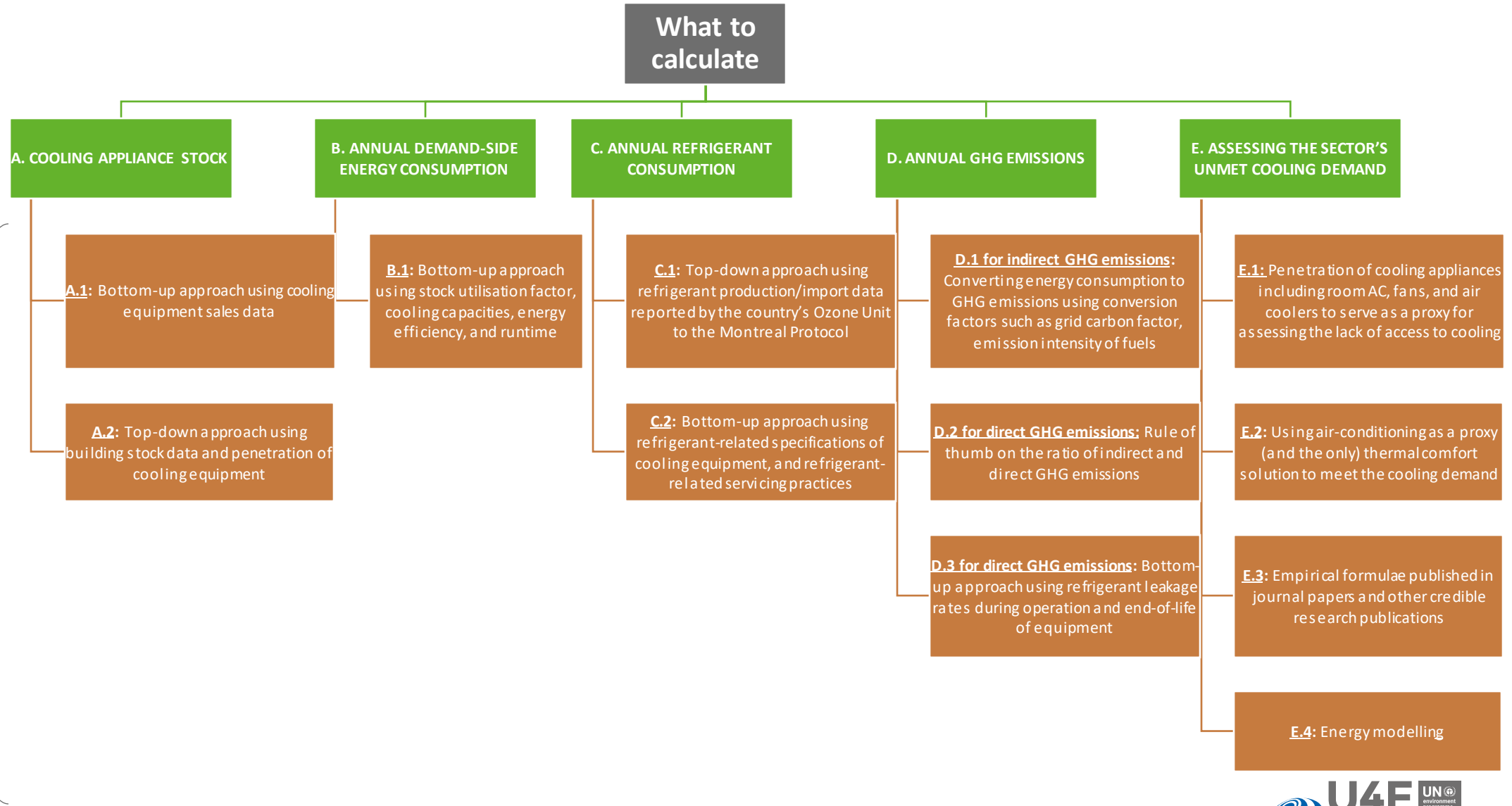
### 5 modular sector: Space Cooling, Food and Healthcare Cold Chain, Mobile AC and Process/Industrial Cooling

Through the NCAP Cooling Data Assessment we address:



# Example Data Analysis: Pathways for Space Cooling in Buildings

How to calculate  
→



# Breakaway Sessions - Sectors

**Space Cooling in Buildings**

**Health Care Cold Chain**

**Food Cold Chain**

**Industrial Process Cooling**

**Mobile Air Conditioning**

# Next Steps

Activity	February				March				April				May				June			
	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4
<b>3, Cooling Demand Assessment</b>																				
<i>3.1 Map sector considerations</i>																				
<i>3.2. Identify key metrics to be calculated</i>																				
<i>3.3. Estimate the baseline</i>																				
<i>3.4. identify data required</i>																				
<i>3.5. identify data gaps</i>																				
<i>3.6. data collection</i>	█	█	█	█	█	█	█	█												
<i>3.7. data capturing</i>	█	█	█	█	█	█	█	█												
<i>3.8. data analysis</i>	█	█	█	█	█	█	█	█												
<i>3.9. project future scenarios</i>									█	█	█	█								
<b>4. National Workshop 1: Validation of data</b>				█																
<b>5. NCAP Report Creation</b>																				
<b>Development of the Contextual chapters: Stakeholder mapping, policy mapping, main drivers, ongoing projects/efforts.</b>		█	█	█	█	█	█	█												
<i>5.1. Preparation of sector specific recommendation, draft integrated Recommendations and Implementation Guidance (*include a table with recommendations and roles and resps)</i>									█	█	█	█								
<i>5.2. Draft Sector Chapters, Analysis and Scenarios, etc</i>	█	█	█	█	█	█	█	█	█	█	█	█								
<i>Finalise report</i>	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█				
<b>6. National Workshop 2: Validation of the NCAP</b>																			█	
<b>Revision after inputs received</b>																				█
<b>Graphic Design, Editing, Foreword (could be in parallel)</b>																			█	█
<b>7. Government approval process. (make sure it's defined as Approval by MOPE's area directors, submission to Perm Secretary or Minister for signature of the foreword, etc)</b>																				





# Contact

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