

**Third synthesis report on technology needs identified by Parties not included in Annex I to the Convention (part 1).**

WTO regional workshop, 11 - 13 November 2014, Hong Kong, China



## 1. Introduction:

- Technology needs assessments are a set of **country-driven activities** that identify the mitigation and adaptation technology priorities of Parties, particularly developing country Parties.
- TNAs present an opportunity to **track an evolving need for new equipment, techniques, practical knowledge and skills** necessary to mitigate GHG emissions and to reduce vulnerability to the adverse impacts of climate change.
- The purpose of TNAs is to **assist in identifying priority technology needs**, which can form the basis for a portfolio of environmentally sound projects and programmes (ESTs) which can facilitate access to, and the transfer of, the ESTs and know-how, in the implementation of Article 4, paragraph 5, of the Convention.



## Third synthesis report on technology needs identified by Parties not included in Annex I to the Convention

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- **Since COP 7 (2001)**, in total **more than 80** developing country Parties have been successfully assessing their technology needs in the areas of climate change mitigation and adaptation, through an analysis that takes into account their development plans and strategies.
- Through its interim financing for capacity-building in priority areas – enabling activities phase II (also known as “top-ups”) – the Global Environment Facility (GEF) provided funding to Parties not included in Annex I to the Convention to enable them to conduct TNAs. **(First generation of TNAs).**



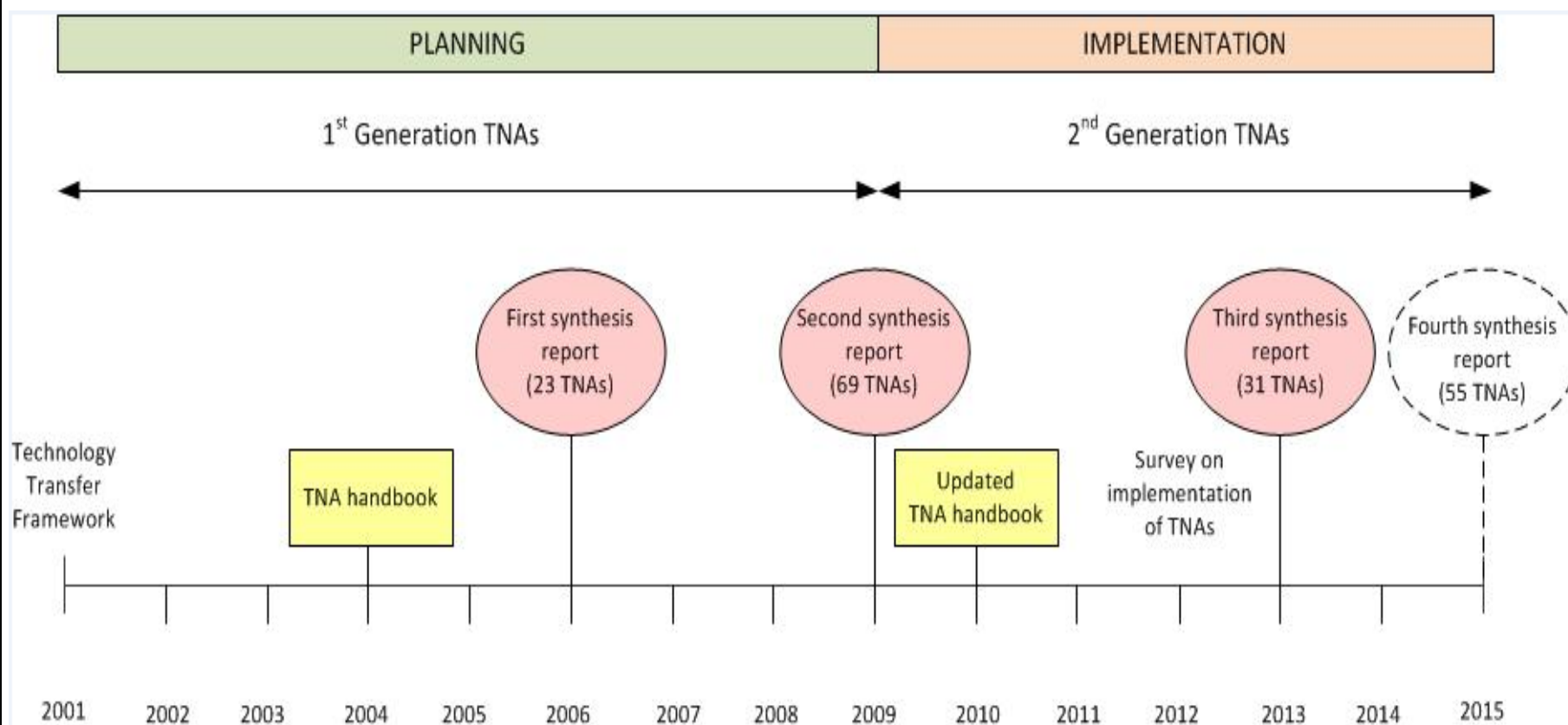
## Second generation of TNAs:

- The SBSTA, at its 35 session, requested the secretariat to prepare an updated TNA synthesis report for SBSTA 37, including TNAs conducted by non-Annex I Parties, under the Poznan Strategic Program on technology transfer.
- By July 2013, a total of 31 TNA reports were available and the information contained in these reports was synthesized into the “Third synthesis report on technology needs identified by non-Annex I Parties” to be presented to SBSTA 39.



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### Evolution of TNA process:



**Overall participation of countries from Asia and Pacific Island Countries in  
TNA process:**

*UNEP Project 36 - Asian Parties*

Bangladesh (2013)  
Bhutan (2013)  
Cambodia (2003 and 2013)  
China (1998)  
Indonesia (2010 and 2012)  
Lebanon (2002 and 2012)  
Mongolia (2013)  
Nepal (2013)  
Sri Lanka (2000 and 2012)  
Thailand (2000 and 2012)  
Vietnam (2005 and 2012)

*UNEP Project 24 - Asian Parties*

Jordan (1999 and 2015)  
Malaysia (2015)  
Philippines (2004 and 2015)  
Lao PDR (2004, 2013 and 2015)

*Pacific Island Countries report (2010)*

Cook Islands  
Federated States of Micronesia  
Fiji  
Kiribati  
Marshall Islands  
Nauru  
Samoa  
Solomon Islands  
Tuvalu  
Vanuatu



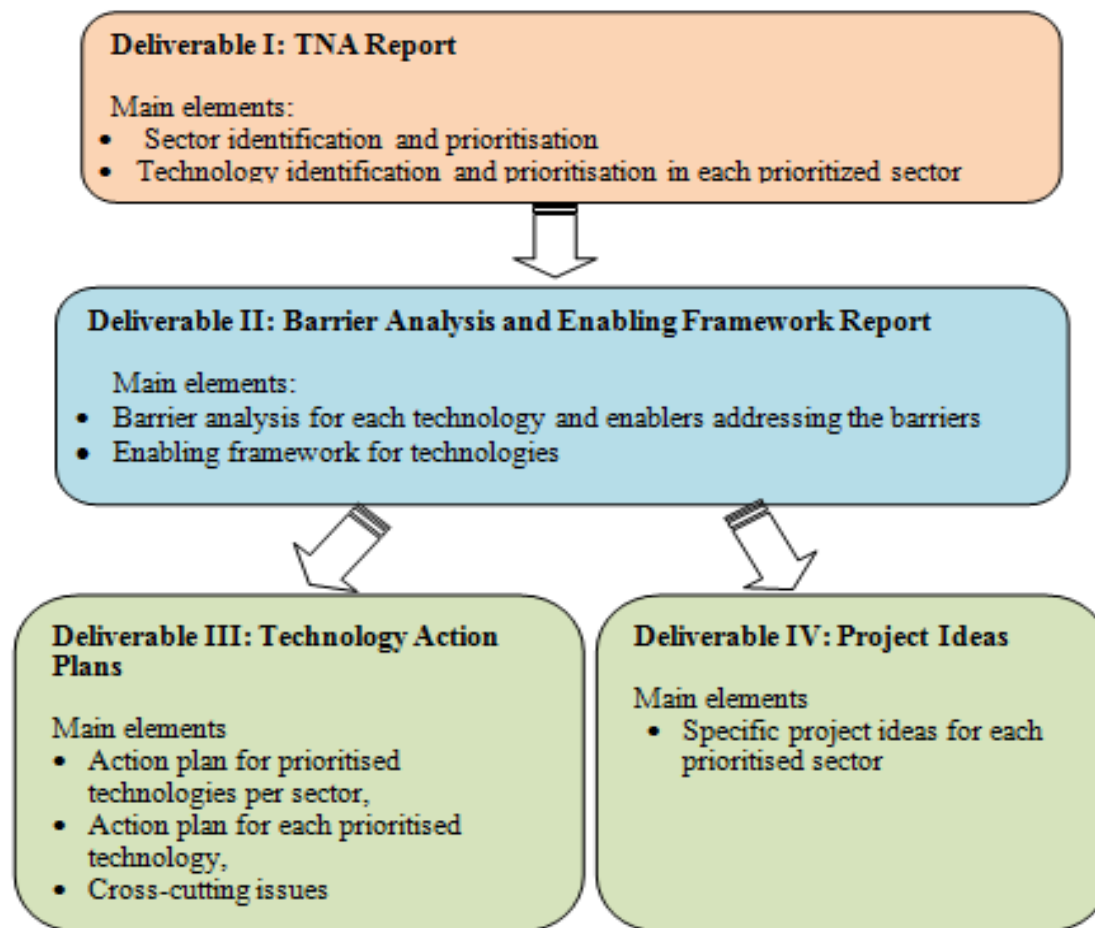
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### The second generation of TNAs: the regional distribution of the 31

#### Parties who conducted TNAs:

- Africa: 11 Parties;
- Asia: 9 Parties;
- Eastern Europe: 3 Parties;
- Latin America and the Caribbean: 8 Parties.

A methodological structure :



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### Examples of conducted TNA reports:

COUNTRY  REGION

Reset

Item Name	Report status	Language	Action	Country	Download
Technology Needs Assessments for Climate Change Mitigation - Indonesia	TNA Report	English	Mitigation	Indonesia	<a href="#">Download</a>
Technology Needs Assessments for Climate Change Adaptation - Indonesia	TNA Report	English	Adaptation	Indonesia	<a href="#">Download</a>

COUNTRY  REGION

Reset

Item Name	Report status	Language	Action	Country	Download
Viet Nam Technology Needs Assessment for Climate Change Mitigation and Adaptation - Summary Report	Summary Reports	English	Mitigation	Vietnam	<a href="#">Download</a>
Viet Nam Technology Needs Assessment for Climate Change Adaptation - Synthesis Report	TNA Report	English	Adaptation	Vietnam	<a href="#">Download</a>
Viet Nam Technology Needs Assessment for Climate Change Mitigation - Synthesis Report	TNA Report	English	Mitigation	Vietnam	<a href="#">Download</a>

COUNTRY  REGION

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Item Name	Report status	Language	Action	Country	Download
Technology Needs Assessment And Technology Action Plans For Climate Change Mitigation - Cambodia	TNA Report	English	Mitigation	Cambodia	<a href="#">Download</a>
Technology Needs Assessment And Technology Action Plans For Climate Change Adaptation - Cambodia	TNA Report	English	Adaptation	Cambodia	<a href="#">Download</a>





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### Example of conducted TNA report:

#### Kenya

**Responsible Entity:**

National Environmental Management Authority (NEMA)

**TNA Coordinator:**

Anne Omambia  
NEMA

**Country background:**

[UNFCCC country page](#)

**Technology Needs Assessments:**

[Technology Needs Assessment And Technology Action Plans For Climate Change Mitigation – Kenya](#)

[Technology Needs Assessment And Technology Action Plans For Climate Change Adaptation – Kenya](#)

[Barrier Analysis And Enabling Framework For Climate Change Technologies - Mitigation – Kenya](#)

[Barrier Analysis And Enabling Framework For Climate Change Technologies - Adaptation – Kenya](#)

[Technology Action Plan Report, Mitigation – Kenya](#)

[Technology Action Plan For Climate Change Technologies, Adaptation – Kenya](#)

[Project Concepts For Climate Change, Mitigation – Kenya](#)

[Project Idea Report For Climate Change Technologies Adaptation – Kenya](#)

**Technology Factsheets:**

**Mitigation**

- Solar Home Systems (SHS)
- Solar Dryers
- Non-Motorized Transport (NMT)-Bicycles
- Mini Hydro-Power
- Electric Train
- Mass Transport
- Co-generation
- Methane capture from landfills
- Waste Paper Recycling
- Waste Compositing
- Plastic solid waste recycling
- Biogas
- Wastes Reuse



## Third synthesis report on technology needs identified by Parties not included in Annex I to the Convention

### Methodology for compilation and synthesis done by UNFCCC:

Sectors - Mitigation
Energy supply and consumption (except for industrial sectors)
Energy Industries
Manufacturing Industries and Construction
Transport
Solid Fuels
Oil and Natural Gas
Transport of CO <sub>2</sub>
Injections and Storage
Other
Sectors as per 2006 IPCC Guidelines and Annex 4 of the TNA Handbook (UNDP)

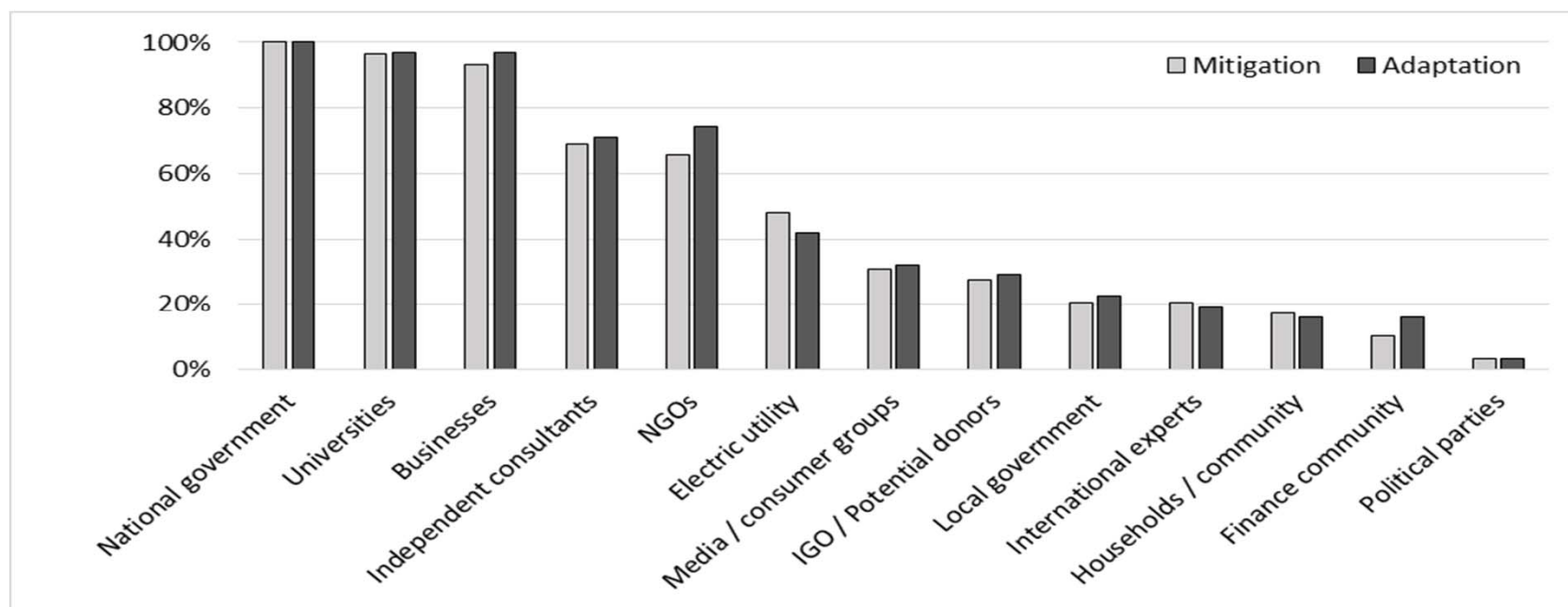
Sector - Adaptation
Water
Agriculture (Land use)
Infrastructure/settlement (including coastal zones)
Human health
Tourism
Transport
Energy
Climate observation and early warning systems
Other
Sectors as per IPCC Climate Change synthesis report 2007, pg. 57



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### 2. Stakeholders:

- Most of the reports were lead by the National Ministries of Environments,
- National government representatives, academia, private sector, consultants,
- Local governments, electric utility companies, news media and potential donors,
- NGOs commonly involved in the TNAs of the Eastern European, Asian and African Parties,
- Less than 15% of Parties reported stakeholders from finance community, in-country donors.

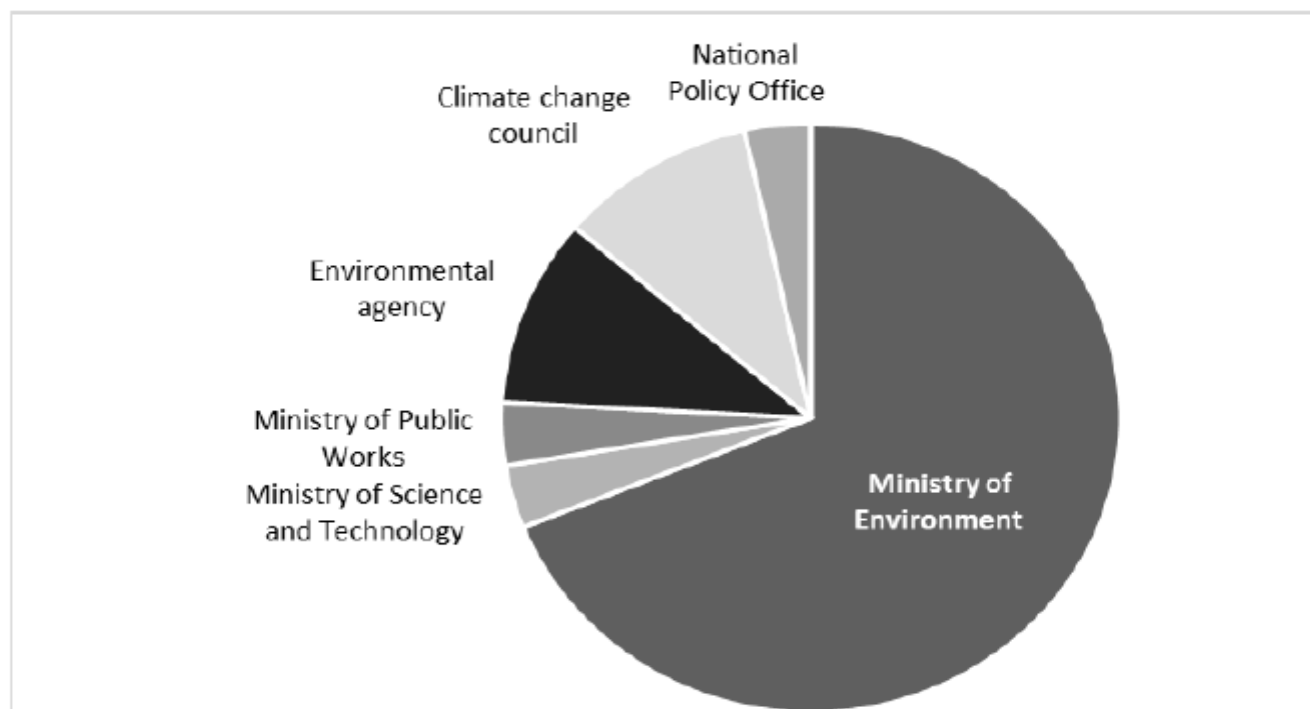


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### 2. Stakeholders:

#### Entities responsible for coordinating the organization of Parties' technology needs assessment processes



### **3. General information, national circumstances:**

Parties commenced their TNA reports with sections on :

- The national GHG profile (for mitigation reports),
- The vulnerability of the country to climate change (for adaptation reports),
- General country information, national circumstances, existing national policies .

Parties referred to their national policies and measure:

- low emission development,
- national green growth and climate resilient strategies,
- climate change related measures and climate change scenario documents.



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### 3. General information, national circumstances:

**Table 4 - Greenhouse Gas Emissions: Sudan; 1995 (Gg)**

GHG Source & Sink Categories	Net CO <sub>2</sub> Emitted	CH <sub>4</sub>	CO	N <sub>2</sub> O	Others (NO <sub>x</sub> , NMVOC, HFCs)	Total CO <sub>2</sub> -eq (Gg)
Energy	4,328	150	2,104	1	323	16,706
Industrial Processes	173	0	0	0	16	173
Agriculture	0	1,713	388	30	46	50,083
Land-use change & Forestry	15,577	90	787	1	23	21,184
Waste	0	33	0	1	1	1,055
<b>Total National Emissions and Removal</b>	<b>20,077</b>	<b>1,985</b>	<b>3,280</b>	<b>33</b>	<b>409</b>	<b>89,220</b>
<b>Total CO<sub>2</sub> emissions from biomass</b>	<b>21,936</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>21,936</b>

Source: Sudan's First National Communication under UNFCCC – Sudan (HCENR), 2003.

**Table 2. Extreme Climate Events in Sudan – Sectors Affected & Impact Categories**

Event	Sectors	Impacts
Drought	Agriculture, livestock, water resources and health	Loss of crops and livestock, decline in the hydroelectric power, displacement wildfire
Floods	Agriculture, livestock, water resources and health	Loss of life, crops, livestock; insects and plant diseases, epidemic/vector diseases, decline in hydro power; damage to infrastructure and settlement areas
Dust Storms	Transport	Air and land traffic accidents and health
Thunder-storms	Aviation	Loss of lives and properties
Heat Waves	Health, agriculture & livestock	Loss of life, livestock and crops
Wind-storms	Settlements and service infrastructure	Loss in lives, property; damage to infrastructure (electricity and telephone lines)

Source: NAPA 2007; Zakiideen, 2007



#### **4. Criteria for sectors prioritization:**

Identification of principal GHG-emitting sectors

Identification of national vulnerability to climate change

National development priorities such as: environmental, social or economic

#### **Environmental development priorities:**

- environmentally sustainable development
- efficient water management
- reduction of environmental risks
- reduced air pollution
- protection of coastal areas
- combating desertification



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### **Social development priorities:**

- reducing poverty
- creating wealth
- ensuring food security
- improving infrastructure and services in rural areas
- improving health conditions
- improving education

### **Economic development priorities**

- development of infrastructure
- enhanced energy security
- improving employment
- enhancing general economic growth
- developing tourism
- reducing energy imports.

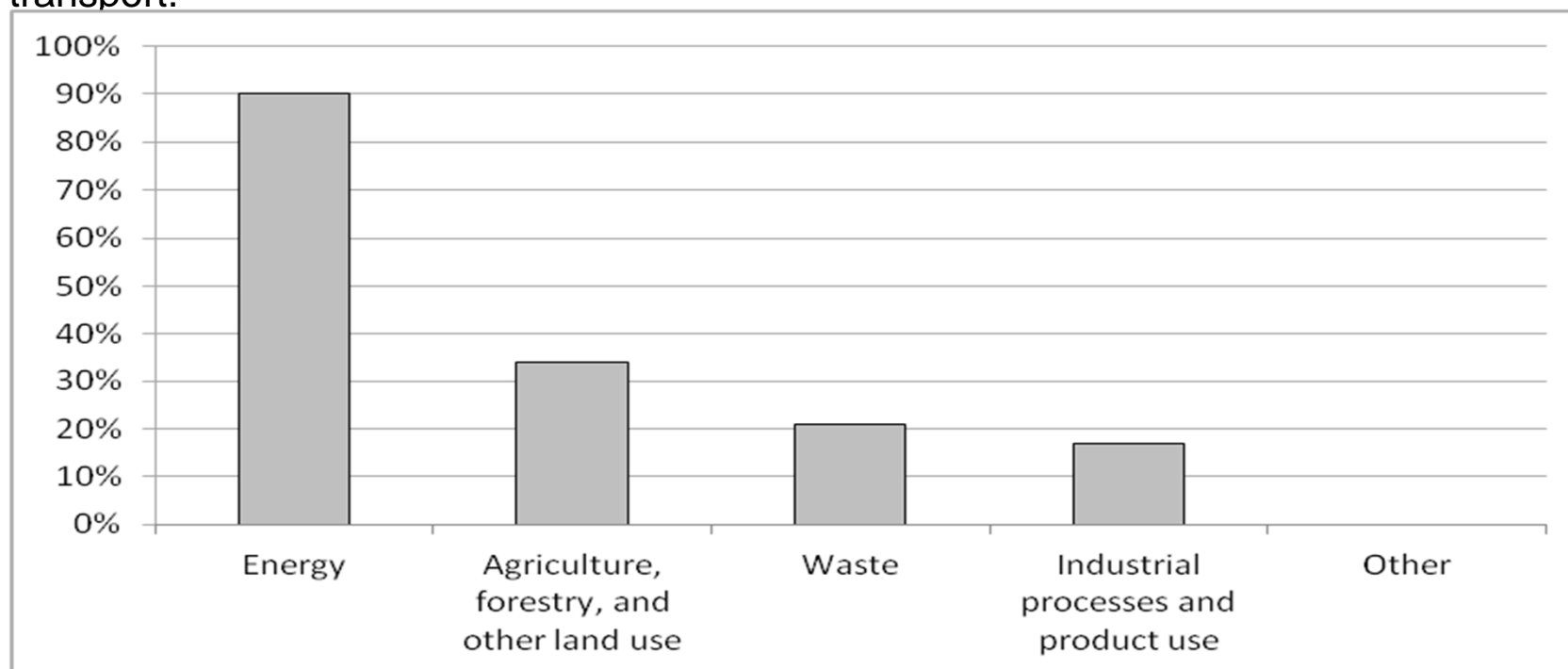




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### 4.1 Prioritization of sectors - mitigation:

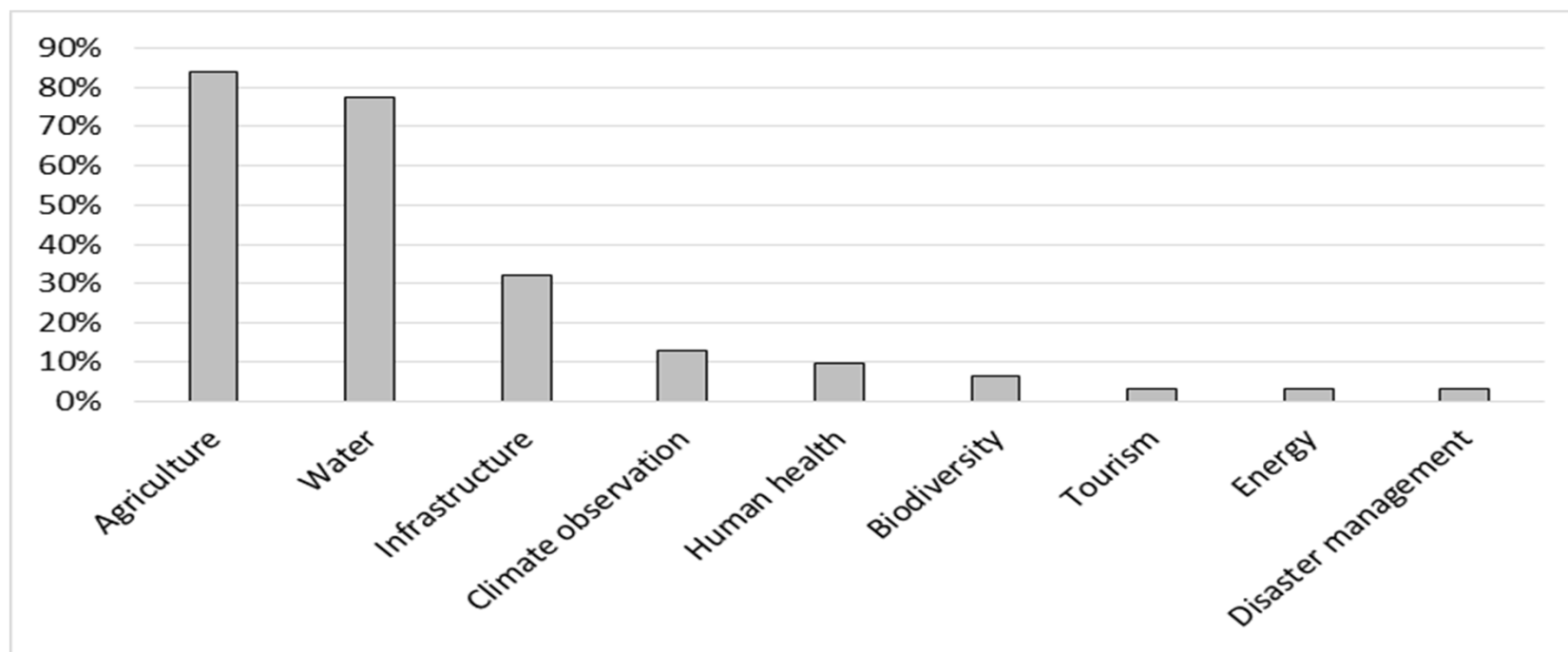
- The energy sector was the most prioritized mitigation sector, followed by agriculture, forestry and other land use sector, and waste sector.
- Within the energy sector, the most prioritized sub-sectors were energy industries and transport.



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### 4.2 Prioritization of sectors - adaptation:

- The most commonly prioritized adaptation sectors were agriculture, water resources, infrastructure and settlements (including coastal zones)
- The prioritized sectors for adaptation were consistent with the sectors identified in national vulnerability analyses.



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### 5. Criteria for technology prioritization:

Creation of preliminary lists of technology options for the prioritized sectors based on:

- results of stakeholder consultations
- expert analysis
- national circumstances.

#### **Prioritizing mitigation technologies:**

- social, economic and environmental criteria,
- potential of the technology to reduce GHG emissions
- market potential of the technology
- employment generation potential of the technology
- investment and operational costs of the technology

#### **Prioritizing adaptation technologies:**

- social, environmental and economic criteria,
- potential contribution of the technology to the reduction of the national vulnerability to climate change
- the technology's investment and operational costs

\* Having defined criteria for prioritizing technologies in their prioritized sectors, most of the Parties used a multi-criteria decision analysis (MCDA) to rank their technology needs for mitigation and adaptation.

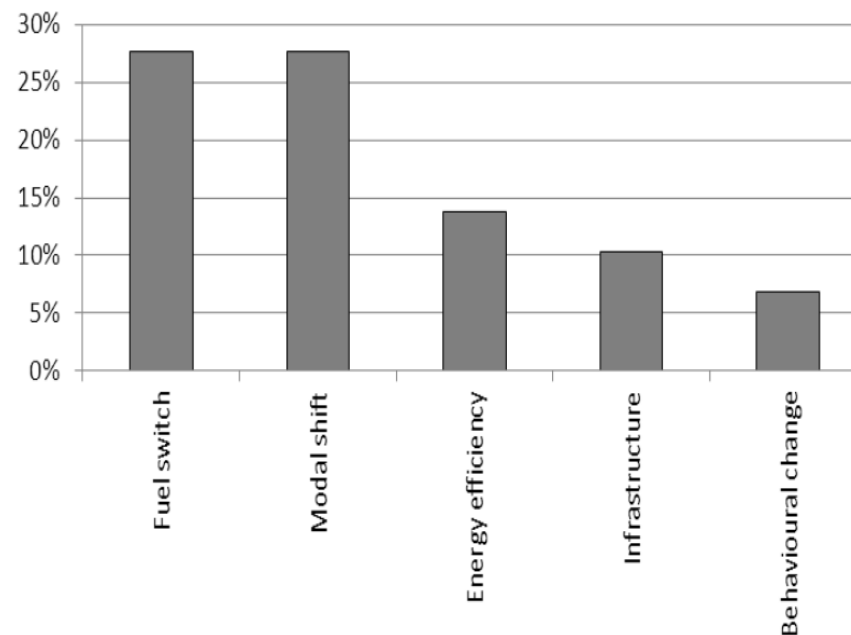
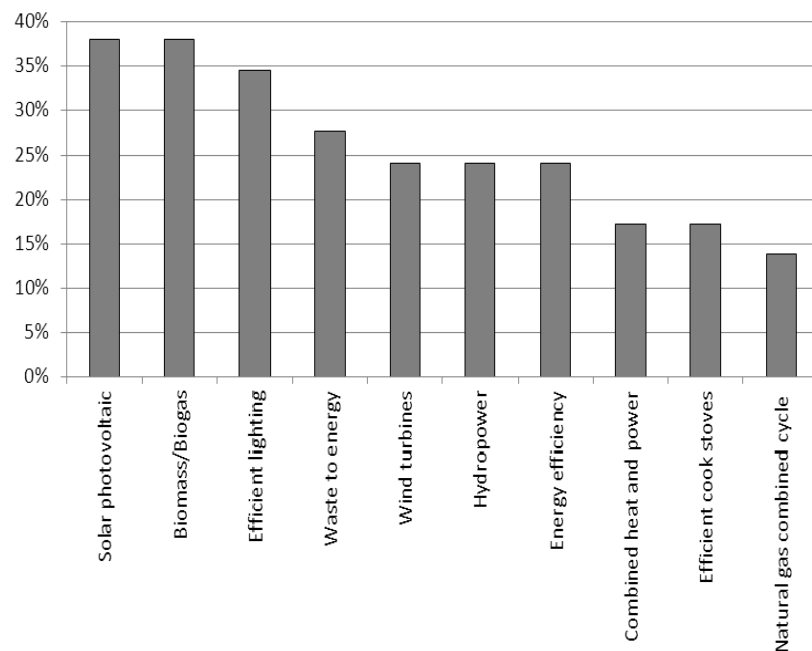
Some of the Parties first assessed the benefits of their technology options (using an MCDA) and then extended that to a cost-benefit analysis by evaluating the benefits alongside the costs of the options.



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### 5.1 Prioritization of technologies - mitigation:

1. **Energy industries subsector** - solar PV, wind turbines, SHPP, and CHP (70% RET);
2. **Transport subsector** - modal shift, fossil fuel switch technologies and infrastructure improvement technologies;
3. **Industrial subsector** - high efficient electric motors and brick production.



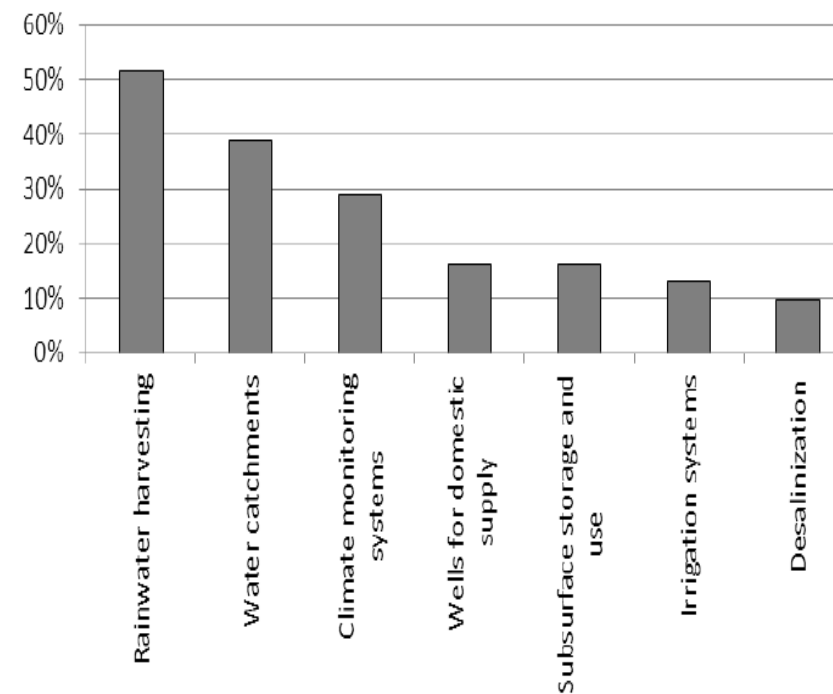
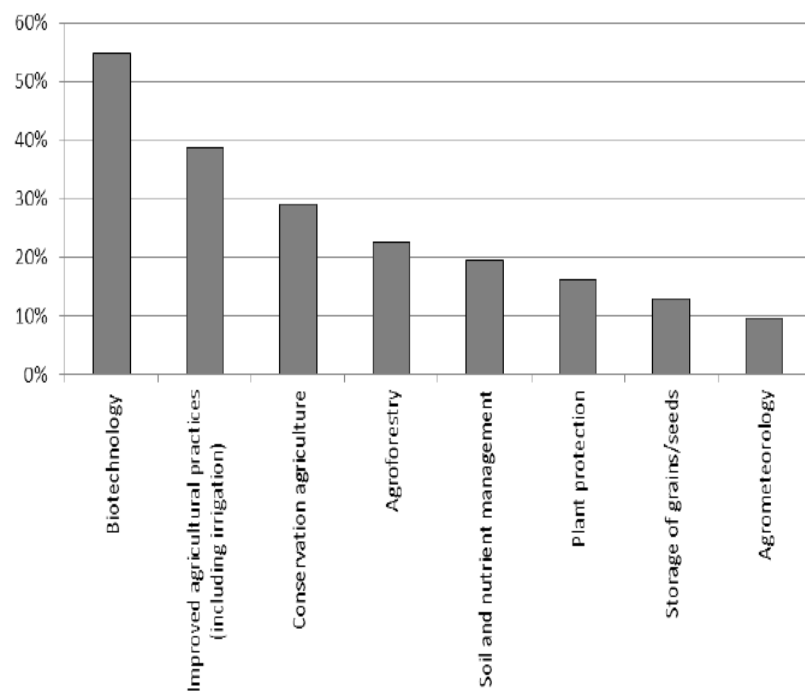
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### 5.2 Prioritization of technologies - adaptation:

#### 1. Agriculture (including forestry)

#### 2. Water resources

#### 3. Infrastructure and settlement (including coastal zones)



**Thank you for your attention**



**Third synthesis report on technology needs identified by Parties not included in Annex I to the Convention (part 2).**

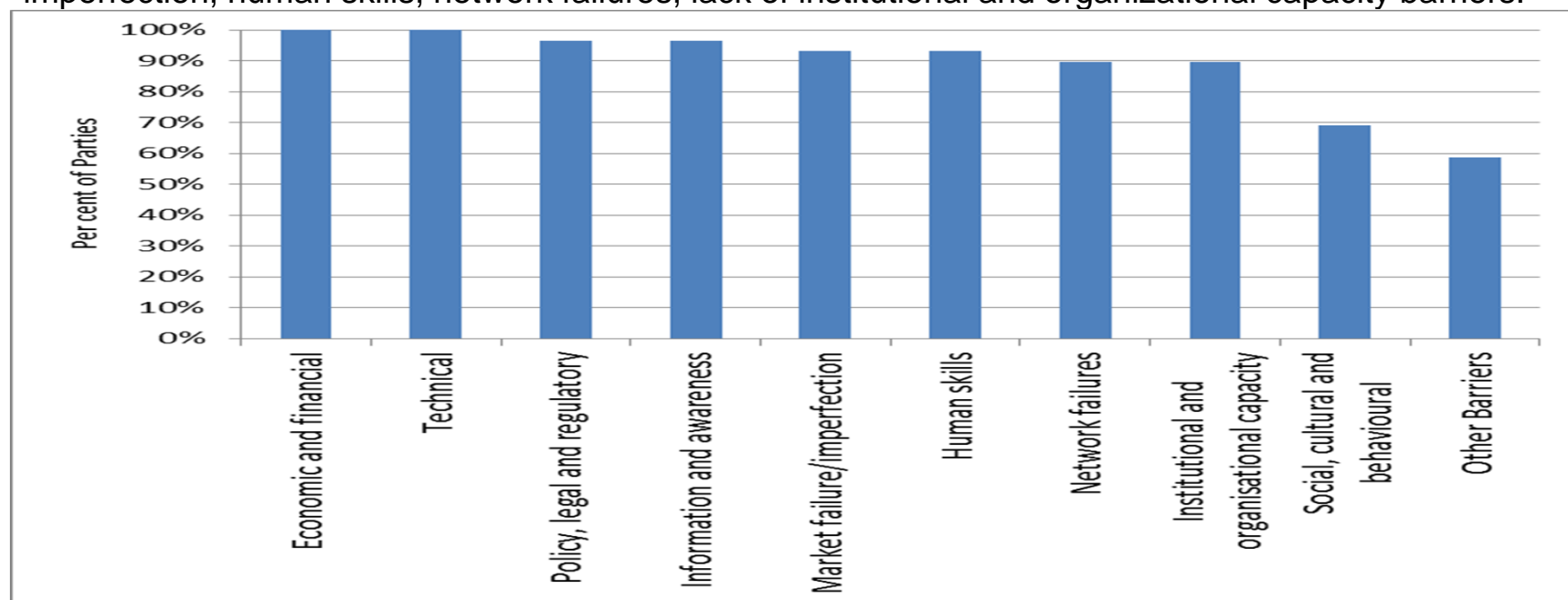
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### 6.1 Barrier analysis - mitigation:

- The barriers to the dissemination of prioritized technologies were addressed by all TNA reports (100% of Parties), separately for mitigation and adaptation technologies.
- The most frequently identified mitigation barriers were economic and financial barriers, followed by technical, policy, legal and regulatory barriers, information and awareness, market failure and imperfection, human skills, network failures, lack of institutional and organizational capacity barriers.

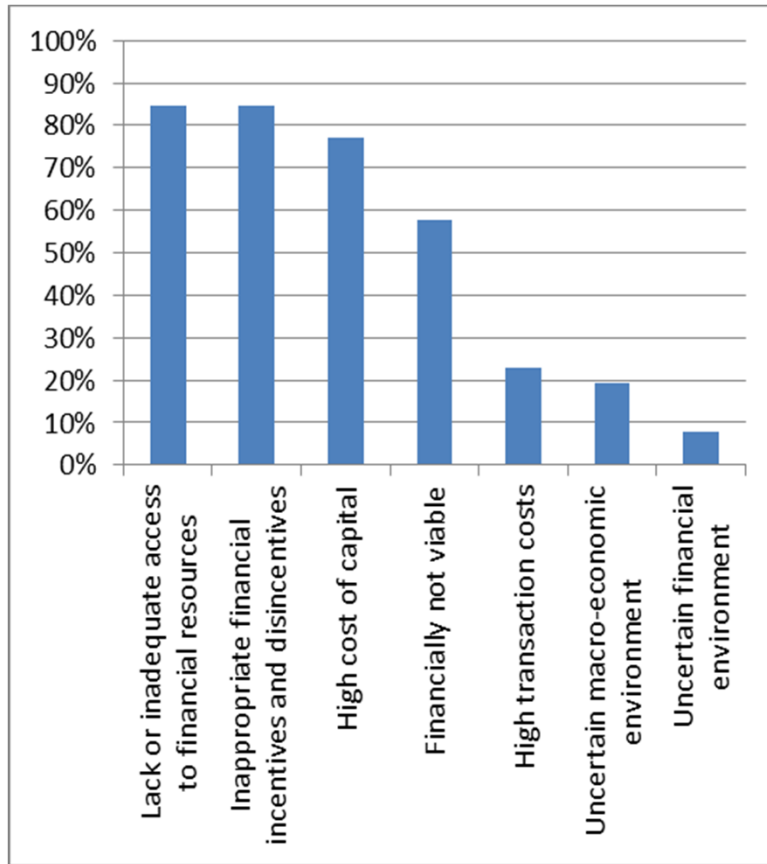




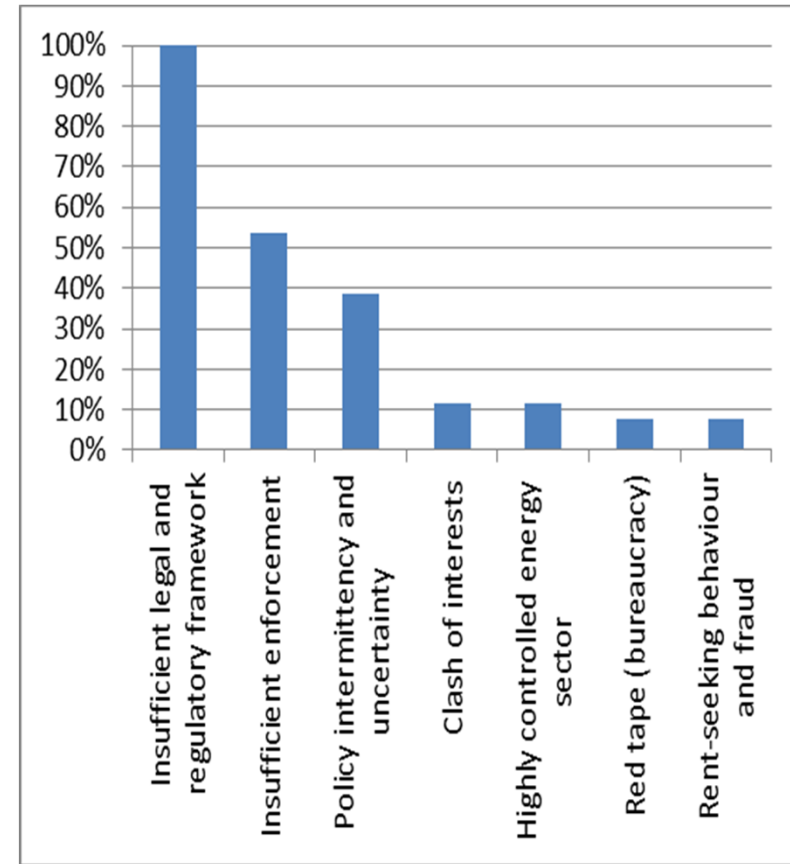
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## Barrier analysis - mitigation:

Economic and financial barriers for the energy sector



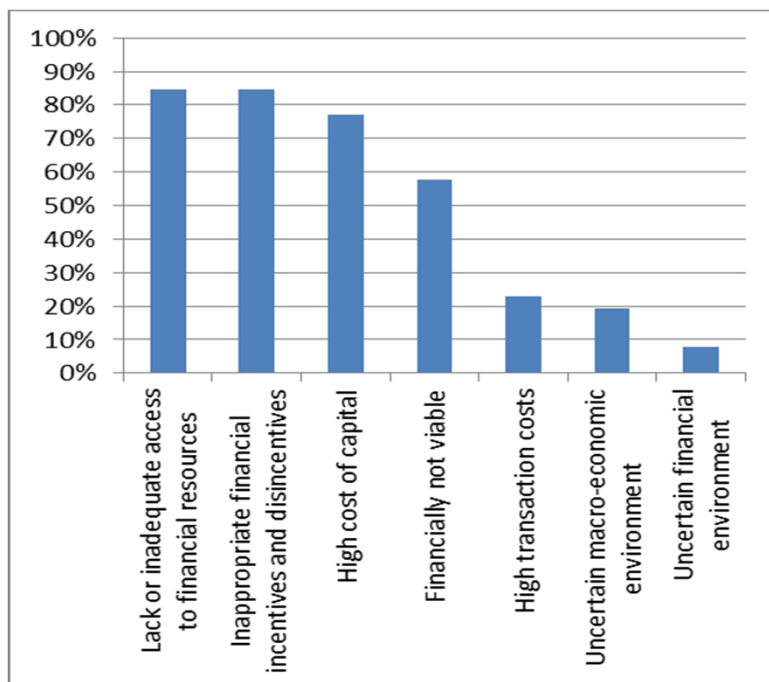
Policy, legal and regulatory barriers for the energy sector



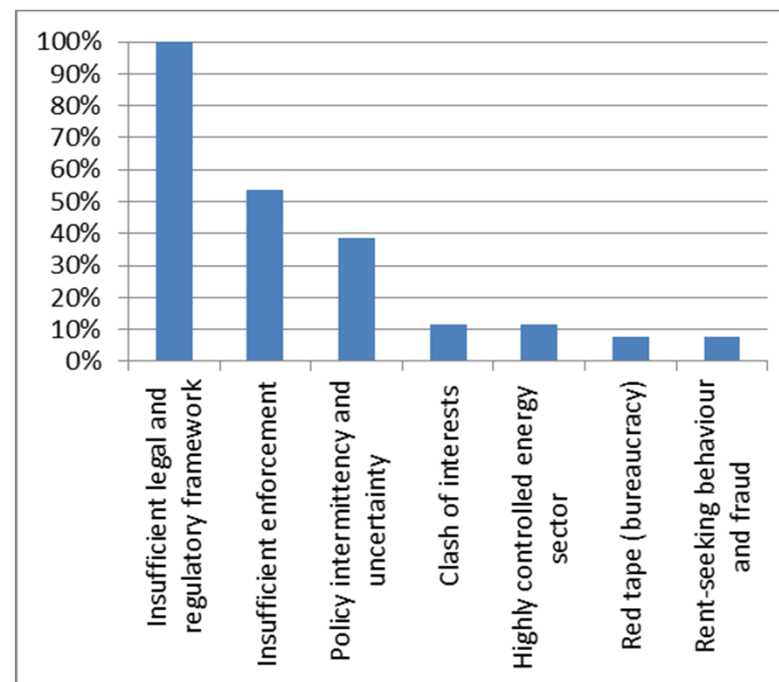
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### Barrier analysis and enabling framework - mitigation:

Economic and financial barriers for the energy sector



Policy, legal and regulatory barriers for the energy sector



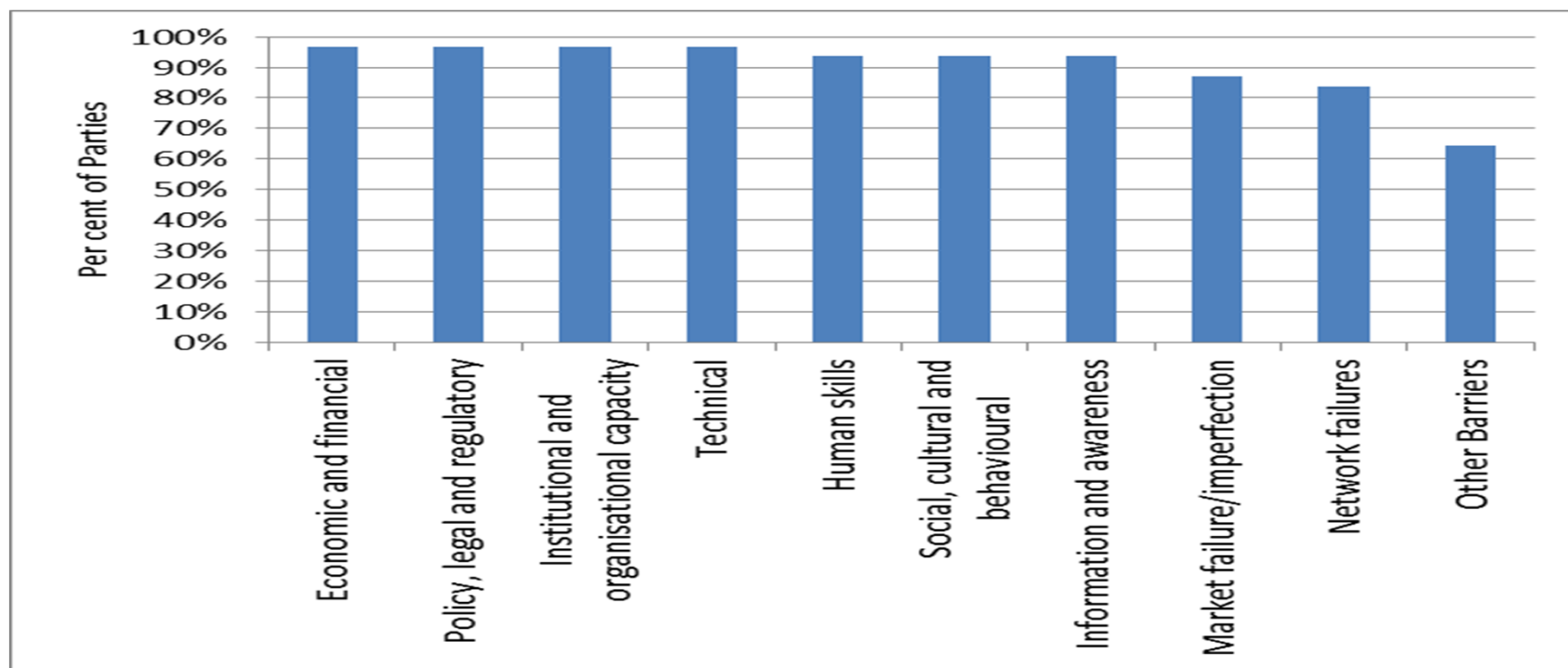
The most commonly identified enablers to address these barriers were to **provide or expand financial incentives** (80%) and to **strengthen the regulatory framework for the technology** (also 80%), both to attract investors to the market.



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### 6.2 Barrier analysis - adaptation:

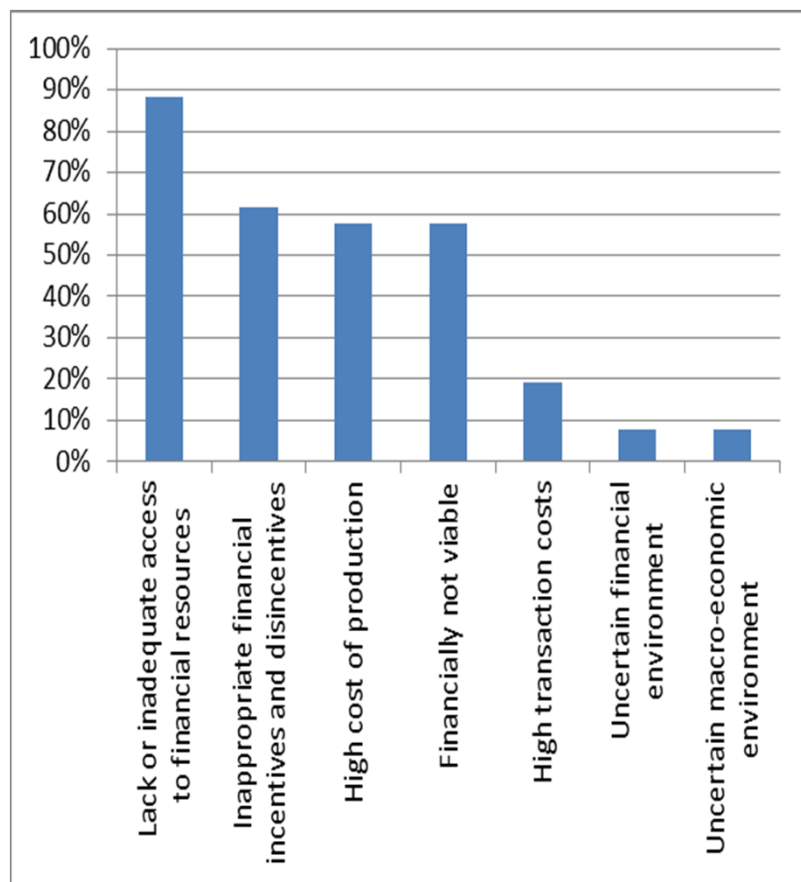
- The most frequently identified adaptation barriers were economic and financial barriers, followed by policy, legal and regulatory barriers, lack of institutional and organizational capacity, human skills, technical, social, cultural and behavioural, access to information and awareness, market failure and imperfection and network failures.



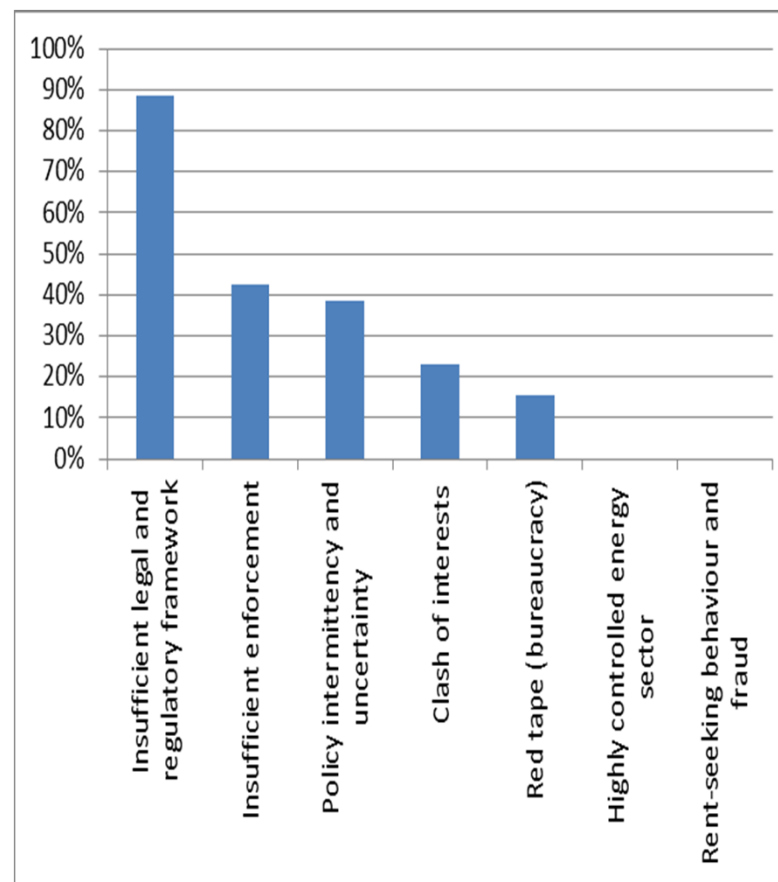
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### Barrier analysis - adaptation:

Economic and financial barriers for the agriculture sector



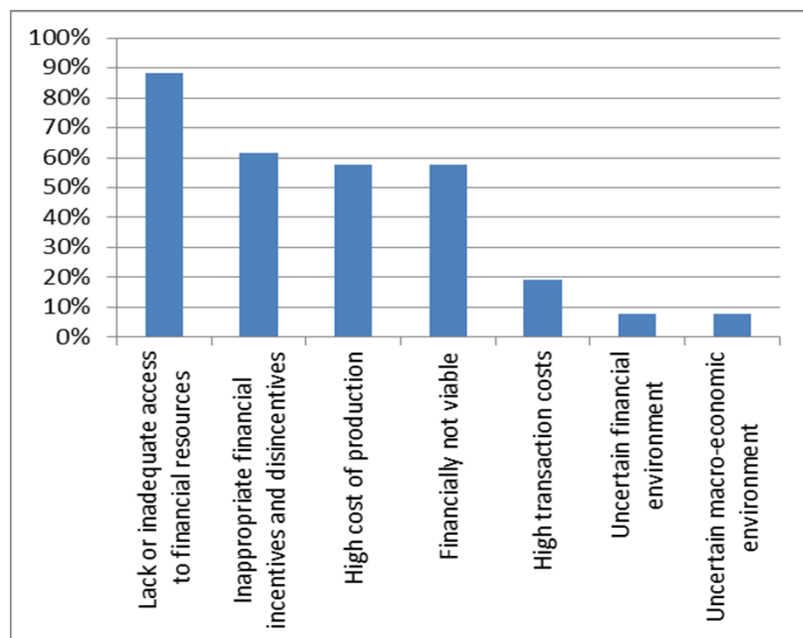
Policy, legal and regulatory barriers for the agriculture sector



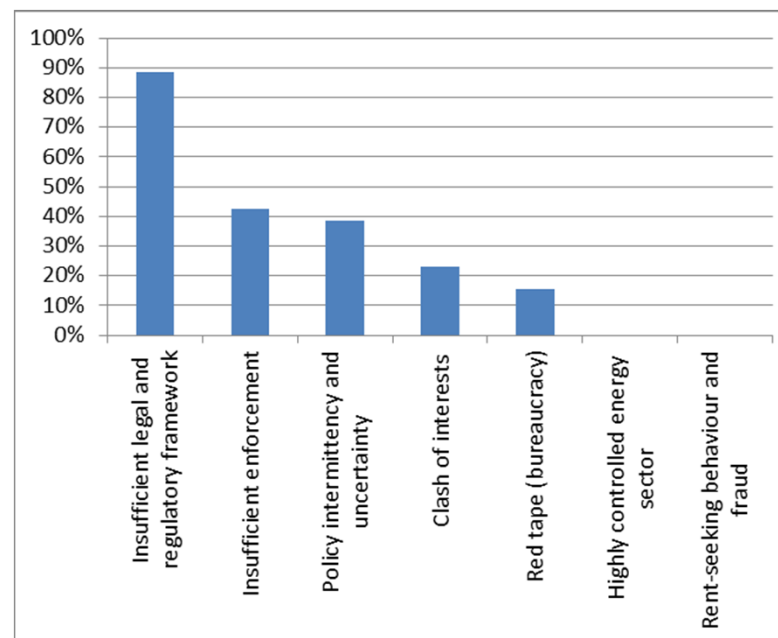
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### Barrier analysis and enabling framework - adaptation:

Economic and financial barriers for the agriculture sector



Policy, legal and regulatory barriers for the agriculture sector



The most commonly identified enablers to address these barriers in the agricultural sector were the **creation of national financial mechanisms or policies** (65 per cent) and the **creation of an allowance in the national budget for this technology** (including promotion of R&D) (50%).



## 7. Technology action plans

- Over 90 per cent of Parties prepared TAPs for the technologies that they prioritized for mitigation and adaptation.
- TAPs recommend an enabling framework for the development and transfer of prioritized technologies at the desired scale. Parties usually assume a scale for implementation of the options, such as stand-alone project, technology within a sector, country goals or milestones.



### Technology action plans

- TAPs contain actions for accelerating the development and transfer of a prioritised technology within the country.
- Parties grouped TAP actions in categories such as:
  - Policy and regulatory actions;
  - Economic and financial actions;
  - Infrastructure requirements;
  - Information campaigns and awareness building;
  - Skills training;
  - Capacity building activities;
  - International cooperation actions.



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### Technology action plans

- More than 60% of Parties specified costs for their **mitigation TAPs**, totalling USD 5.2 bn.
  - TAPs relating to physical investments (infrastructure) (USD 2.8 bn),
  - Financial and economic support and incentives (USD 1.4 bn), and
  - Capacity building measures (USD 214 million).
- More than 60% of Parties specified costs for their **adaptation TAPs**, totalling USD 2.4 bn
  - TAPs relating to physical investments (USD 934 million),
  - Financial and economic support and incentives (USD 866 million), and
  - Capacity building measures (USD 369 million).

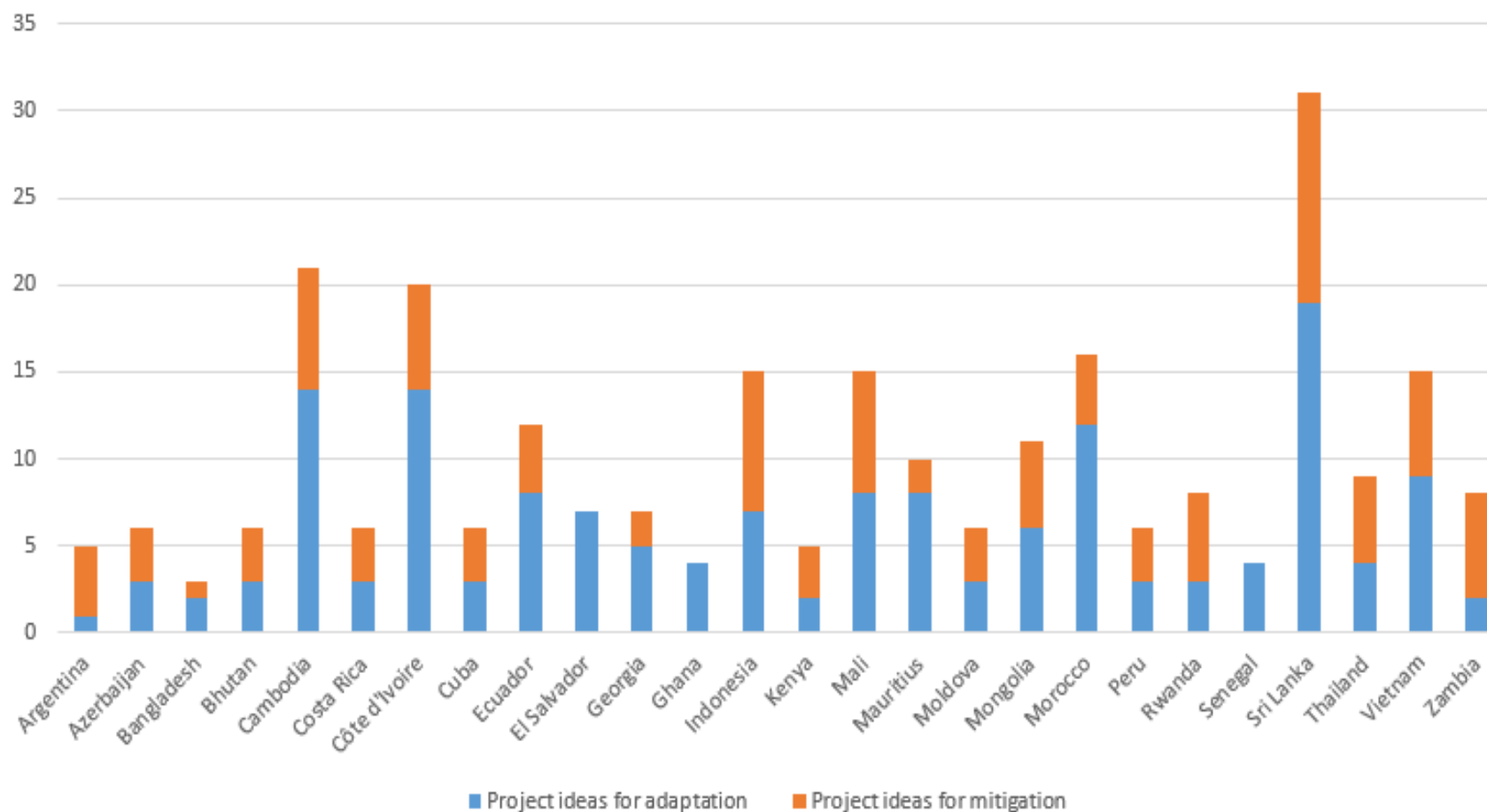




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### 8. Project ideas reports

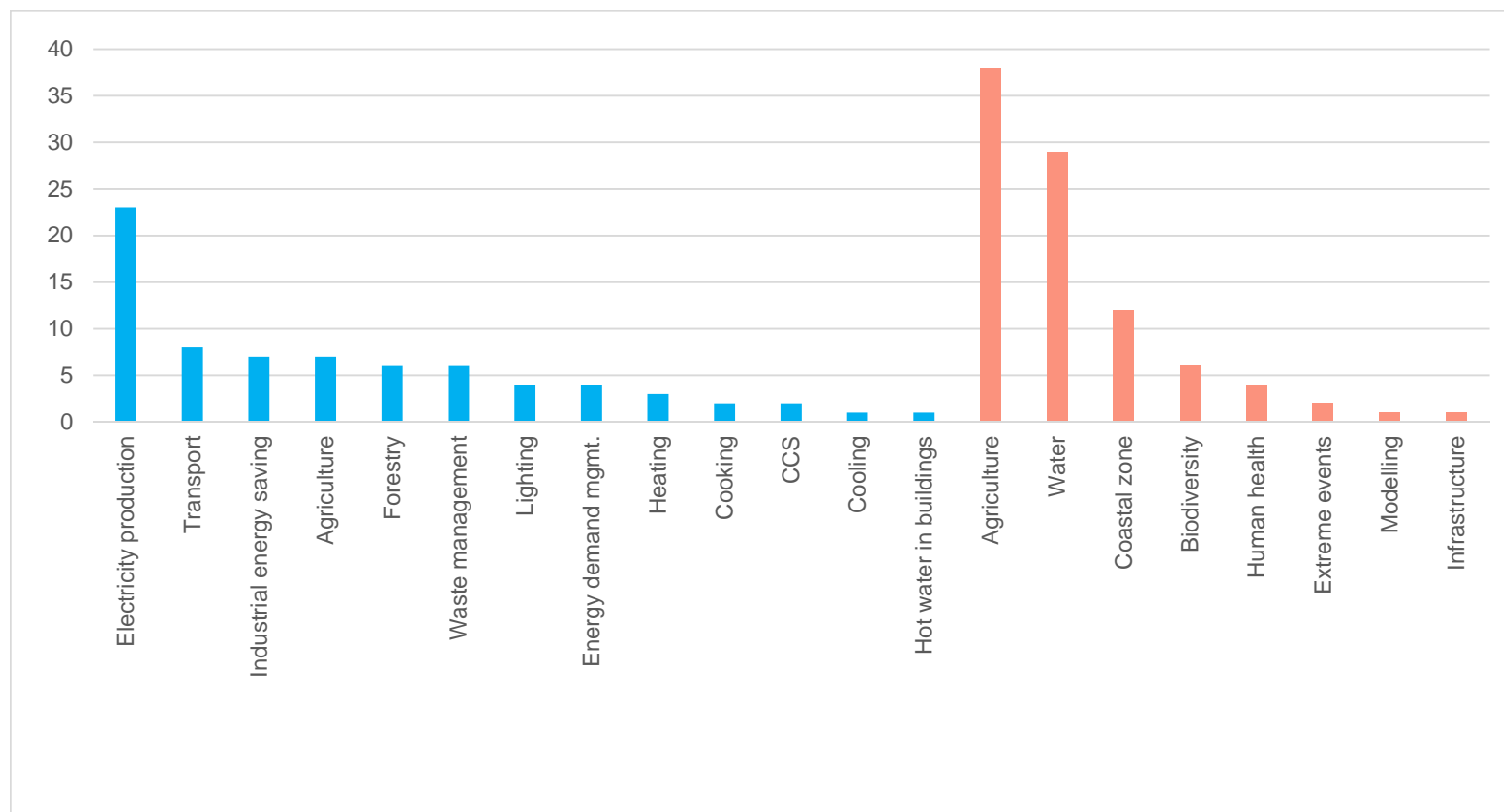
#### Quantification of mitigation and adaptation project ideas submitted per Party.



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### Project ideas reports

#### Distribution of project ideas per mitigation and adaptation sectors.



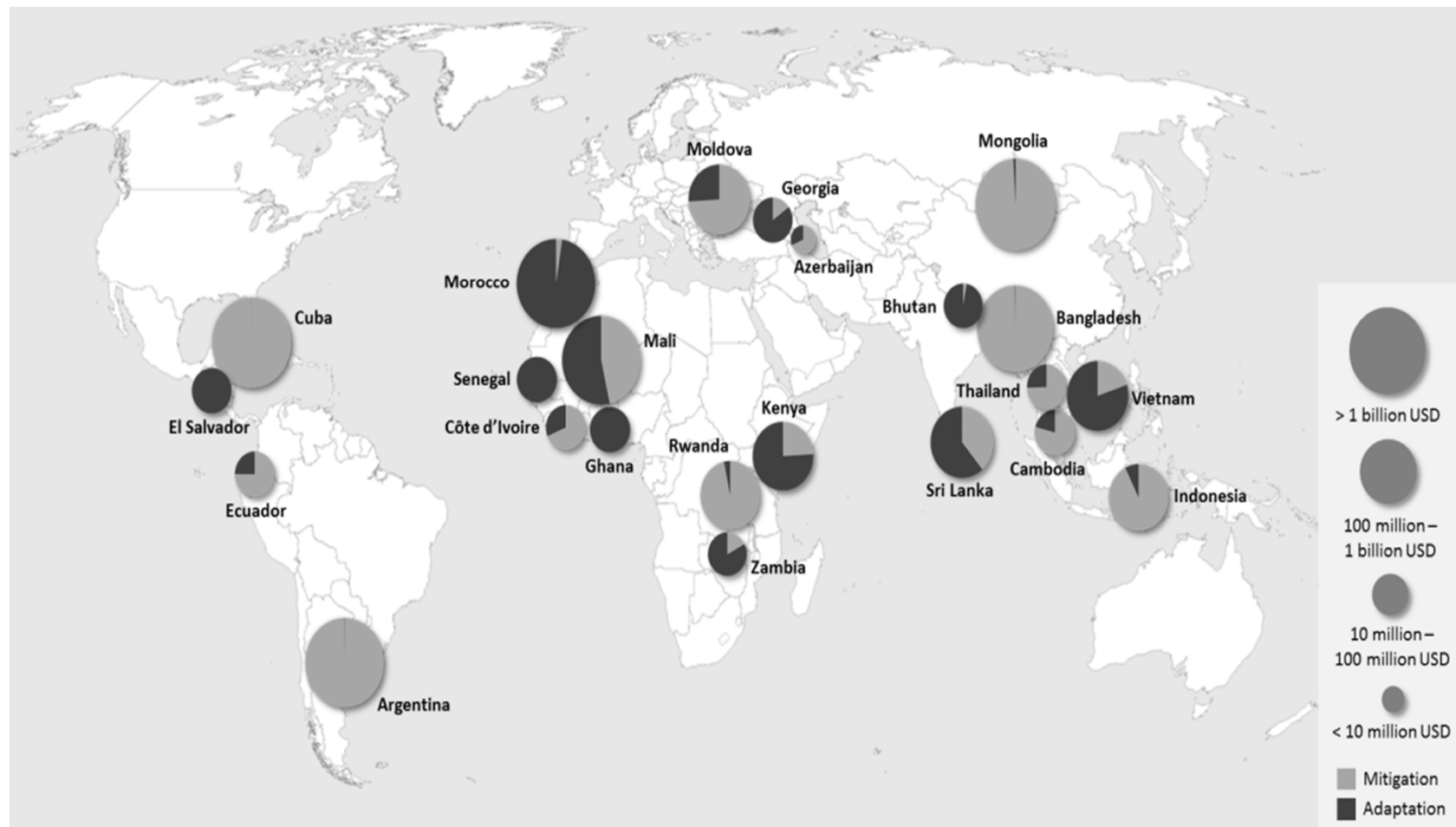
## Project ideas reports

- The total estimated budget required for the 257 project ideas identified by Parties amounted to more than USD 24.7 bn.
- USD 12.5 bn was estimated to be required for project ideas related to mitigation, and 12.2 bn for adaptation.
- Most of the mitigation budget was required for the energy sub-sectors: energy industries (27% of the total budget) and transport (20%).
- The sectors for adaptation where most of the budget was allocated are water (35%) and agriculture (14%).
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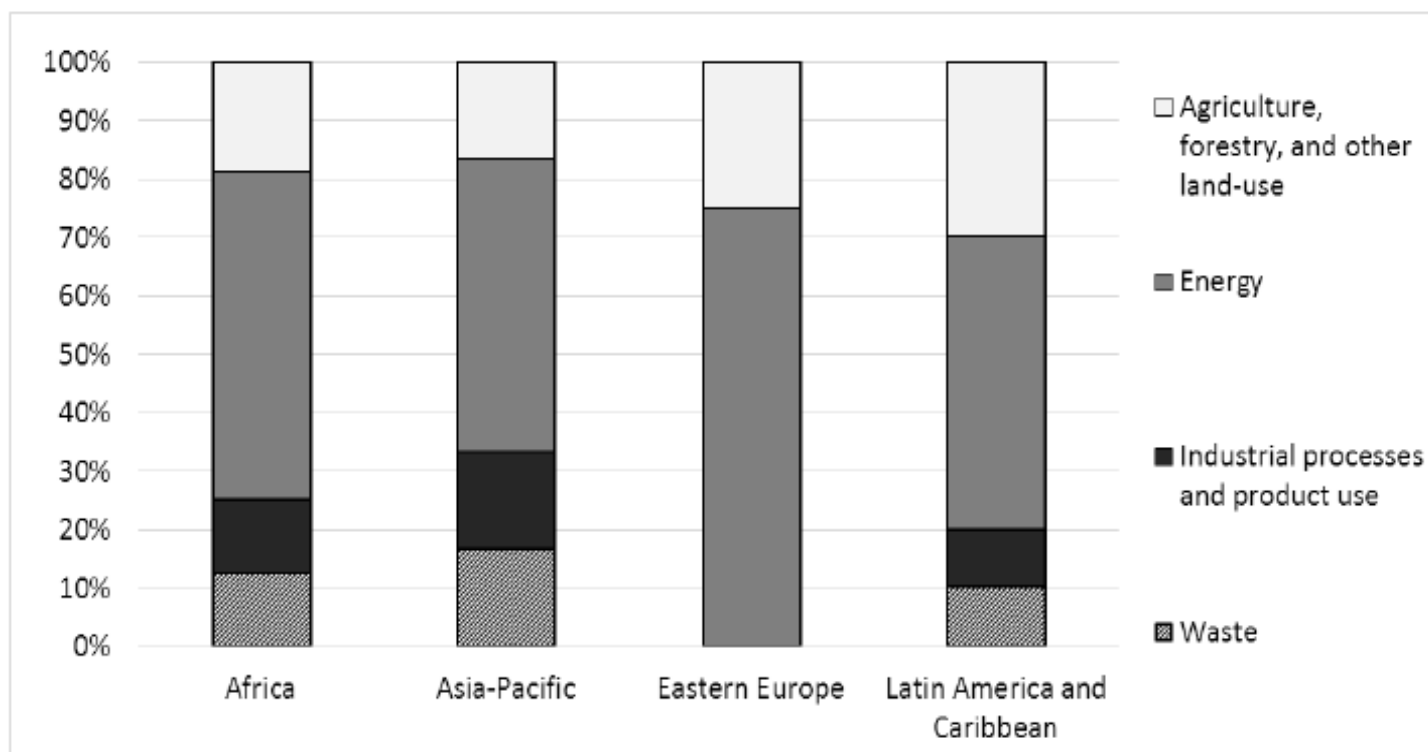
## Project ideas reports



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### 9. Regional analysis:

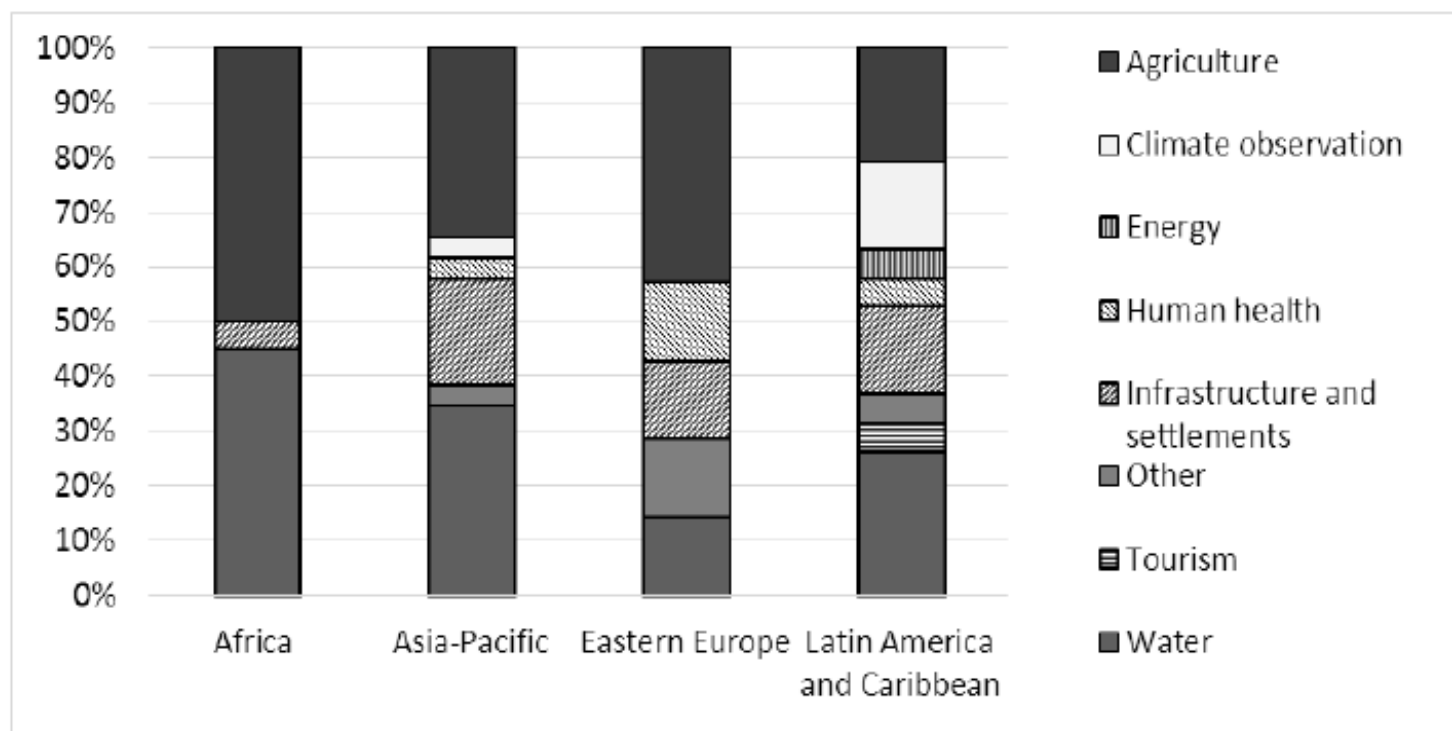
**Prioritized mitigation sectors in technology needs assessments by region (percentage of all prioritized sectors in the region)**



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### Regional analysis:

Prioritized adaptation sectors in technology needs assessments by region (percentage of all prioritized sectors in the region)



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### Regional analysis:

#### Commonly reported barriers to the development and transfer of mitigation technologies by region

##### *Africa*

- Inappropriate financial incentives and disincentives
- Insufficient legal and regulatory framework
- Poor market infrastructure
- Inadequate information

##### *Asia-Pacific*

- Lack of or inadequate access to financial resources
- High cost of capital
- Insufficient legal and regulatory framework
- Poor market infrastructure
- Lack of skilled personnel for the installation and operation of climate technologies

##### *Eastern Europe*

- Inappropriate financial incentives and disincentives
- Lack of or inadequate access to financial resources
- High cost of capital
- Insufficient legal and regulatory framework
- Poor market infrastructure

##### *Latin America and Caribbean*

- Inappropriate financial incentives and disincentives
- Weak connectivity between actors favouring the new technology
- Limited institutional capacity
- Lack of skilled personnel for the installation and operation of climate technologies
- Inadequate information



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### Regional analysis:

#### Commonly reported barriers to the development and transfer of adaptation technologies by region

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##### *Africa*

- Lack of or inadequate access to financial resources
- Poor market infrastructure
- Restricted access to technology
- Limited institutional capacity
- Inadequate information

##### *Asia-Pacific*

- Lack of or inadequate access to financial resources
- Limited institutional capacity
- Inadequate information

##### *Eastern Europe*

- High cost of production
- Financially not viable
- Restricted access to technology
- Insufficient legal and regulatory framework
- Inadequate information

##### *Latin America and Caribbean*

- Lack of or inadequate access to financial resources
  - Insufficient legal and regulatory framework
  - Traditions and habits
  - Inadequate information
- 





**Thank you for your attention**

