Climate Technology Needs Assessment in Asia

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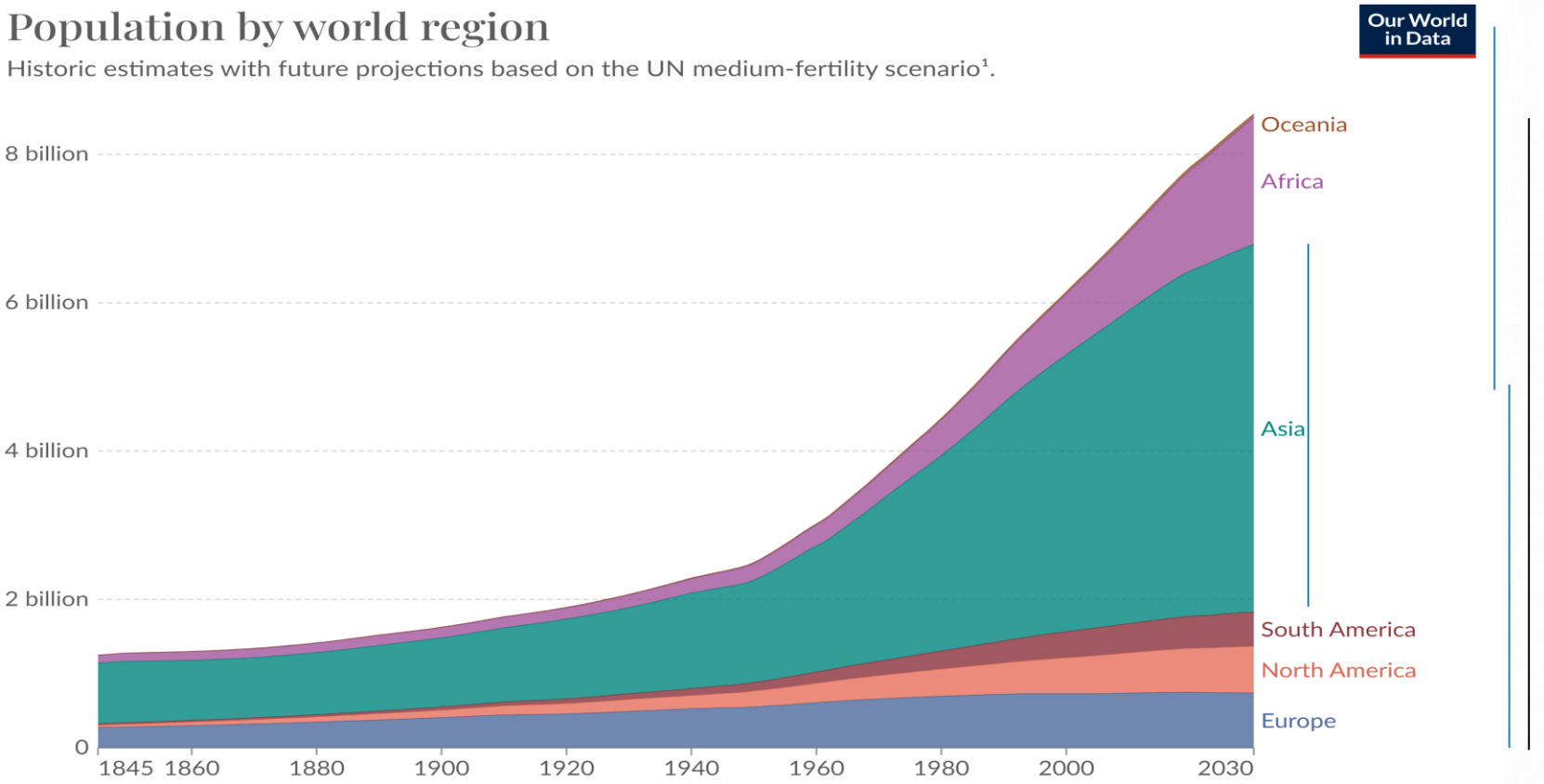
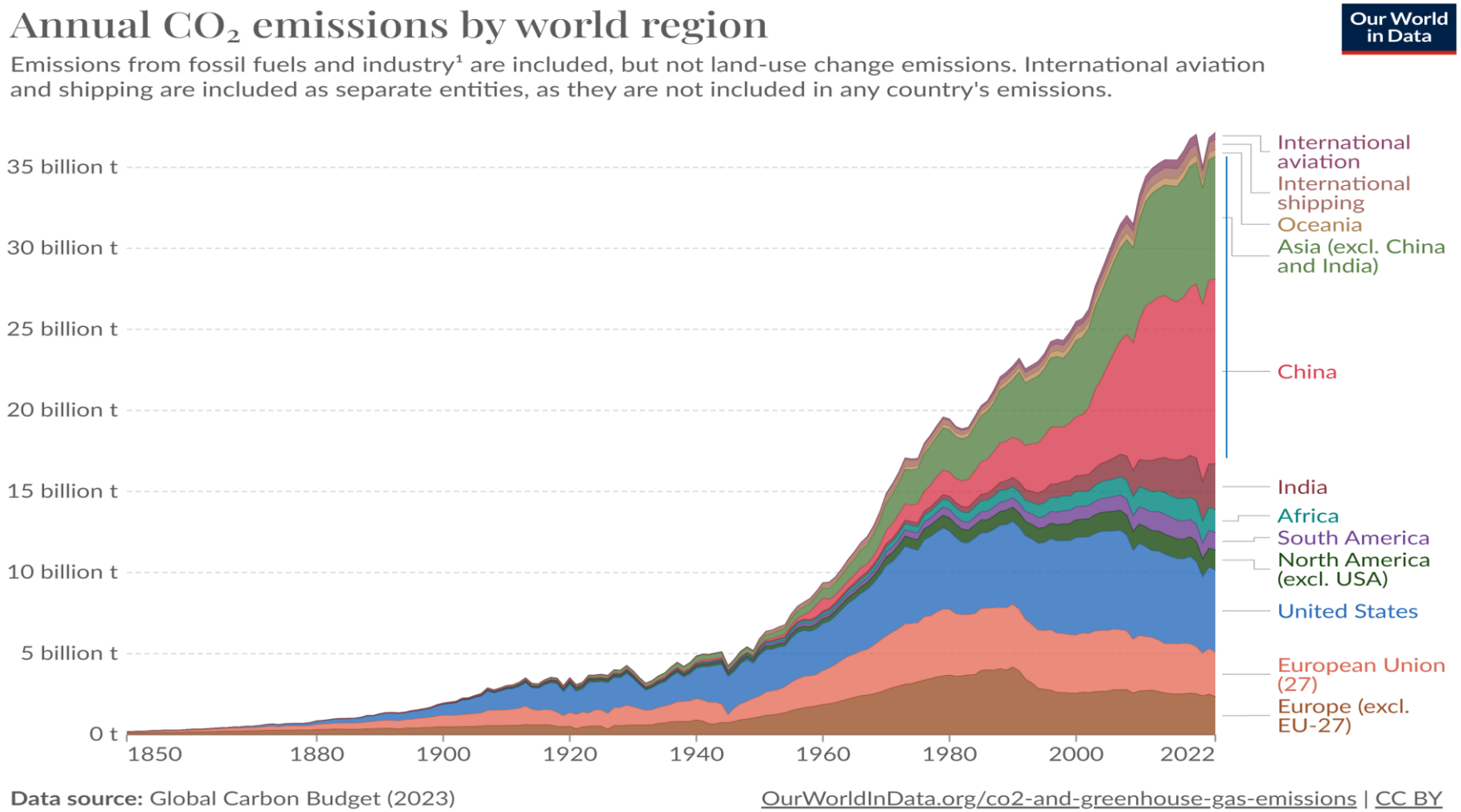
6 February 2024

Population



1. UN projection scenarios: The UN's World Population Prospects provides a range of projected scenarios of population change. These rely on different assumptions in fertility, mortality and/or migration patterns to explore different demographic futures. Read more: Definition of Projection Scenarios (UN)

CO_2 emission by region



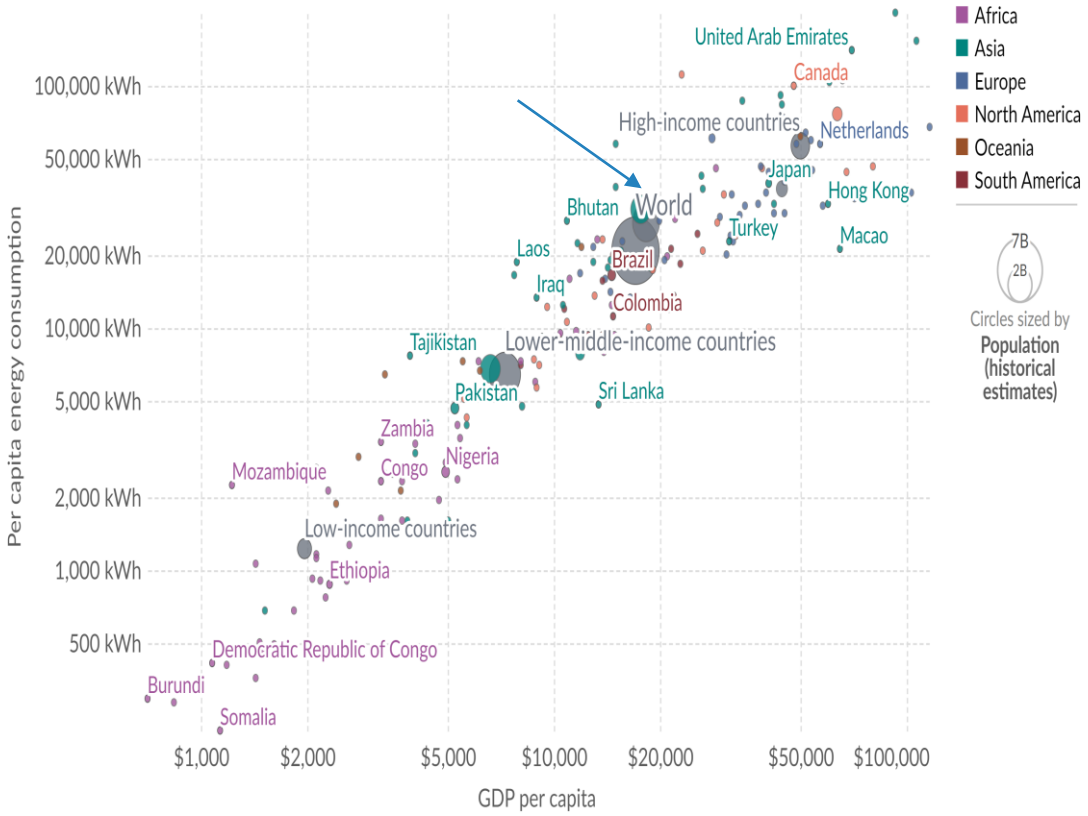
1. Fossil emissions: Fossil emissions measure the quantity of carbon dioxide (CO_2) emitted from the burning of fossil fuels, and directly from industrial processes such as cement and steel production. Fossil CO_2 includes emissions from coal, oil, gas, flaring, cement, steel, and other industrial processes. Fossil emissions do not include land use change, deforestation, soils, or vegetation.

Energy vs GDP, Person

Energy use per person vs. GDP per capita, 2021

Our World in Data

Energy refers to primary energy[1], measured in kilowatt-hours[2] per person, using the substitution method[3]. Gross domestic product (GDP) is adjusted for inflation and differences in the cost of living between countries.



Data source: U.S. Energy Information Administration (2023) and other sources

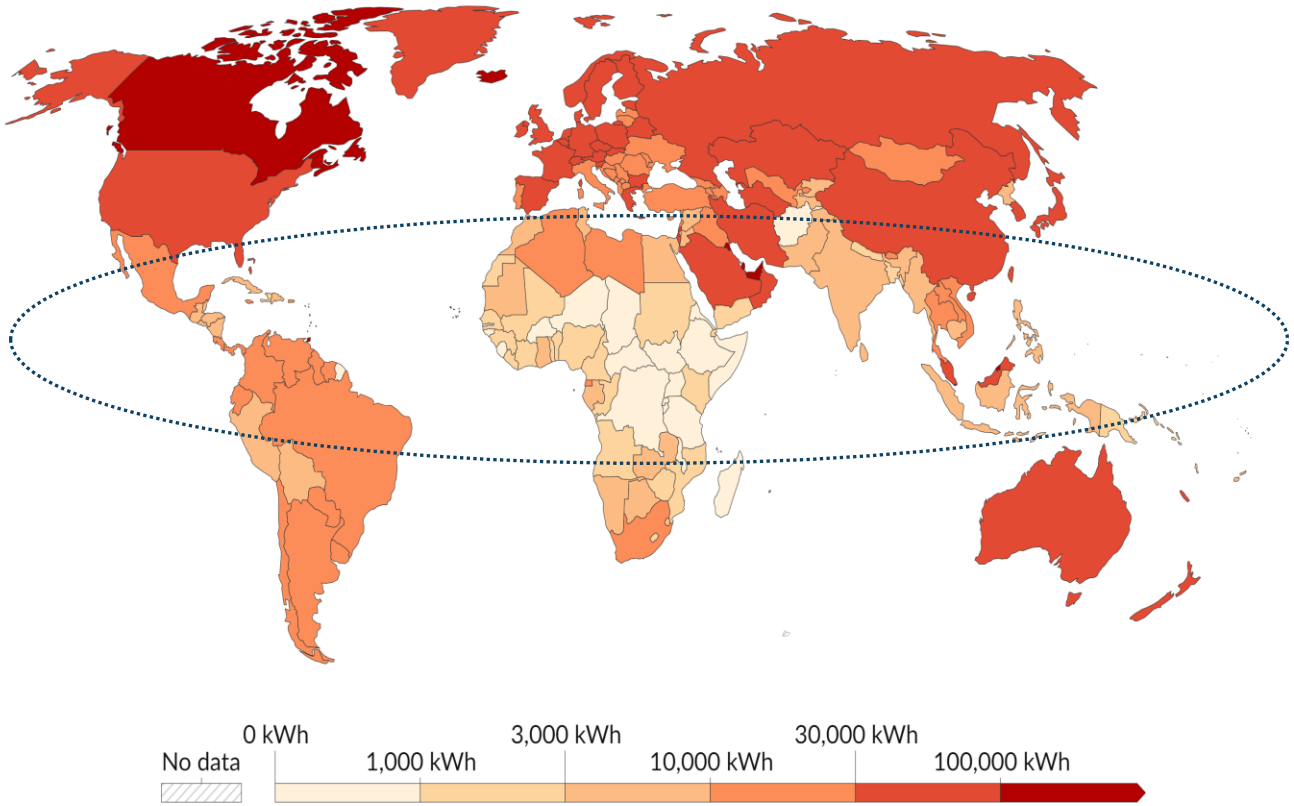
Note: GDP data is expressed in international-$[4] at 2017 prices.

OurWorldInData.org/energy | CC BY

Energy use per person, 2022

Our World in Data

Measured in kilowatt-hours[1] per person. Here, energy refers to primary energy[2] using the substitution method[3].



Data source: U.S. Energy Information Administration (2023); Energy Institute - Statistical Review of World Energy (2023); Population based on various sources (2023)

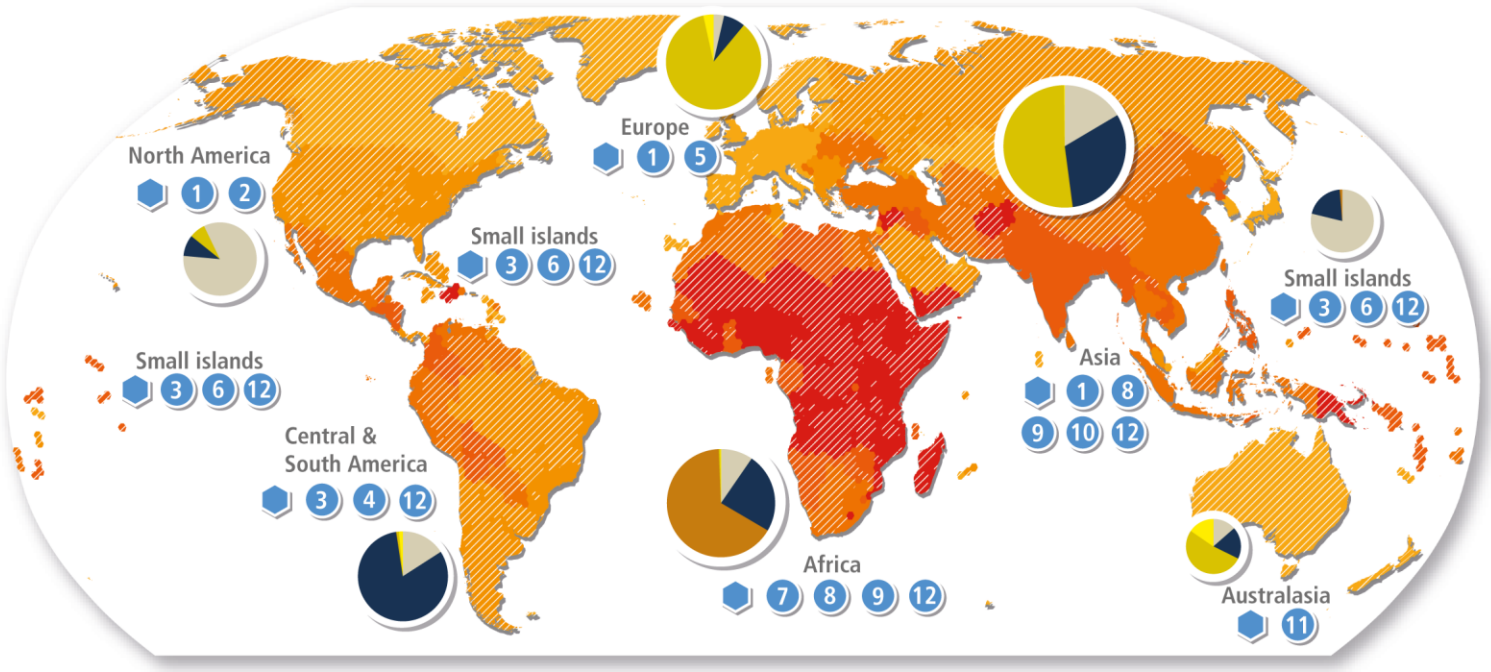
OurWorldInData.org/energy | CC BY

1. **Primary energy**: Primary energy is the energy available as resources – such as the fuels burnt in power plants – before it has been transformed.

1. **Watt-hour**: A watt-hour is the energy delivered by one watt of power for one hour. Since one watt is equivalent to one Joule per second, a

Observed human vulnerability to climate change is a key risk factor and differs globally

Vulnerability at the national level varies. Vulnerability also greatly differs within countries.
Countries with moderate or low average vulnerability have sub-populations with high vulnerability and vice versa.



Relative vulnerability

- Very high
- High
- Medium
- Low
- Very low

Population density

- High
- Low

Examples of Indigenous Peoples with high vulnerability to climate change and climate change responses (4.3.8, 5.10.2, 5.13.5, Box7.1, 8.2.1, 15.6.4) and the importance of Indigenous Knowledge (Box9.2.1, 11.4, 14.4, Cross-Chapter Box INDIG)

Pie charts

Flood | Storm | Drought | Heat | Wild Fires

The size of the pie charts show average mortality per hazard event per region between 2010 and 2020.
The slices of pie charts show the distribution of deaths from a particular hazard.

Source: AR6, Chpat 8: Impacts, Adaptation and Vulnerabilty
https://www.ipcc.ch/report/ar6/wg2/chapter/chapter-8/

Examples of vulnerable local groups across different contexts include the following:

1 | **Indigenous Peoples of the Arctic** | health inequality, limited access to subsistence resources and culture | CCP 6.2.3, CCP 6.3.1

2 | **Urban ethnic minorities** | structural inequality, marginalisation, exclusion from planning processes | 14.5.9, 14.5.5, 6.3.6

3 | **Smallholder coffee producers** | limited market access & stability, single crop dependency, limited institutional support | 5.4.2

4 | **Indigenous Peoples in the Amazon** | land degradation, deforestation, poverty, lack of support | 8.2.1, Box 8.6

5 | **Older people, especially those poor & socially isolated** | health issues, disability, limited access to support | 8.2.1, 13.7.1, 6.2.3, 7.1.7

6 | **Island communities** | limited land, population growth and coastal ecosystem degradation | 15.3.2

7 | **Children in rural low-income communities** | food insecurity, sensitivity to undernutrition and disease | 5.12.3

8 | **People uprooted by conflict in the Near East and Sahel** | prolonged temporary status, limited mobility | Box 8.1, Box 8.4

9 | **Women & non-binary** | limited access to & control over resources, e.g. water, land, credit | Box 9.1, CCB-GENDER, 4.8.3, 5.4.2, 10.3.3

10 | **Migrants** | informal status, limited access to health services & shelter, exclusion from decision-making processes | 6.3.6, Box 10.2

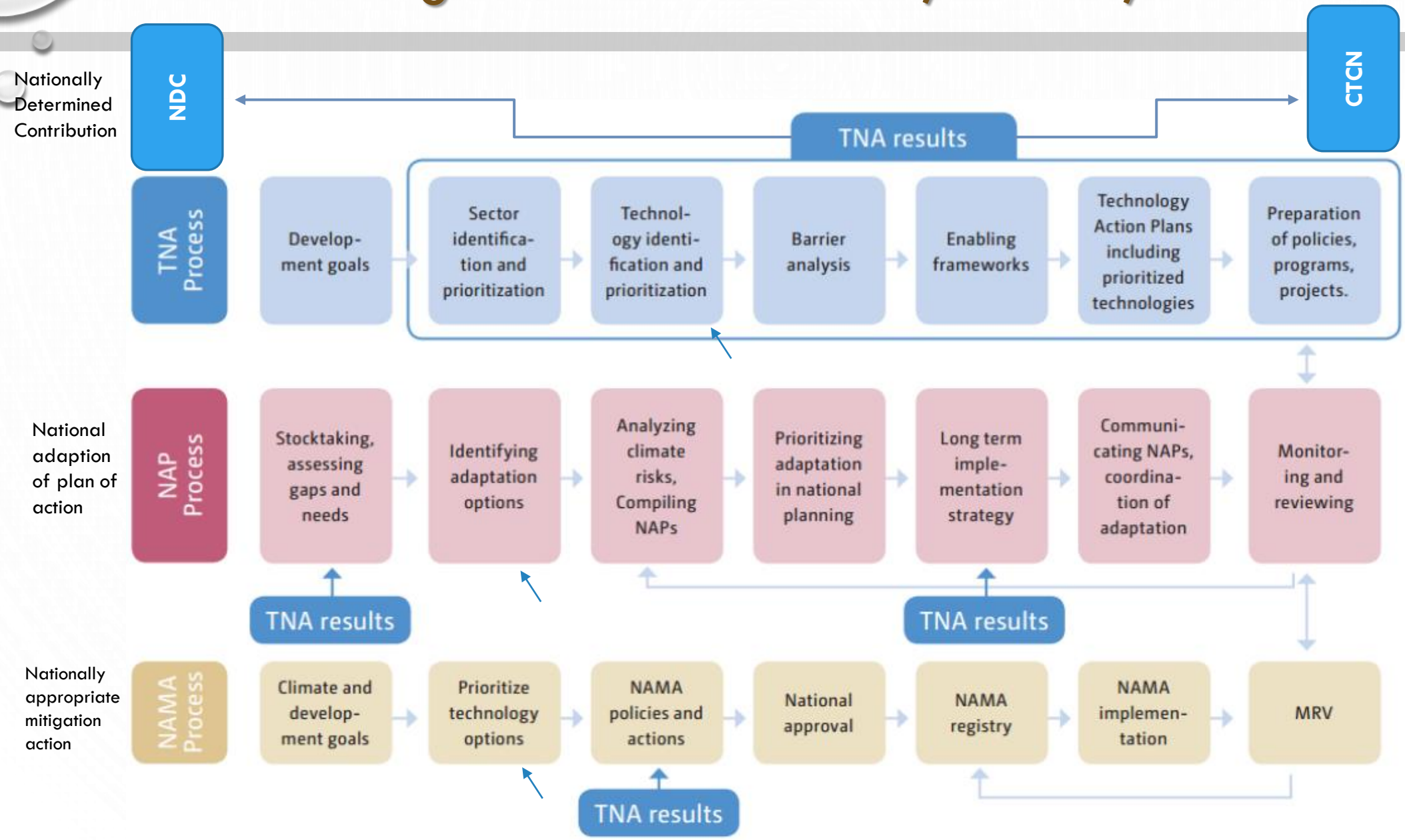
11 | **Aboriginal and Torres Strait Islander Peoples** | poverty, food & housing insecurity, dislocation from community | 11.4.1

12 | **People living in informal settlements** | poverty, limited basic services & often located in areas with high exposure to climate hazards | 6.2.3, Box 9.1, 9.9, 10.4.6, 12.3.2, 12.3.5, 15.3.4

Climate change mitigation and adaptation enablers

- Technology (sector-wise R &D for appropriate technology, technology transfer)
- Finance (international/national cooperation, carbon pricing, insurance, risk assessment/ transfer mechanisms)
- Information (EWS, inclusive decision making)
- Capacity building (awareness, community engagement, skills, vulnerable people)
- Policy (regulatory frameworks)
- Governance
- … …

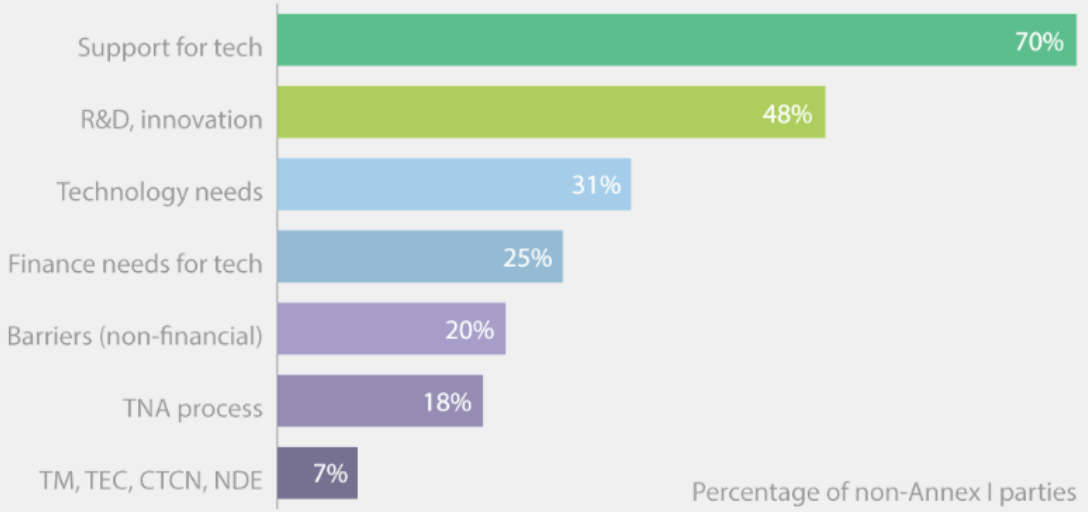
Linkage of TNA with NAP, NAMA, NDC



Countries' commitments
Nationally Determined Contributions (NDCs)

- NDCs: country's efforts to reduce national emission and adapt to CC impacts. NDCs are at core of Paris Agreement and the achievement of these long-term goals to keep temp rise ideally below 1.5^{0}C.
- Of the 190 Parties that submitted an INDC, more than 75 per cent mentioned technology. Approximately 25 per cent of Annex I Parties referred to technology, generally in the context of R&D and innovation to support national action. **Nearly 140 developing countries mentioned technology in their INDCs, representing approximately 95% of all developing countries**.
- **More than 100 developing countries expressed the need for international support for technology development and transfer to implement their national plans. Nearly one-third mentioned specific climate technology needs, with one-fifth (26 countries) referring to technology needs assessments (TNAs).**

Technology themes which developing countries often raised in their INDCs included support for technology; research, development and innovation; technology needs; finance needs for tech; non-financial barriers; technology needs assessment process.



https://unfccc.int/ttclear/tna/ndcs.html

INDCs are post-2020 climate actions COP (countries) intended to take under the new international agreement at Conference of the Parties (COP21) in Paris in December 2015 - aiming to achieve the long-term goals of the Paris Agreement, i.e. to hold the increase in global average temperature to well below 2°C, to pursue efforts to limit the increase to 1.5°C, and to achieve net zero emissions in the second half of this century.

Climate Technology Needs Assessments [TNAs]

- Understanding climate technology needs is the starting point for effective actions (for mitigation / adaptation) on climate change.
- TNAs strongly emphasized in the Paris Agreement, and they play a central role in the newly agreed UNFCCC Technology Framework, which provides overarching guidance to the UNFCCC's Technology Mechanism activities

TNAs - *set of country-driven activities that identify mitigation and adaptation technology priorities of developing countries to mitigate greenhouse gases and adapt to adverse impacts of climate change*

Regional Centers

- ENDA Energie Environnement Développement, Senegal [**Africa**]
- Fundación Bariloche, Argentina [**Latin America and Caribbean**]
- AIT [**Asia**],
- USP (**Pacific region**)

TNA participating countries

THE GLOBAL TECHNOLOGY NEEDS ASSESSMENTS PROJECT, PARTICIPATING COUNTRIES

2009-2013

34 COUNTRIES

Africa and Middle East: Ivory Coast, Ghana, Kenya, Lebanon, Mali, Mauritius, Morocco, Rwanda, Senegal, Sudan, Zambia

Asia and CIS: Azerbaijan, Bangladesh, Bhutan, Cambodia, Georgia, Indonesia, Kazakhstan, Lao PDR, Moldova, Mongolia, Nepal, Sri Lanka, Thailand, Vietnam

Latin America and Caribbean: Argentina, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guatemala, Peru

2015-2018

24 COUNTRIES

Africa and Middle East: Burkina Faso, Burundi, Egypt, Eswatini, Gambia, Jordan, Madagascar, Mauritania, Mozambique, Seychelles, Tanzania, Togo, Tunisia

Asia and CIS: Armenia, Kazakhstan, Lao PDR, Pakistan, Philippines

Latin America and Caribbean: Belize, Grenada, Guyana, Honduras, Panama, Uruguay

2018-2022

22 COUNTRIES

Africa: Benin, Central African Republic, Chad, Djibouti, Guinea, Niger, Liberia, Malawi, São Tome and Principe, Uganda

Eastern Europe: Ukraine

Asia and Pacific: Afghanistan, Fiji, Myanmar, Nauru, Vanuatu

Caribbean: Antigua & Barbuda, Dominica, Haiti, Jamaica, Suriname, Trinidad & Tobago

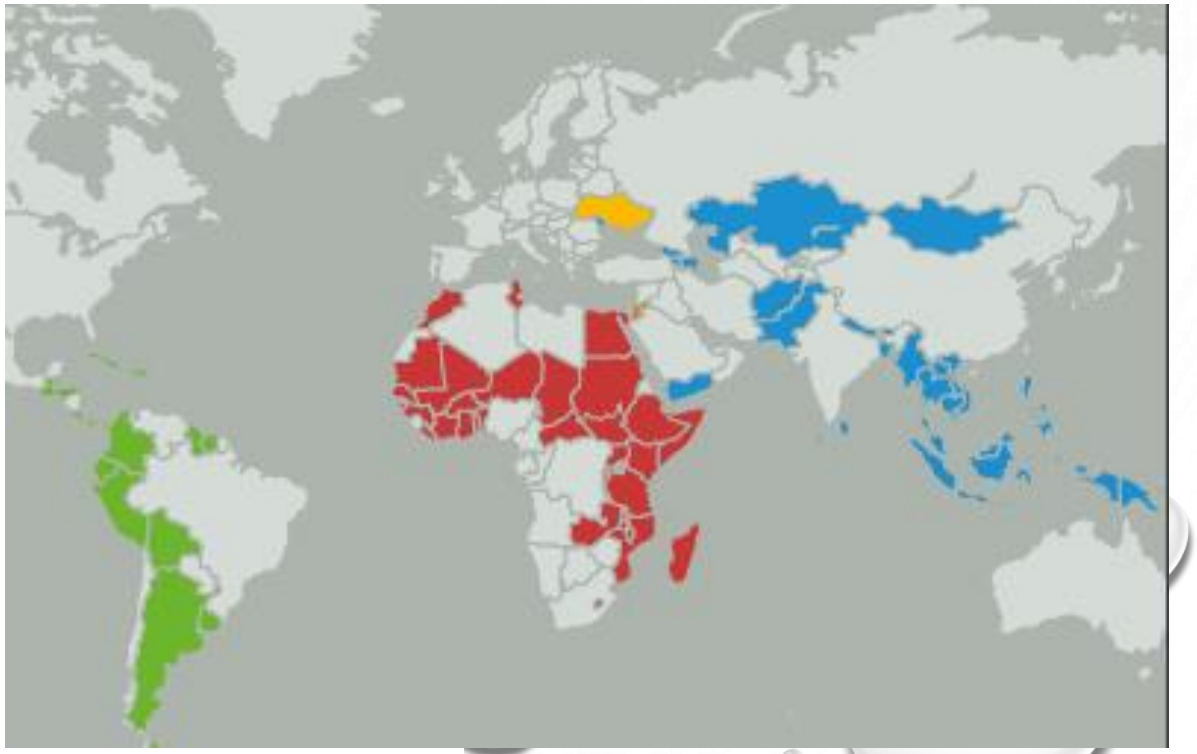
2020-2023

17 COUNTRIES

Africa: Comoros Union, Ethiopia, Guinea-Bissau, Lesotho, Somalia, South Sudan

Asia and Pacific: Kiribati, Maldives, Niue, Papua New Guinea, Solomon Islands, Timor-Leste, Tonga, Tuvalu, Yemen

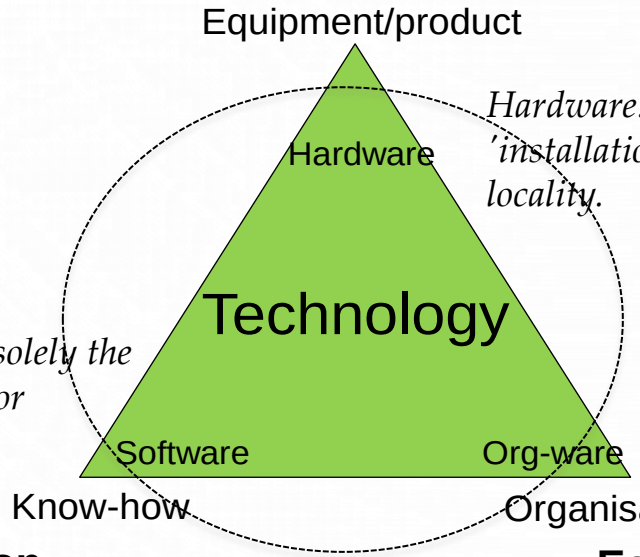
Caribbean: Bahamas, St. Kitts & Nevis



What is a climate technology?

1) Solar home systems,
2) Drip irrigation
S: system design, operation
O: ownership, repair

Technology: *a piece of equipment, technique, practical knowledge or skills for performing a particular activity* (IPCC, 2000)



Hardware: component of technologies that require the transfer and 'installation' of physical material from sources outside the targeted locality.

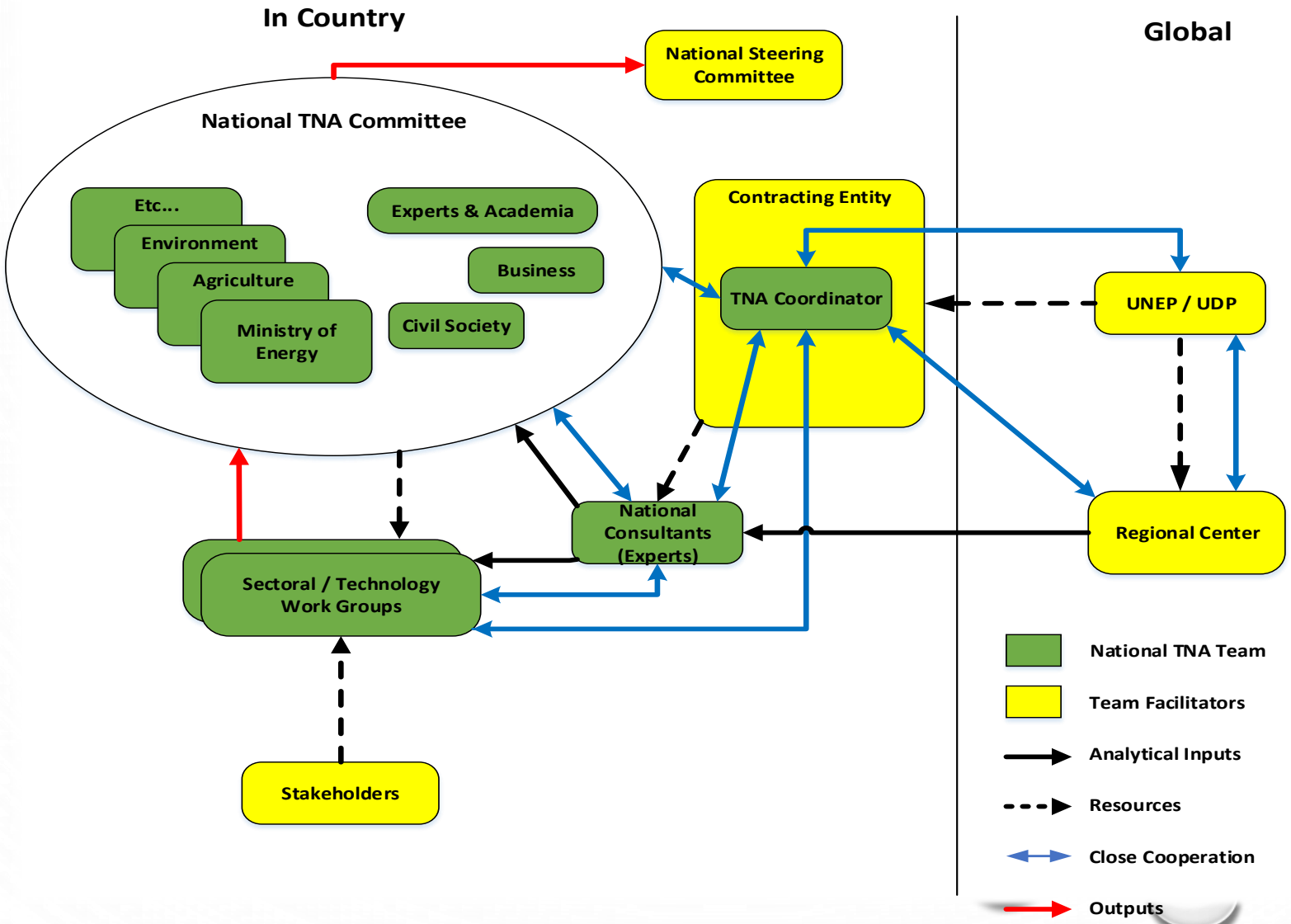
***Software**: …that involve solely the transfer of knowledge and/or practice*

***Orgware:** … that involve the re-organization or establishment of social networks and/or institutions.*

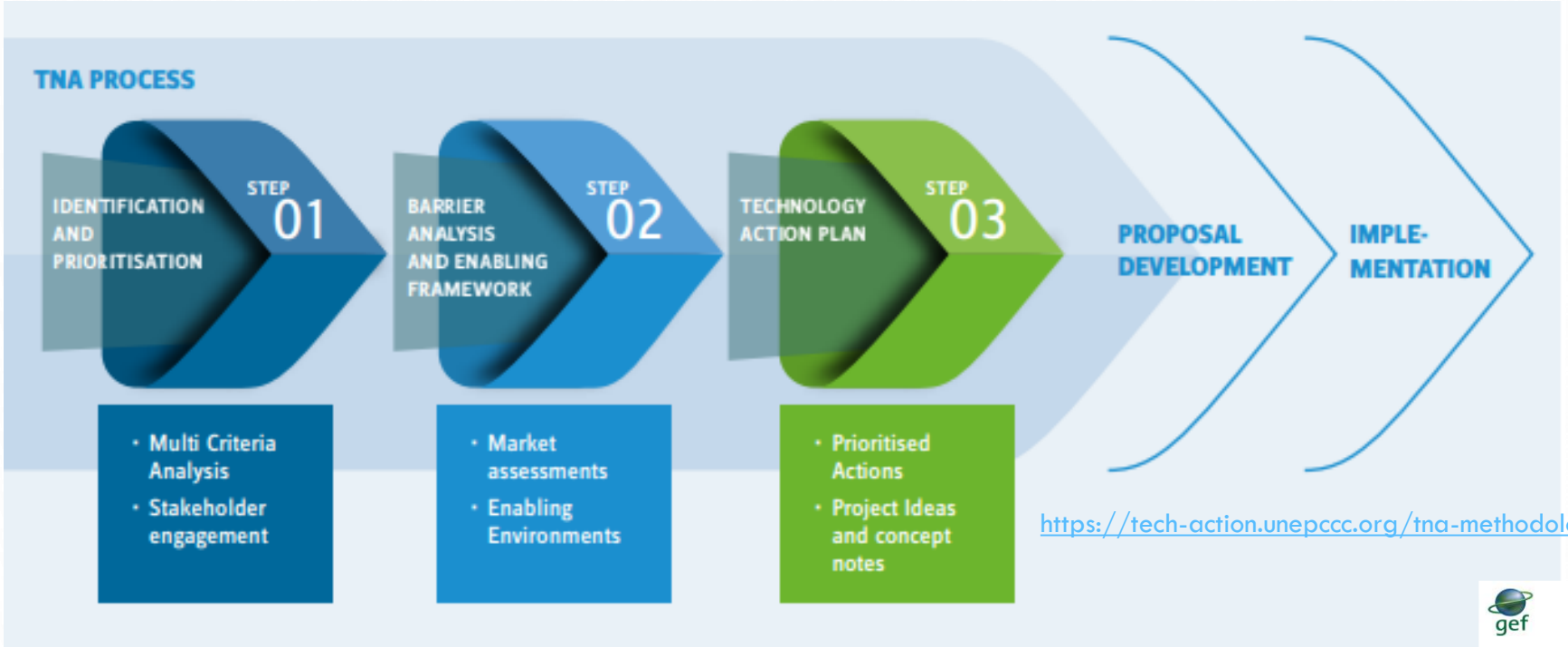
1) New crop rotation
2) Zero tillage
S: knowledge,
O: farm management practice

Early warning system
S: data handling, analysis (Land use planning)
O: institutional setup, decision support

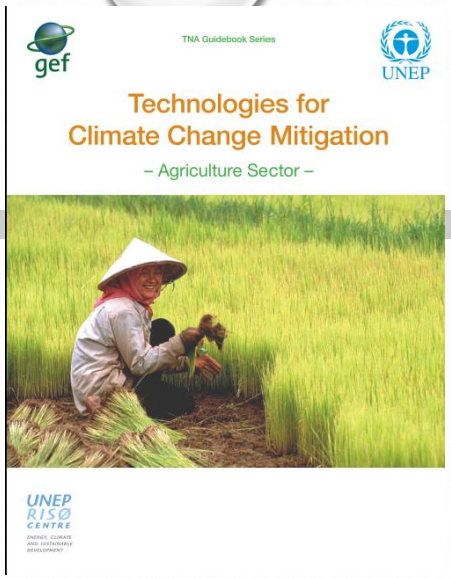
How was it done?
TNA Institutional arrangements for implementation

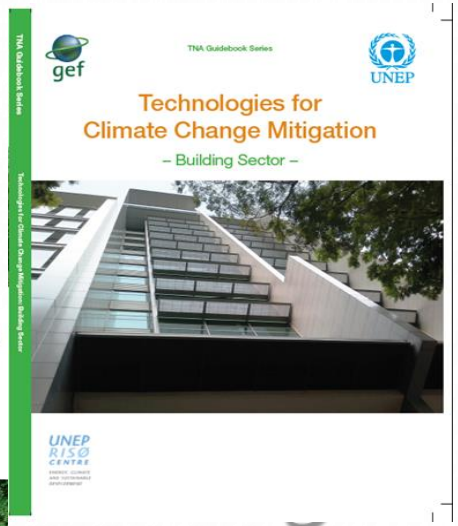


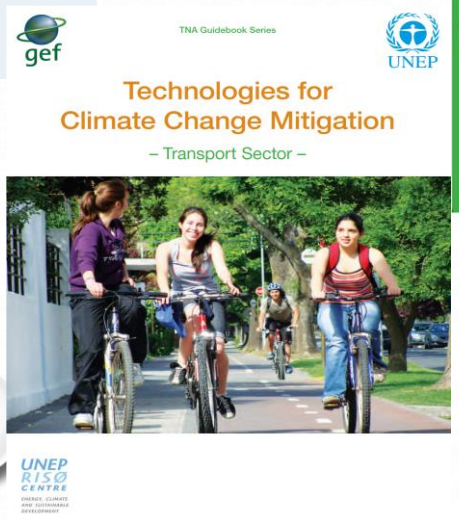
TNA Methodology



https://tech-action.unepccc.org/tna-methodology/







TNA Objectives

1. To **identify and prioritise** mitigation/adaptation technologies for selected sectors/sub-sectors
2. To identify, analyse and address **barriers** hindering the deployment and diffusion of the prioritised technologies including enabling the framework for the said technologies
3. To articulate, based on the inputs obtained from the two previous steps, a **Technology Action Plan (TAP)** with suggested actions presented in terms of project ideas

Step 1: Identification and Prioritization

Objective

- to select a few technologies for market analysis and eventual inclusion in the technology action plan

Inputs

- review of existing planning documents (ndc, nap, tna, napa, national communications, energy plans, renewable energy plans, etc)
- stakeholder experience and knowledge
- information from technology database (techwiki)
- multi criteria analysis (MCA) conducted by groups of informed stakeholders
  - contribution to development goals (poverty, social, environment)
  - economically competitive compared to the baseline
  - significant reduction potential
  - industrial development, employment

Technology Fact Sheet (TFS)

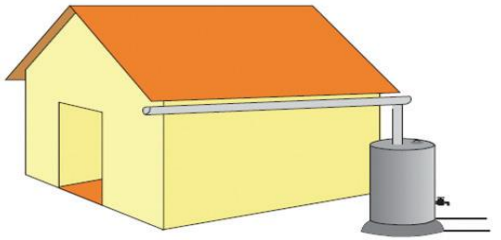
A sheet/document that synthesizes essential information for each priority technology within the context of the country

S. No	Heading	What is expected?
1	Introduction	What is the topic?
		Some details on its origin
		why it is considered for TFS?
		How this technology can contribute to GHG mitigation?
		Which sector(s) can this contribute
		Overview of GHG profile of that sector.
		What technology can it replace or reinforce
		What are its advantages?
2	Feasibility of technology and operational necessities	Description of the technology
		What is the input required? Status of these inputs
		Is the technology feasible in developing countries?
		Capacity requirements
		Examples of successful implementation of technologies if any.
3	Status of the technology and its future market potential	Trend of the technology development
		Capacity (technology, MW, etc) changes over the years
		Where this has potential
		Why it has the potential?
		Implementation assumption of the technology (if the technology is new), For example by 2020 the share of Technology A will be XX%.
4	How the technology could contribute to socio-economic development and environmental protection	What are its potential impacts on SD – social, environmental and economics (if qualitative/quantitative data is available)
5	Financial requirements and costs	Investment costs (with capacity)
		Operational and Maintenance costs
		GHG reduction cost
		Payback period, etc
6	Barriers to further deployment or development	What are the barriers? – financial, technological, institutional, policy, awareness
		How has this being addressed in countries? Why?
7	CDM market status	Information on where to apply for CDM technologies for the particular technology.
		Latest information on number of projects related to the technology in CDM pipeline
8	References	recent

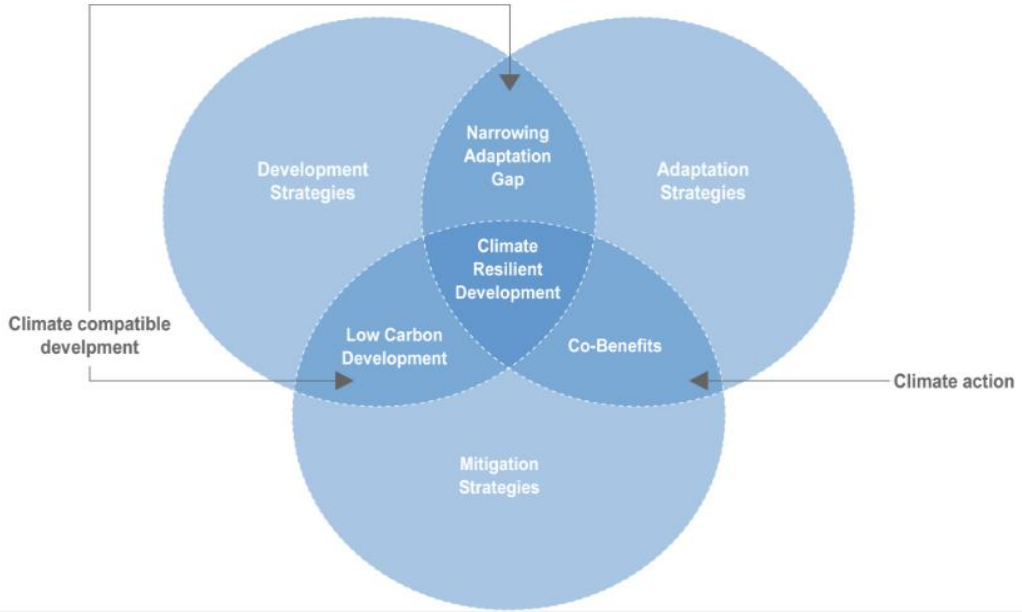
Example: Rainwater harvesting

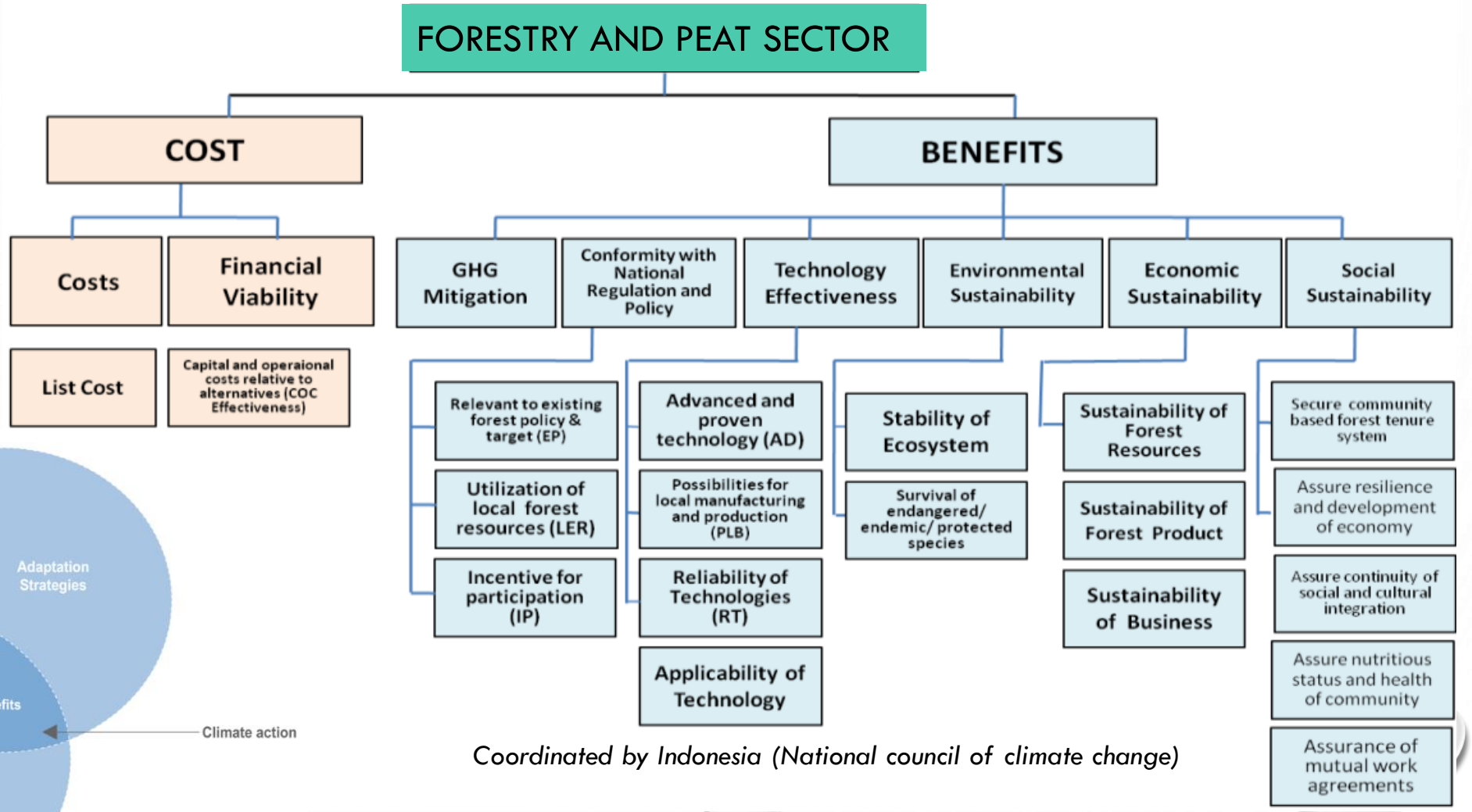
Technology: Rainwater Harvesting from Rooftops	
Technology characteristics	
Introduction	Storage of rainwater can provide short-term security against periods of low rainfall and the failure or degradation of other water supplies. RWH from rooftops into storage containers has been continuously practiced in parts of Africa and Asia for thousands of years. In societies where RWH is a common part of water practices, simple household RWH can be practiced effectively with little training or capacity building. RWH contributes to climate change adaptation at the household level primarily through two mechanisms: (1) diversification of household water supply; and (2) increased resilience to water quality degradation. It can also reduce the pressure on surface and groundwater resources (e.g. the reservoir or aquifer used for piped water supply) by decreasing household demand and has been used as a means to recharge groundwater aquifers. Another possible benefit of rooftop RWH is mitigation of flooding by capturing rooftop runoff during rainstorms. RWH is popular as a household option as the water source is close to people, so it is convenient and requires a minimum of energy to collect it. An added advantage is that users own, maintain, and control their system without the need to rely on other members of 'the community' or other stakeholders. • Low cost • Easy accessible technology
Institutional and organizational requirements	Basic RWH involves collection, management and use by individual households and there are few if any institutional requirements. However, storage containers usually show strong economies of scale. Therefore, groups of households can often benefit by directing rainfall to one or larger, shared storage containers.
Operation and maintenance	Operation and maintenance consists primarily of simple cleaning and basic repairs. However, some training for households, especially related to protecting water quality (e.g. first flush methods, filtration) and budgeting rainwater are likely to lead to improved outcomes.
Endorsement by experts	In the last two decades, interest in rainwater harvesting has grown. Its utilisation is now an option along with more 'traditional' water supply technologies, particularly in rural areas in developing countries.
Adequacy for current climate	Fits well, both for present and expected climate
Size of beneficiaries group	Several households may share one medium to large tank. One household may use one small tank.

Costs	
Cost to implement adaptation options	If a household already has a suitable hard roof for use as a catchment surface, storage containers are the major expense. The cost of storage containers typically depends on construction quality, tank size, and other factors. A large, high quality storage container can be a major investment for poor households. The storage capacity of the container needs to meet the demand for water during extended dry periods. Investment costs show a considerable range by country mainly due to variations in the price of construction materials. Initial cost per capita is relatively high compared to alternatives (if available) but recurrent costs are relatively low. Economies of scale for storage are high, i.e. the larger the tank the lower the price per cubic metre. Cost per unit established = USD 50 Total costs (10 000 units)= USD 400 000
Additional cost to implement adaptation option, compared to "business as usual" (extra storage capacity)	Additional cost per unit = USD 10 Total additional costs = USD 80 000
Development impacts, indirect benefits	
Economic benefits	
Employment	Creation of jobs to support construction of RWH systems and to provide training to users/households
Investment	Can create investments in production of storage containers
Public and private expenditures	Reduce public and private expenditures associated with water infrastructure.
Social benefits	
Income	It can also provide significant savings for households that are sometimes forced to purchase vended or bottled water The water can also contribute to productive and economic livelihood purposes.
Education	Saved time from fetching water can be used for reading and studying. Improved health improves school attendance
Health	Increases per capita water availability. Lack of water can have serious health effects and allow for the spread of disease and illness if the reductions continue for even modest lengths of time. Stored rainwater is a convenient, inexpensive water supply close to the home. This can greatly decrease the time spent fetching water or queuing at water points. In many settings, RWH can reduce exposure to waterborne pathogens by providing improved potable water quality and high quality water for other household purposes including hygiene, bathing and washing.
Environmental benefits	Promotion of rainwater harvesting will enhance groundwater recharge
Local context	
Opportunities and Barriers	Opportunities for investment in RWH are greatest when it can lead to time and cost savings, in addition to improved water quality and health gains. Conditions are most favorable for household RWH when other water sources are: far from the home, of degraded quality, unreliable, or expensive. When "hard" (e.g. metal or tile, in contrast to vegetative) roofing is already in use, capital costs are lower, and efficiency and water quality are superior. Barriers to implementation include inadequate or unsuitable (e.g. vegetative) roofing, lack of space for appropriate storage containers, and extreme air pollution. Local supply chains for storage containers and other system components should be in place. Difficult to predict eventual capacity limitations and bad management practices of RWH over a long period.
Status	Present in some areas, lacking in other.
Timeframe	The implementation can start now. Before construction begins, the users are required to prepare the site for construction and collect the sand and gravel required for construction. The construction of a tank is completed during three phases. Each phase of construction lasts approximately two weeks. A carpenter and three assistants provide the technical skills required of the project, while household members/users provide manual labor.
Acceptability to local stakeholders	Easy to accept for all involved stakeholders. However, access to water can be sensitive to national policies and investment priorities.



Technology prioritization criteria [*example from Indonesia*]





Coordinated by Indonesia (National council of climate change)

Step 2: Barrier analysis and enabling framework

Barrier analysis - objective

- to analyse market conditions for the each selected technology and to identify barriers for enhanced deployment

Methodology

- facilitated workshops with sectoral and technology working groups (5-10 stakeholders)

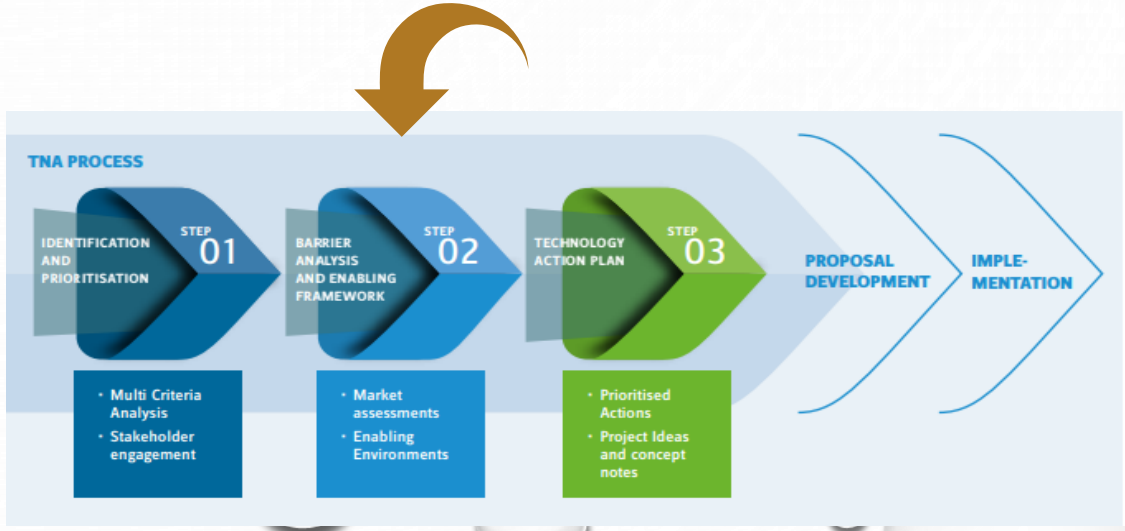
Output - barriers prioritized and grouped into main categories. for example:

- institutional
- legal
- technical

Enabling Framework - objective

- Find possible solutions to address barriers

- **Possible solutions**
  - Economic incentives
    - Tax exemptions, smart subsidies, cheap financing
    - Governmental finance schemes
  - Institutional changes
    - Energy efficiency, renewable energy (funding agencies)
    - Flood control, coastal zone management (regional, national)
  - Legal changes
    - Standards, Building codes, lighting standards
    - Power purchase agreements



Step 3: Technology action plan

TAP: a concise plan for the transfer of the prioritized technologies that will contribute to achieve national targets for climate change mitigation and adaptation and overall development (range from single project to large scale)

Objective:

- translates the TNA and BAEF reports into implementable actions
- builds a bridge between national climate change policy and sectoral development plans
- prepares a pipeline of project ideas, e.g. for GCF and other funds
- funding

TAP Process

Step 1	Step 2	Step 3	Step 4	Step 5	Step 6	Step 7
Ambition for the TAP	Actions and activities for the TAP	Identify stakeholders and determine timelines	Capacity needs and cost estimates	Management planning	Reporting	Tracking the implementation status of TAPs
1.1 Proposed scale of technology transfer	**2.1** Summary of measures to overcome technology barriers **2.2** Select actions for TAP **2.3** Identify activities to implement actions	**3.1** Identify stakeholders for TAP implementation **3.2** Schedule actions and activities	**4.1** Capacity building requirements for implementation of TAP **4.2** Estimating costs of actions and activities	**5.1** Risks and contingency planning **5.2** Next steps	**6** Collect the TAP tables	**7.1** Why track TAP implementation **7.2** Who reports **7.3** What to report **7.4** How to report

Guidance materials to conduct TNA

- **TNA guidebook**
  - TNA step by step
  - Guidance for a gender-responsive TNA
  - Overcoming barriers to the transfer and diffusion of climate technologies
  - Enhancing Implementation Of Technology Needs Assessments
  - Identifying and prioritising technologies for climate change adaptation
  - Identifying and prioritising technologies for mitigation
  - Identification and Engagement of Stakeholders in the TNA Process
  - Evaluating Measures For Inclusion In A Technology Action Plan
  - Indigenous Peoples and Climate Technologies

- **Technology guidebook**
  - Technologies for Climate Change Adaptation – Coastal Erosion and Flooding
  - Technologies for Climate Change Adaptation – Water Sector
  - Technologies for Climate Change Adaptation – Agriculture Sector
  - Technologies for Climate Change Mitigation – Agriculture Sector
  - Technologies for Climate Change Mitigation – Transport Sector
  - Technologies for Climate Change Mitigation – Building Sector
  - Climate technologies in an urban context
  - Report – Taxonomy of Climate Change Adaptation Technology
  - Finance guidebooks

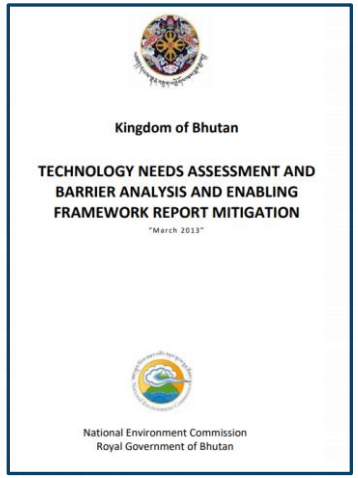
https://tech-action.unepccc.org/tna-methodology/

Project deliverables

I. Technology Needs Assessment report

Adaptation

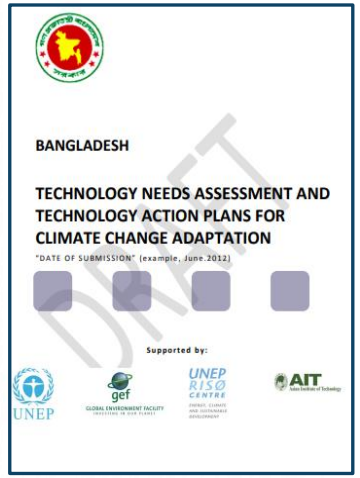
II. Barrier analysis and enabling framework report



Adaptation

III. Technology actions plans

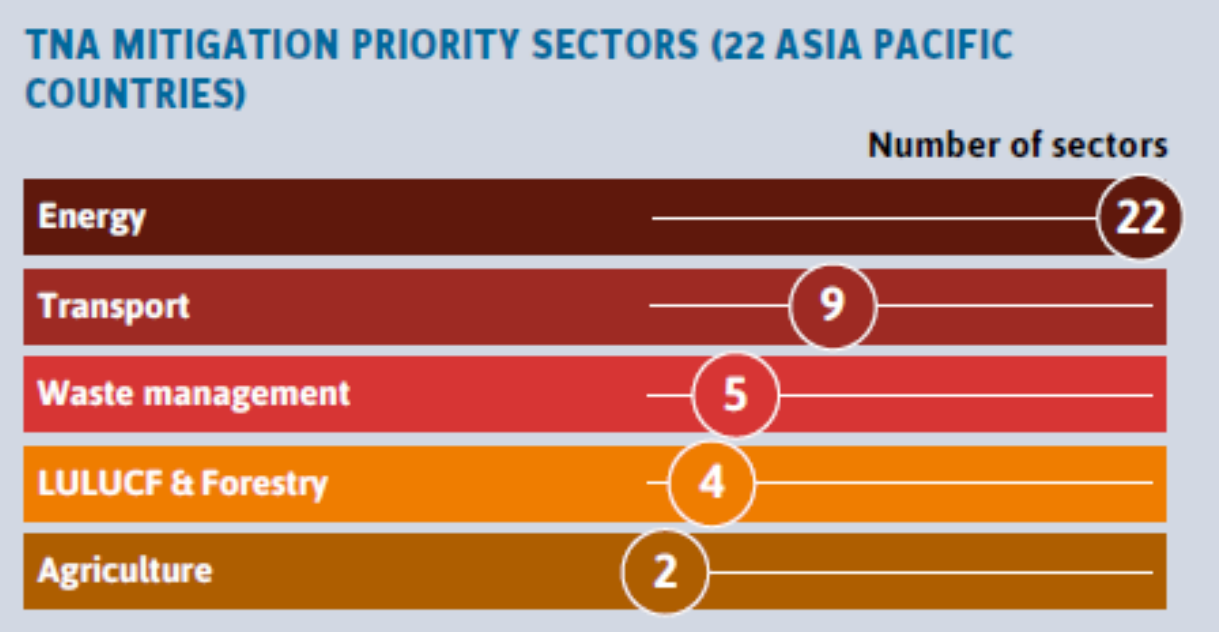
Mitigation

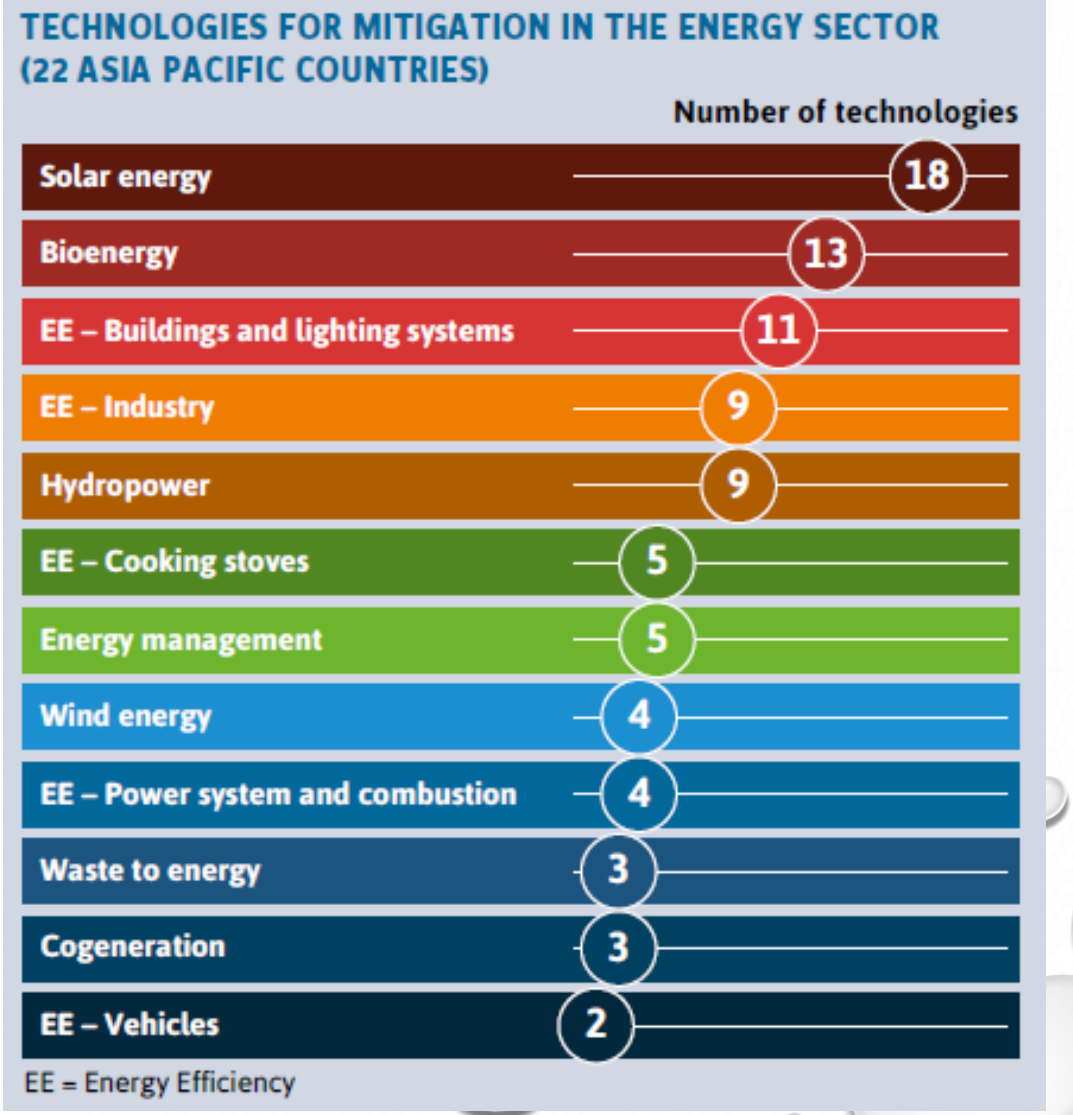


https://tech-action.unepccc.org/

Regional summary

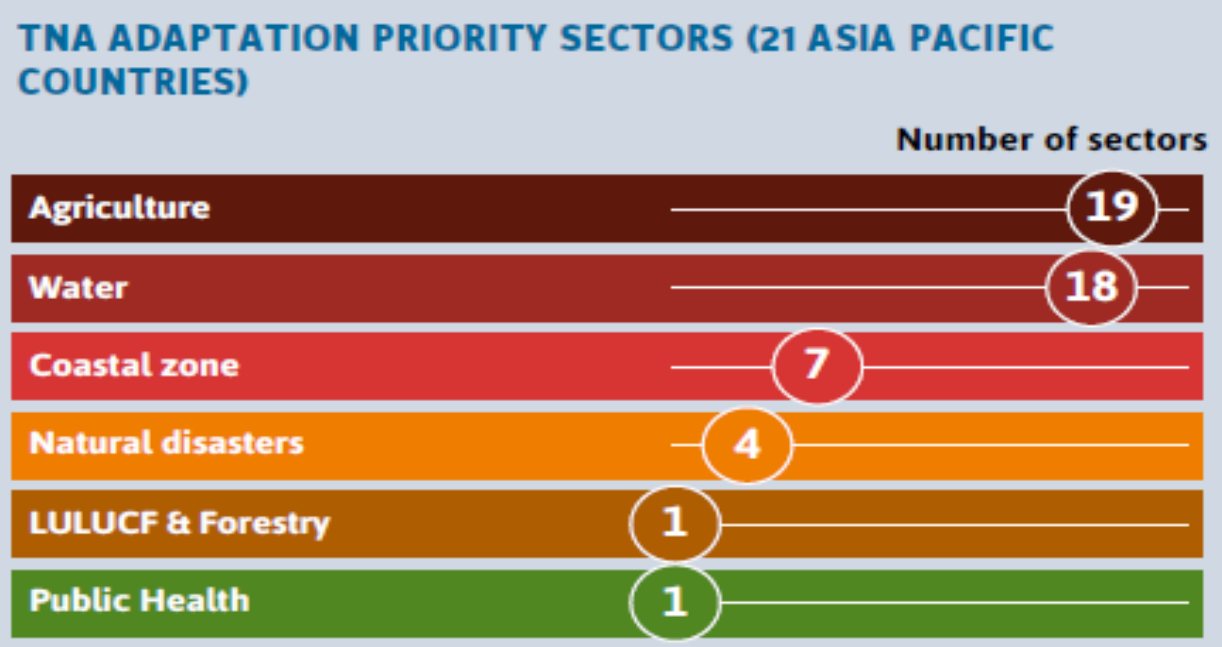
Prioritized Sectors and Technologies for **mitigation** in Asian countries

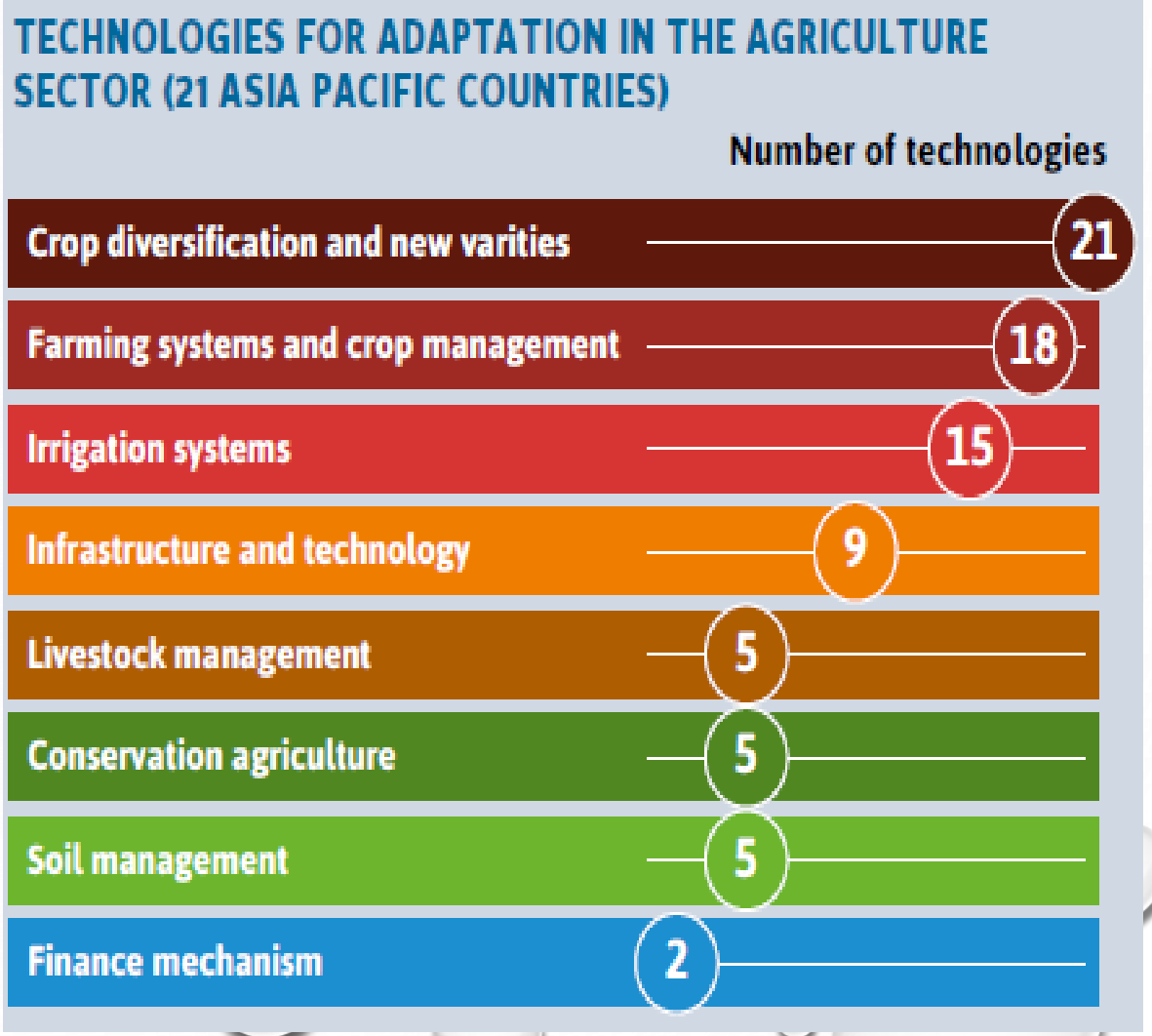




- Almost countries prioritized energy sector
- 41% of the prioritized the transport sector,
- 23% the waste management sector.

Prioritized Sectors and Technologies for adaptation in Asian countries





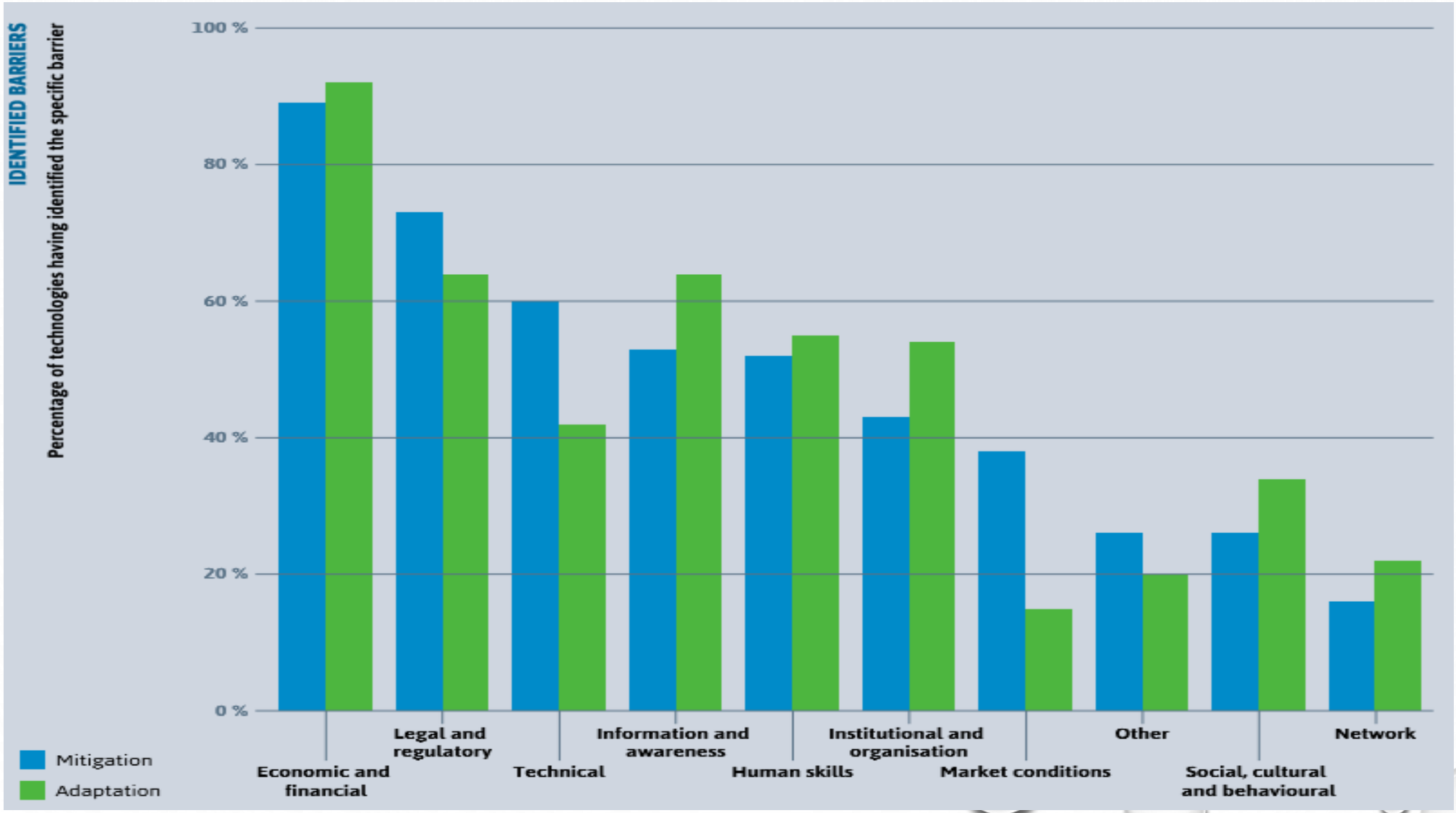
- 90% of countries in the Asia Pacific region prioritized the agriculture sector,
- 86% prioritized the water sector,
- 33% prioritized the coastal zones sector.

Prioritized technologies (Country examples)

Bangladesh (*Coordinating organization:* Ministry of Environment and Forests, MOEF)	
Adaptation	**Mitigation**
Water sector ○ Rehabilitation of existing embankments and dykes, with dredging ○ Tidal barriers (sluice gates) ○ Comprehensive disaster management incorporating early warning systems and involving local communities Agriculture sector ○ Development of drought-tolerant rice varieties ○ Training in improved farming practices for crops, irrigation and water management; soil fertility management (conservation and restoration of soil quality) etc. ○ Establishment of a climate-smart Agriculture Technology Dissemination Center	Power generation sector ○ Natural gas combined cycle ○ Solar home photovoltaic ○ Advanced natural gas combined cycle ○ Integrated Gasification Combined Cycle, single unit Power use sector ○ Compact fluorescent lamp ○ Linear fluorescent lamp
Bhutan (National Environment commission)	
Water resources sector ○ Efficient irrigation methods Agriculture sector ○ Development of drought-resistant and pest-resistant crop varieties Natural disasters and infrastructure sector ○ Climate-resilient roads	Solid waste disposal on land sector ○ Composting Transport sector ○ Intelligent transport system Manufacturing industries and construction sector ○ Waste heat recovery

Myanmar (Environmental conservation department)	
Agriculture ○ Solar powered drip irrigation technologies in cash crop production and plantation ○ Conservation Agriculture (CA) technology for sustainable rain fed agriculture lands ○ Improvement of “Salinity tolerance rice varieties” in coastal and inland salinity areas Water ○ Renovation and improvement in village ponds and tube wells ○ Water resources management for disaster management in river basin areas ○ Solar-powered desalination and purification technology in coastal areas	Energy ○ Solar Mini Grid ○ Replacing incandescent lamps and fluorescent lamps with LED ○ Substitution of Fuelwood with efficient fuel (LPG) at Household Level for cooking Industry ○ Energy Efficient Boiler ○ Efficient Electric Motor ○ Solar thermal
Nepal (Ministry of Forests and Environment)	
Agriculture sector ○ Livestock management ○ Alternate wetting and drying technologies LULUCF & Forestry ○ Silviculture ○ Short rotation forestry	Energy sector ○ Electric cookstoves ○ Biogas Transport sector ○ Bus Rapid Transit

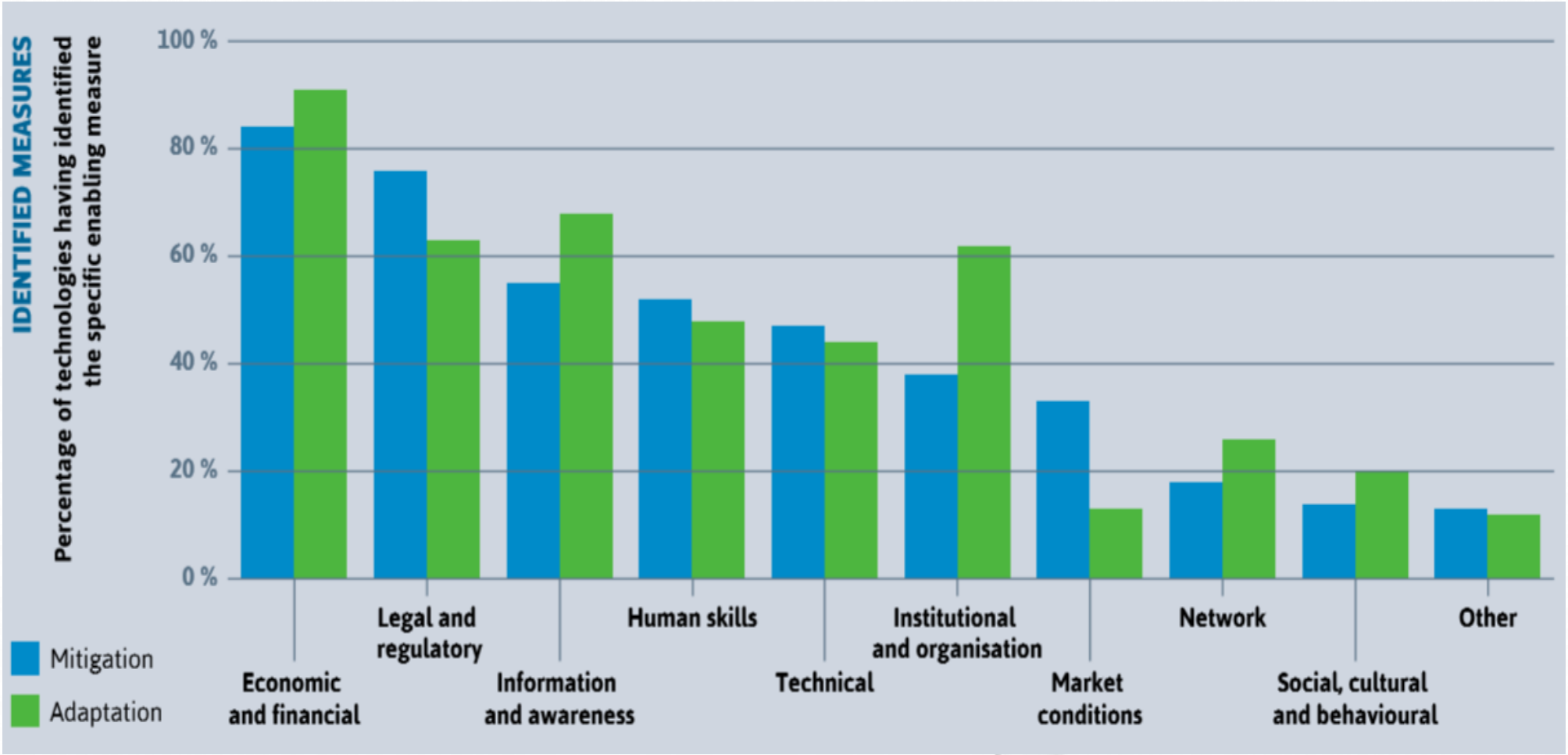
Barriers to technology diffusion



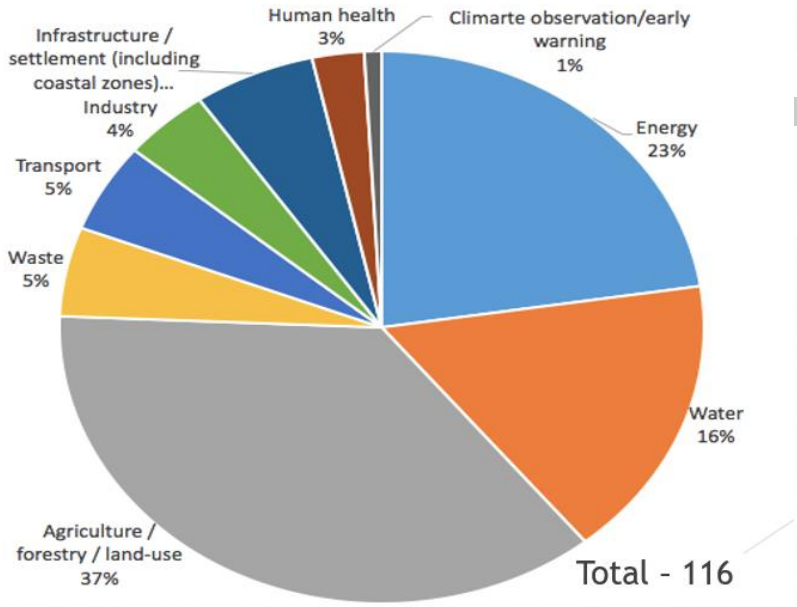
Barriers for implementing technologies

	Technologies / Barriers	Measurement and monitoring of carbon sequestration and emission	Peat remapping	Water mgmt.	No-till soil cultivation	Mini-till soil cultivation	Classic tillage	Sustainable forest mgmt.	Afforestation and reforestation	Rehabilitation of mangrove	Nutrition improvement trough controlled fodder	Wet and dry Irrigation
	Country Acronym [2] -->	ID			MD			VN				
Financial	High upfront cost		•	•	•	•	•				•	•
	Lack of economic tools (subsidies, grants etc.)			•				•	•	•		
	Limited research budget	•	•					•				
	High transaction cost	•										
	High operation and maintenance costs				•	•	•				•	
Technical	Insufficient technology information	•		•	•	•	•		•	•	•	•
	Lack of technical expertise and capacity	•		•								
	Technology not established at the proposed scale		•								•	
Policy, legal and regulatory	No legal and regulatory support	•			•	•	•	•				
	Lack of coordination between key agencies	•	•	•	•	•	•					
Market Failure	Price distortions and dysfunctional value chain				•	•	•					
Social, cultural and behavioral	Consumer preferences and social biases				•	•	•					
Institutional and organizational capacity	Limited public awareness				•	•	•					
	Lack of technical institutions		•		•	•	•					
	Lack of R&D		•									

Enabling environment



TECHNOLOGY ACTION PLANS (TAP)



Bangladesh 20

Energy 7

Water 6

Agriculture/forestry/land-use 7

Bhutan 6

Waste 1

Transport 1

industry 1

Agriculture/forestry/land-use 1

Water 1

Infrastructure/settlement (including coastal zones) 1

Cambodia 8

Energy 2

Transport 2

Water 3

Infrastructure/settlement (including coastal zones) 1

Indonesia 13

Agriculture/forestry/land-use 6

Energy 2

Waste 1

Water 3

infrastructure/settlement (including coastal zones) 1

Mongolia 11

Energy 5

Agriculture/forestry/land-use 6

Sri Lanka 26

Energy 3

Transport 3

Industry 3

Agriculture/forestry/land-use 8

Human health 3

Water 3

Infrastructure/settlement (including coastal zones) 3

Vietnam 20

Energy 4

Agriculture/forestry/land-use 11

Water 3

infrastructure/settlement (including coastal zones) 2

Thailand 9

Agriculture/forestry/land-use 3

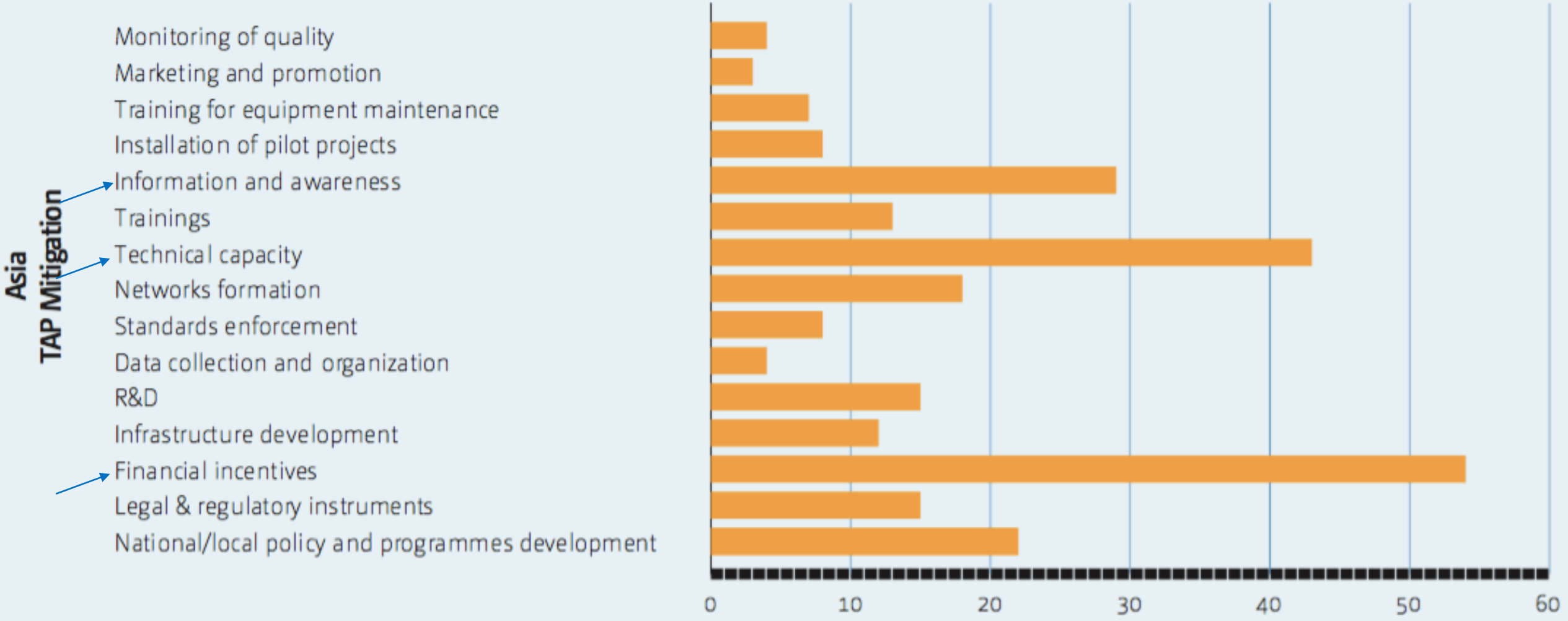
Climarte observation/early warning 1

Energy 3

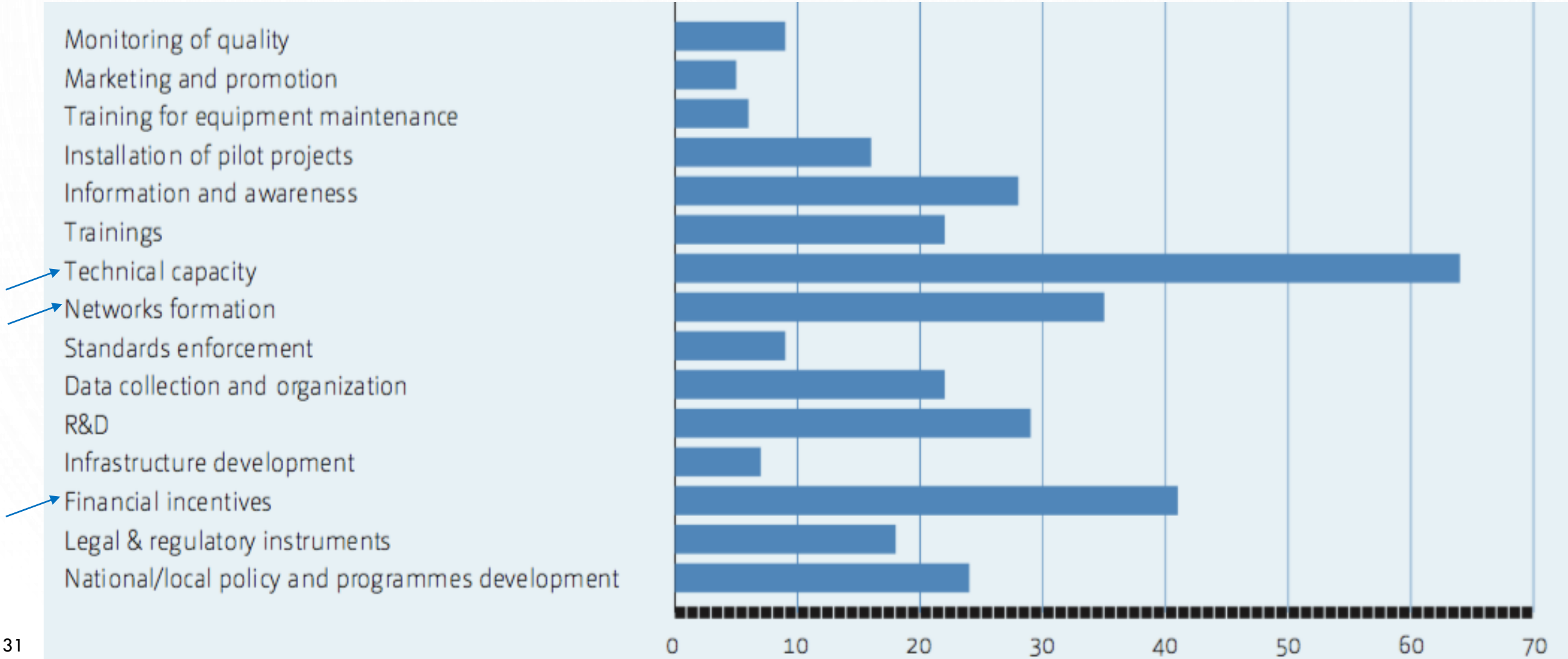
Waste, energy 1

Industry, energy 1

Identified Actions in Mitigation TAPs



Identified Actions in Adaptation TAPs



Financial Needs

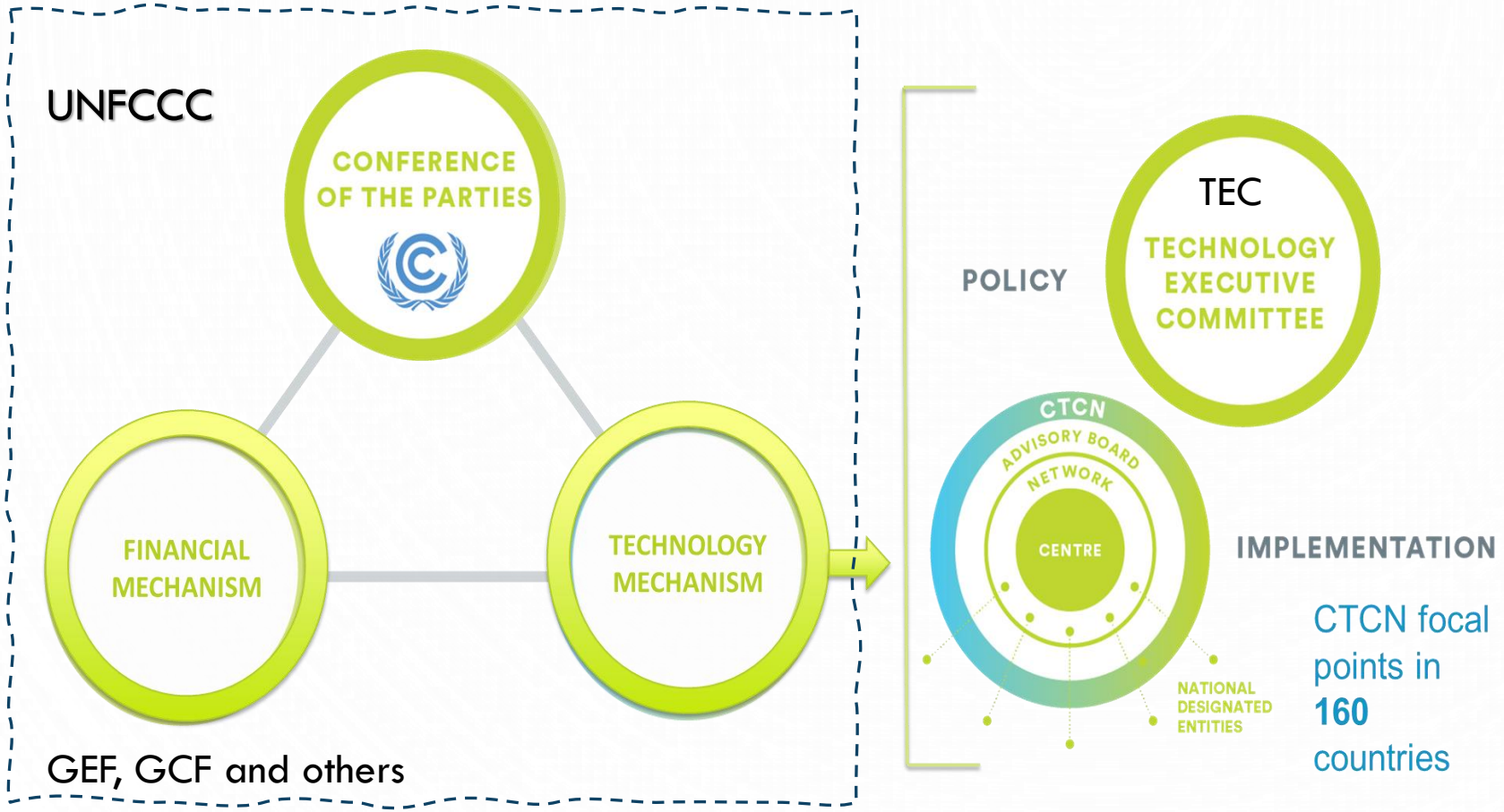
- 16 countries have completed TAPs containing an indicative investment proposal for each technology by potential public and/or private funders.
- total estimated budget for implementing the priority climate technologies amounts to **6.5 billion USD**
  - 5.3 billion for mitigation – 92% in energy sector, 4% in transport, 4% in AFOLU / LULUCF
  - 1.2 billion for adaptation – 81% in agriculture sector, 14% in water sector, 5% in other sectors)

TNA Key findings

- National circumstances played a significant role on which sectors were selected for consideration in the prioritization process.
- 3 major sectors in Asian countries: Energy, AFOLU, Transport.
- Identification of technologies ranged from SPECIFIC to GENERAL. Some technologies were very specific like PV systems, wind systems, BRT and MRT (in energy and transport sector) whereas, some were vague like sustainable forestry management, water management and nutrition improvement (in AFLOU). This is due to
  - Lack of recent data availability cited by Cambodia, Bangladesh, Vietnam and Indonesia. The analysis is based on their national communication report.
  - Need of capacity to conduct the TNA process
- Lack of finance, technical capacity in future, and information are major barriers of technology implementation
- ~6.5 Billion USD needed for 16 countries. Much more in regional level. Cost of adaptation is underestimated (18% of total estimated)

Climate Technology Center and Network (CTCN)

https://www.ctc-n.org/



- Technology mechanism of UNFCCC
- Builds on Technology Needs Assessment (TNAs), technology roadmaps and actions plans
- Help countries implementing their Technology Action Plan (TAP)

CTCN Core services

Mandate: to promote the accelerated development and transfer of climate technologies for energy-efficient, low-carbon and climate-resilient development, at the request of developing countries.

REDUCE GHG EMISSIONS

SERVICE 1
Technical Assistance

SERVICE 2
Knowledge Sharing

SERVICE 3
Collaboration & Networking

STRENGTHEN CLIMATE RESILIENCE

↓ MITIGATION

- Agriculture
- Energy Supply
- Forestry
- Industry
- Transport
- Waste Management

ADAPTATION FUND
Climate Innovation Accelerator
SMALL GRANTS. BIG IMPACT.

ADAPTATION

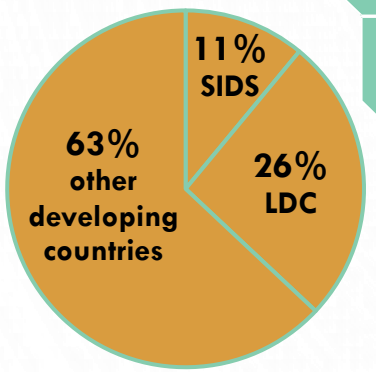
- Agriculture & Forestry
- Coastal Zones
- Early Warning & Environmental Assesment
- Human Health
- Infrastructure, Transport & Urban Design
- Marine & Fisheries
- Water

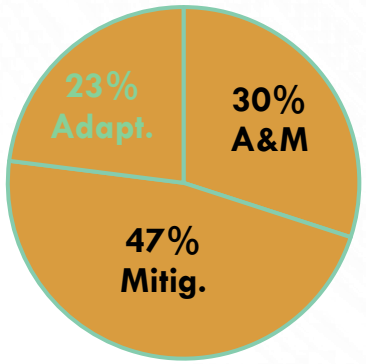
TECHNICAL ASSISTANCE PROJECTS

since 2014

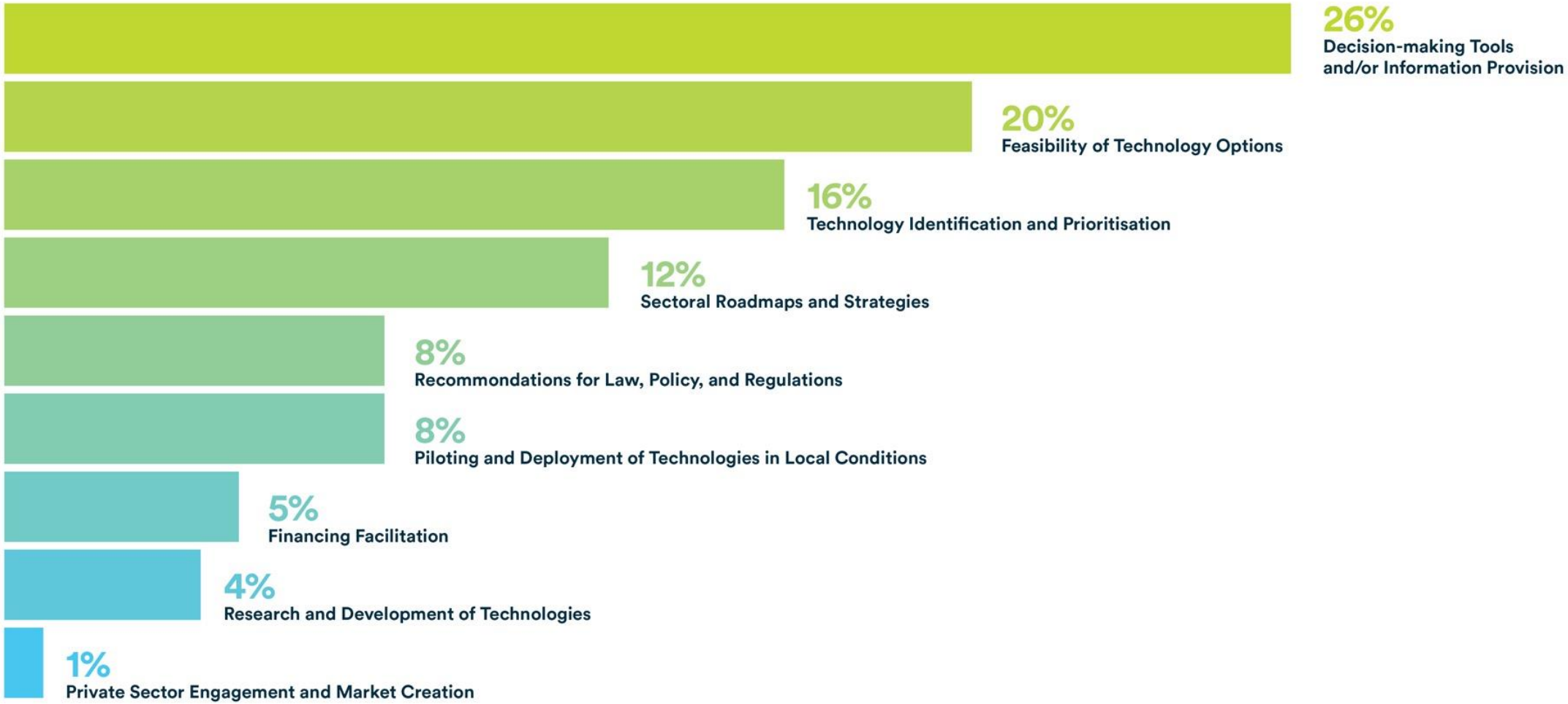
UN environment programme | CTCN UN Climate Technology Centre & Network

Over 360* TA requests received from 107 countries





Distribution of Technical Assistance Requests by Type of Assistance



For further information

- https://tech-action.unepdtu.org/country-profiles/
- https://unfccc.int/ttclear/tna/reports.html
- https://unfccc.int/sites/default/files/resource/sbi2020_inf.01.pdf
- https://unfccc.int/ttclear/misc_/StaticFiles/gnwoerk_static/TNA_key_doc/e247e8710df74cb7b394981905ad8806/292029a852fd48909fc9874a00959a1c.pdf