

**Draft TEC technology policy brief.  
The results of the TNAs and integration of TNAs with NAMAs and NAPs.**

**Summary**

- The TEC, at its 5th meeting, agreed to establish a TNA taskforce to prepare the first draft of a technology brief on the results of the TNAs and a technology brief on the integration of TNAs with other NAMAs and NAPs, for consideration of the TEC at its 6th meeting.
- The TNA taskforce consists of the following members: Mr. Gabriel Blanco, Mr. Kunihiko Shimada, Mr. Tim Sill and Mr. Can Wang;
- The TEC may wish to exchange views on the draft technology policy brief and determine any necessary follow-up actions. The TEC will be invited to provide comments and/or suggestion for the improvement of the draft technology policy brief, with a view to finalizing the brief at its next meeting in order to making it available in time for COP 19.

**TEC technology policy brief.**  
**The results of the TNAs and possible integration of TNAs with NAMAs and NAPs.**

**1. Why this policy brief?**

- This technology policy brief was prepared to inform national level decision makers in charge of mitigation and adaptation processes on the results of the TNA process and on interlinkages and possible integration between TNAs, NAMAs and NAPs, with a view to avoid duplication of efforts of countries in the planning process, and to enhance the implementation of mitigation and adaptation actions.

**2. A brief look back on the TNA under the Convention**

- Since 1999<sup>1</sup> Parties not included in Annex I to the Convention are conducting and reporting their technology needs assessments (TNAs) to identify, prioritize and highlight their technology needs in various sectors, to reduce greenhouse gas emissions and to facilitate adaptation to the adverse impacts of climate change. In their efforts Parties have drawn attention to specific barriers to technology transfer and have suggested measures to address them. They also highlighted various ways used to involve stakeholders in a consultative process to conduct TNAs, including the methodologies and criteria used to prioritize their technology needs.
- Based on the TNA reports submitted by Parties, two synthesis reports have been prepared by the UNFCCC Secretariat<sup>2</sup> with an aim to identify common needs for environmentally sound technologies (ESTs), barriers to technology transfer, measures to address these barriers, including capacity building from a global, regional and national perspective. Both synthesis reports indicated that TNAs provide useful information for the implementation of future activities aimed at mitigating or adapting to climate change<sup>3</sup>.

*TNA under the Poznan Strategic Programme*

TNA development is a key component of the Poznan Strategic Programme on Technology Transfer supported by the Global Environment Facility (GEF), and one of the three funding windows of the Poznan strategic program supports TNAs. Under the TNA funding window, a global supporting program was opened by the GEF in 2009 to countries that have prepared their TNAs but need to update them, to reflect the evolving needs and circumstances of the country, as well as to those that have not received GEF funding to prepare a TNA, to prioritize the technologies that are considered to be of strategic importance to the country. Preparation of the new TNAs was linked to the revised handbook for TNAs<sup>4</sup> which was commissioned by the UNDP with support of the UNFCCC, UNEP, the Expert Group on Technology Transfer, and other agencies. The revised handbook was complemented by a series of guidebooks<sup>5</sup>, which were developed within the UNEP-GEF project, to broaden and fine-tune the guidance.

UNEP in collaboration with the UNEP Risoe Centre implemented new rounds of TNAs, on behalf of the GEF. They provided targeted financial, technical and methodological support to assist 36 countries in conducting TNA projects. In 2013 the GEF Council approved a subsequent UNEP project to support TNAs of additional 24 low-and medium-income countries in 2014-2015. UNEP, on behalf of the GEF, is implementing a new round of TNAs with objectives that go beyond identifying technology needs. The TNAs will lead to the development of a national Technology Action Plan (TAP) that prioritizes technologies, recommends an enabling framework for the diffusion of these technologies, and facilitates identification of technology transfer projects and their links to relevant financing sources. The TAP will systematically address practical actions necessary to reduce or remove policy, finance and technology related barriers.

**3. TNA process at the national level**

*How the process was carried out at the national level?*

The goal of a TNA is to identify technologies for mitigation and adaptation which also support a country's development objectives. For that the TNA process contains the following key steps (see Figure 1):

- (a) To identify key priorities based a country's long term vision on climate and development,

<sup>1</sup> In October 1999, the GEF Council agreed that some of the immediate capacity building priorities of Non-Annex I Countries, identified in the COP decision 2/CP.4, may initially be met through additional funding under expedited procedures for enabling activities.

<sup>2</sup> FCCC/SBSTA/2006/INF.1 and FCCC/SBSTA/2009/INF.1

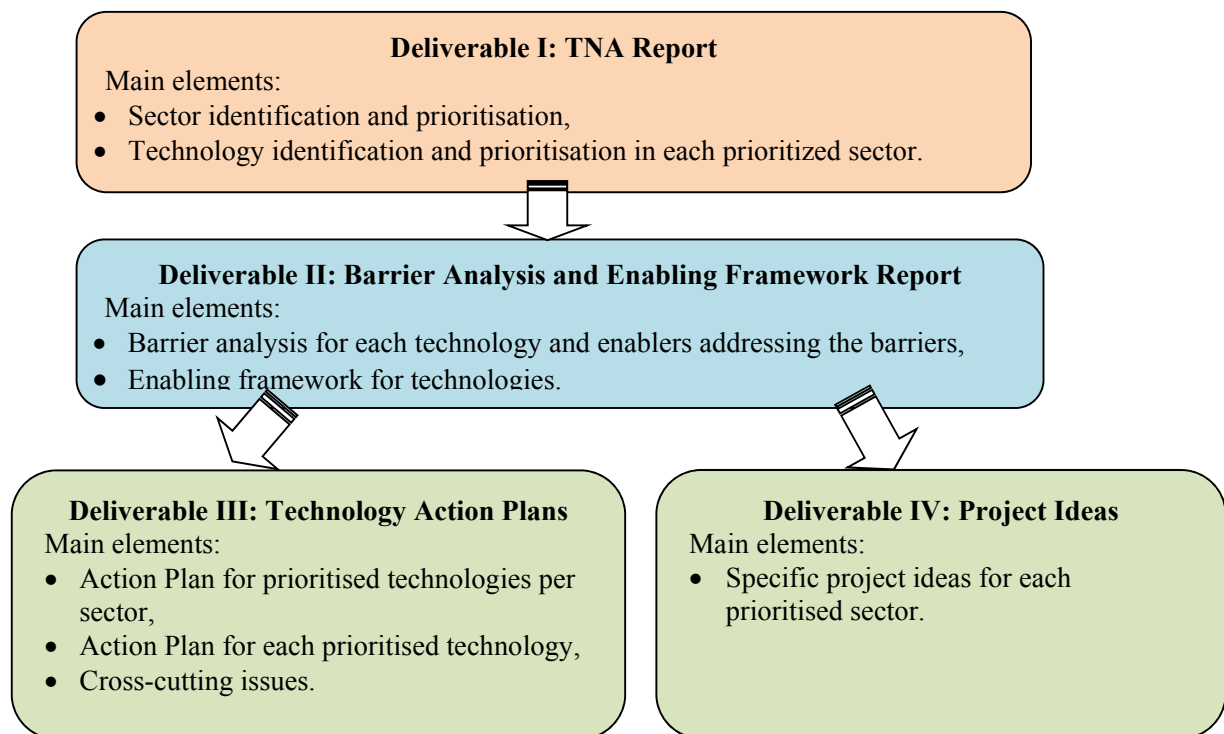
<sup>3</sup> A third TNA synthesis report is currently under preparation by the UNFCCC.

<sup>4</sup> [http://unfccc.int/ttclear/sunsetcms/storage/contents/stored-file-20130321154847356/TNA\\_Handbook\\_Nov2010.pdf](http://unfccc.int/ttclear/sunsetcms/storage/contents/stored-file-20130321154847356/TNA_Handbook_Nov2010.pdf)

<sup>5</sup> <http://tech-action.org/Guidebooks.asp>.

- (b) To identify strategic sectors or areas to support these priorities,
- (c) To prioritize technologies and measures for mitigation and adaptation within these sectors,
- (d) To identify barriers for development and transfer of these technologies/measures within a country, and
- (e) To formulate technology action plans (TAPs) of projects, programmes or strategies.

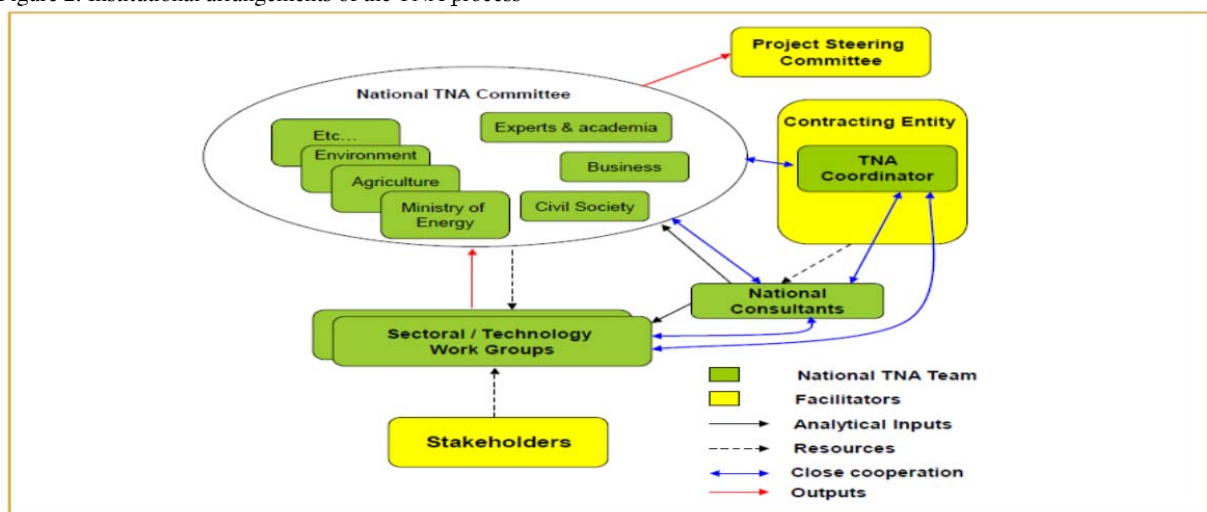
Figure 1. Main Country Deliverables from the TNA Project and their relations



### Stakeholder involvement

- The type and involvement of stakeholders were mentioned in most TNA reports, although the roles of the stakeholders were not identified in all cases. Stakeholders were involved mostly in setting the selection criteria for the technology needs, in selecting and prioritizing sectors and technologies and in identification of barriers and enablers. Possible roles of stakeholders involved in the conducting of TNA reports are shown in the Figure 2.

Figure 2. Institutional arrangements of the TNA process



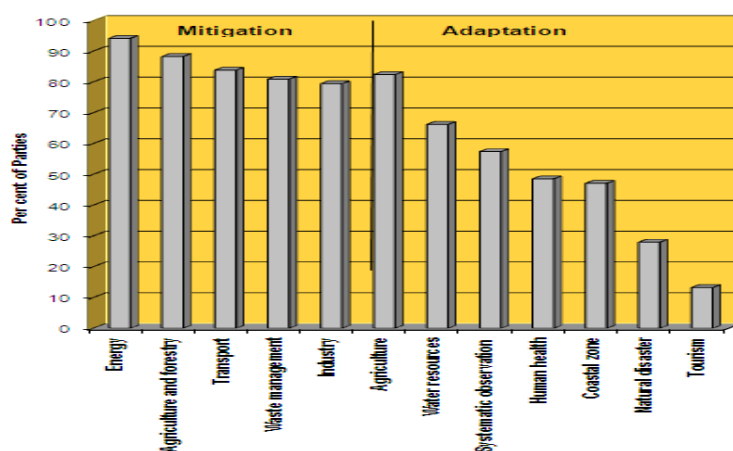
### Criteria and methods used to prioritize technology needs.

- In most of the TNA reports, criteria used to select and prioritize the technology needs were influenced by development-related concerns. Some Parties sought compatibility between climate protection and their economic and social goals, such as those related to economic growth, improving the standard of living, health and poverty reduction.
- In order to find the suitable technologies for maximizing sustainable development, GHG emission reduction, and adaptation benefits, the methods used to prioritize technology needs included multi-criteria decision analysis (MCDA), the analytical hierarchy process, cost–benefit and risk–benefit analyses, use of optimization models, and questionnaire surveys, interviews and workshops with stakeholders.
- MCDA was used for prioritizing sectors and technologies and measures for mitigation and adaptation, because it was considered by most of the Parties as a suitable approach for evaluation of issues involving multiple stakeholders and trade-offs between multiple and conflicting objectives, where assessments can be difficult to quantify and uncertainty appears. The technique is therefore appropriate to determine to what extent a sector or technology contributes to sustainable development, GHG emission reduction and/or adaptation benefits.

### Sectors and technologies identified and priorities in the initial TNA reports.

- The energy sector was the mostly prioritized sector for technology needs for mitigation. In energy sector, the most identified technologies were solar photovoltaic technology, biomass, large, small and micro-hydropower plants, efficient lighting and water heating; water pumping, efficient fuel-conserving stoves and ovens, and solar drying of agricultural products. Agriculture was the mostly prioritized sector in for technology needs for adaptation. In agriculture sector, the most identified technologies were crop management, efficient use of water and improving irrigation systems. The sectors identified by most non-Annex I Parties in their TNAs are shown in the Figure 3.

Figure 3: Mostly identified sectors by non-Annex I Parties in their TNA reports

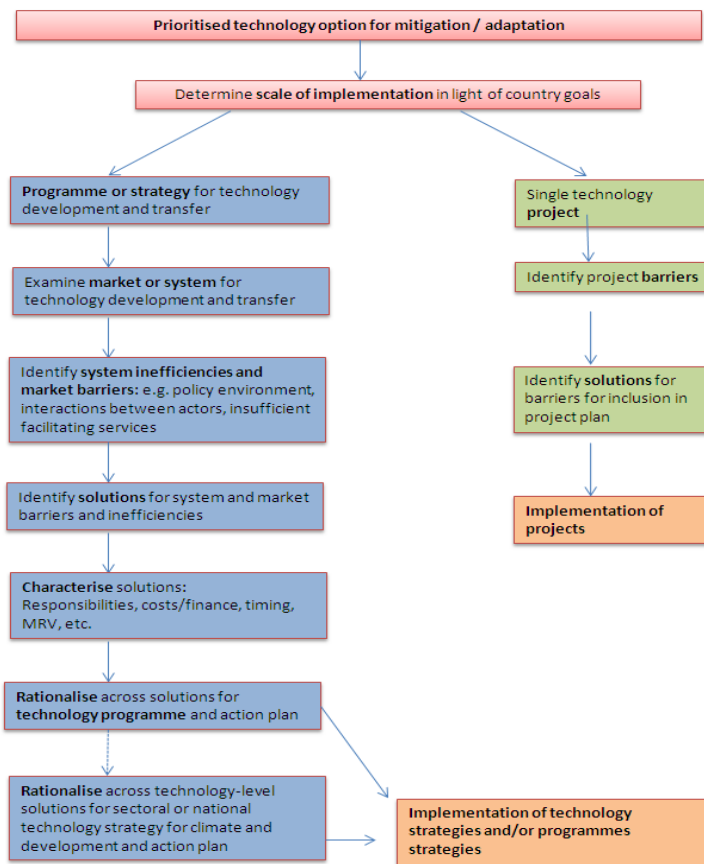


- **Barrier analysis and enabling framework.** Most of non-Annex I Parties analysed and identified in their TNAs barriers and measures to address barriers. The main barriers to technology transfer identified were economic and market barriers. High investment costs and incompatible prices, subsidies and tariffs were also considered to be important economic and market barriers. Other important barriers to technology transfer identified included lack of information and awareness regarding ESTs and lack of institutional, regulatory and human capacity to successfully tackle the technology transfer process.
- The measures identified by Parties to address these barriers to technology transfer included: development of strategies at a national level creating environment for the implementation of the results of the TNAs, national involvement to attract foreign investment; increased participation of

the private sector in technology transfer; removal of subsidies and price distortions; improvement of collaborative research and development of ESTs; and increasing of public awareness.

- Most Parties indicated that existing in-country capacity is insufficient to address the transfer of ESTs, and many Parties were able to identify in-country capacity-building needs in their TNA reports. Identified capacity building needs included those relating to access to information and awareness-raising, human, institutional and organizational capacity; implementation of policies and programmes, implementation and enforcement of appropriate regulations; and economic, market and infrastructure capacity.
- From TNA technology prioritisation a country could choose to develop technology projects and technology strategies and programmes. Both pathways would come through different barrier analysis requirements shown in the Figure 4. The Figure 4 also shows that should a country want to develop strategies for TNA prioritised technology options, then the barrier analysis would require a broader system or market-level analysis.

Figure 4: Barriers analysis requirements when developing projectst and strategies/programmes at a national level



#### 4. TNA results - what are the successes and challenges of their implementation?

##### Project ideas and implementation of TNA results.

- Numerous project ideas, proposals and programmes were developed as outcomes of the TNA process. These project ideas appear to be consistent with the national development priorities of countries, and further work is planned in relation to their funding and implementation. However, the number of sound project proposals is very small compared to the number of project ideas reported by Parties in their TNAs.
- It seems to be a real challenge to propose projects in a way that makes them implementable and attractive to the financial sector. Those projects which were implemented should serve as examples to assist in the creation of a future model for the implementation of the results of the TNAs.

- Two surveys were undertaken by the UNFCCC in 2010 and 2013 to find out information on the status of implementation of the results of TNAs undertaken since 1999. Based on the responses received from 22 non-Annex I Parties which participated in the two surveys, the following implementation success factors, failure factors and experienced were identified:

**Success factors** that facilitated implementation of the project proposals from the TNA, as identified by countries in the survey:

- Availability of domestic and/or international funding,
- Involvement of relevant state authorities in the project development from the beginning,
- Ability to reach political and institutional consensus when deciding on implementation priorities,
- High priority for government and/or municipality of the proposed strategies, programmes, projects, or technologies.
- Interest of national stakeholders in capacity building,
- Pro-active knowledgeable project champion supporting process by his capacity or as a source of funding, if possible.

**Challenges**, which prevented projects from implementation, as identified by countries in the survey:

- Some TNA reports were prepared by teams of consultants and no state authority was involved when proposing the projects which resulted in the lack of ownership of state authorities and hence no interest to implement the results,
- Environmental issues not considered a priority for the government,
- A high investment and/or low rate of return of the proposed projects,
- Low visibility of the projects reported in the TNAs to possible donors,
- Low attractiveness of some innovative technologies, due to availability of cheaper alternatives.

**Lessons learned** from the implementation of the results of the TNAs shown that:

- Involvement of policy makers in the proposed strategies, programmes and projects, and high priority for the government of the proposed project, or particular technologies involved in the project, is of a key importance to gain public recognition and support,
- Governmental engagement in the TNA process is fundamental to deliver appropriate policies and to create regulatory frameworks to enable environments for investments, and to participate in innovative funding instruments such as public-private partnerships,
- Probability of a successful implementation tends to be high where there is a strong signal from donors or investors regarding the availability of financing for the specific prioritized technologies,
- Creating an efficient mechanism for delivering targeted information about funding opportunities linked to prioritized technologies would be an important implementation support factor,
- The TNA, NAMA, and NAP processes could feed into one another, avoiding duplication and overburdening the capacity of countries to report on their development.

## **5. TNA linkages with other processes**

### **Why integration of TNAs with NAMAs and NAPs?**

- Within both TNA and NAMA processes the Parties undertake their efforts in the context of sustainable development, supported and enabled by technology, financing and capacity-building, aimed at achieving a deviation in emissions relative to ‘business as usual’ emissions in 2020.
- Climate change mitigation is mostly applied through implementation of EST and in order to develop NAMAs there is a necessity to identify and prioritize the appropriate technologies.
- TNAs for adaptation could particularly contribute to the elements of NAPs as identified by the Initial guidelines for the formulation of national adaptation plans by least developed country Parties<sup>6</sup>. In developing NAPs, consideration would be given to identifying specific needs, options and priorities on a country-driven basis, coordinated with sustainable development objectives, policies, plans and programmes. These elements are in line with the steps in a TNA.
- This TNA-based support could complement the support to NAPs that is provided by national adaptation programmes of actions (NAPA). The TEC could possibly support this by rationalising results of TNAs for adaptation and NAPAs for efficient input for NAPs. Based on the experience with NAMAs, and NAPs, Figure 5 and Table 1 present an overview of commonalities and differences between TNA, NAMA and NAP processes.

<sup>6</sup> FCCC/CP/2011/9/Add.1;

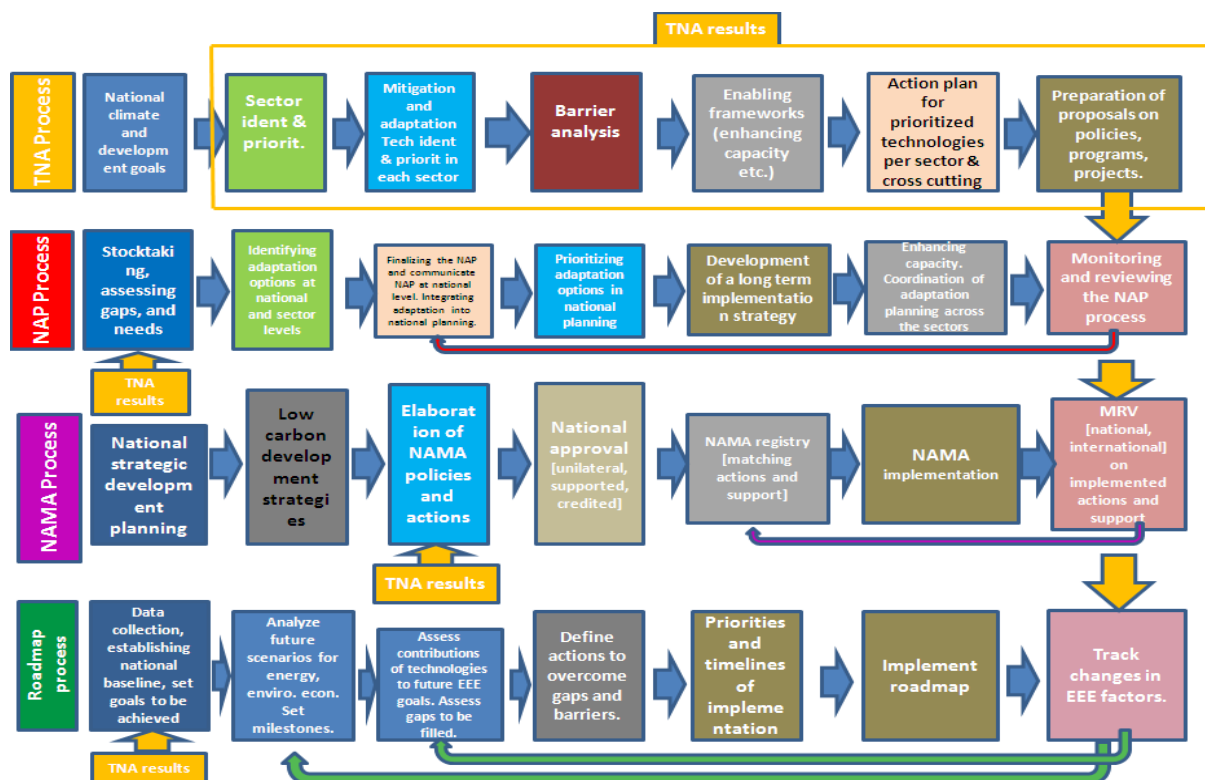
Table 1. Overview of commonalities and differences between processes

a. To what extent are TNA, NAMA and NAP processes embedded in a country's long term development vision?	
<p><b>Commonalities</b></p> <ul style="list-style-type: none"> <li>• Common focus on a country's overall sustainable development context</li> <li>• Strategic (sub)sectors and areas identified in a TNA could be used as inputs for NAMAs and NAPs</li> <li>• Processes are generally participatory</li> </ul>	<p><b>Differences</b></p> <ul style="list-style-type: none"> <li>• Unlike for TNAs, under the Convention no specific methodologies exist for NAMAs and NAPs as of yet</li> </ul>
b. How are technologies or measures for mitigation and adaptation in the country identified?	
<p><b>Commonalities</b></p> <ul style="list-style-type: none"> <li>• TNA procedures are in principle suitable for other policy concepts that identify technologies and actions in light of climate policy and sustainable development.</li> <li>• Therefore, TNA technology portfolios and TAPs could be input for NAMA, and NAP processes.</li> </ul>	<p><b>Differences</b></p> <ul style="list-style-type: none"> <li>• TNAs explicitly focus on technology choices. In NAMAs and NAPs prioritisation of technologies is more an implicit step before formulating policy action.</li> </ul>
c. What actions are envisaged for low-emission and climate-resilient pathways?	
<p><b>Commonalities</b></p> <ul style="list-style-type: none"> <li>• There is a common focus on <i>strategic pathways</i> with action plans either at the technology or sector and national levels.</li> <li>• NAMA and NAP formulation could possibly benefit from the identification in a TNA of actions for acceleration of technologies for mitigation and adaptation.</li> </ul>	<p><b>Differences</b></p> <ul style="list-style-type: none"> <li>• Whereas a TNA focuses mainly on technologies and measures for mitigation and adaptation, NAMAs and NAPs could be more overarching and focus on broader mitigation, adaptation and development issues</li> </ul>

**How to possibly interlink TNA process with NAMAs, NAPs and technology roadmaps processes?**

The figure 5 shows possible input of the TNA results into the other processes. It also shows the stages of the four processes, including TNA, NAP, NAMA and roadmaps. The stages with similar substance are marked with the same colour.

Figure 5: A possible input of the TNA results into other processes under the Convention.



### How TNAs could possibly contribute to NAMA and NAP processes?

- **Prioritisation of measures:** the TNA methodology can be used for a detailed prioritisation of measures to be included in NAMAs or NAPs and possibly implemented. This supports the process of embedding NAMAs in national mainstream processes.
- **Clarity on scale of implementation:** while several NAMAs have been identified, the scale at which these actions could potentially be implemented within a country is often not clear. For instance, implementation could be at full technical potential, at a scale required for meeting country and/or sector goals, or in the form of an isolated project. TNAs and TAPs could offer this information as these assume a certain scale of technology implementation: as project, sector programme, or national strategy.
- **Identification of actions to accelerate development and transfer of technologies and mitigation and adaptation measures:** In a TNA, stakeholders analyse how the development and transfer of priority technologies can be accelerated in the country. This is done by exploring gaps and barriers in the enabling environment for prioritised technologies and by identifying actions to solve these gaps and barriers.
- **A national strategy** for technology development and transfer with action plans, technology programmes, and/or technology projects help to **create an enabling environment** in a country for technologies for mitigation and adaptation. Each of these outputs could be considered inputs for a NAMA and NAP.

### Which benefits would the interlinkages of TNA, NAMA and NAP processes bring?

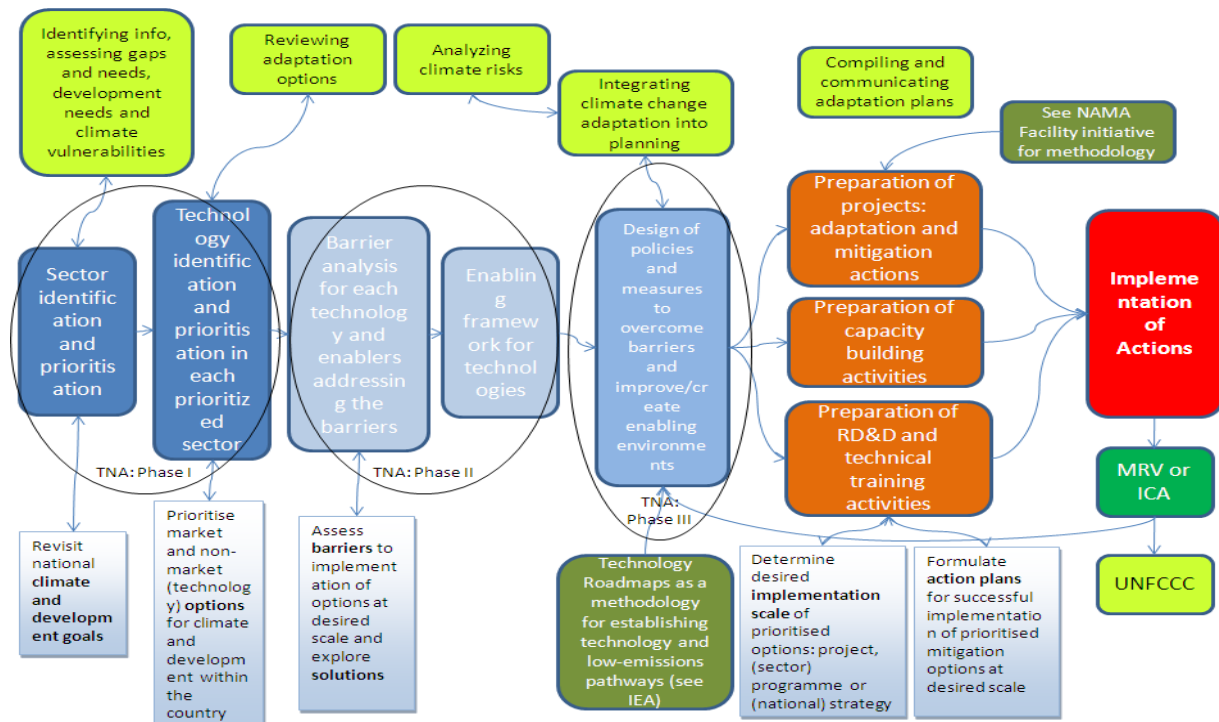
- **Exchanging data and knowledge:** TNAs, NAMAs and NAPs could be complicated by lack of data or limited exchange of data between countries. Inter-linkages with other processes could support collaboration on data collection, avoid ‘data competition’ between processes and help rationalize existing data and other resources across the processes. This would streamline similar but not identical processes and avoid or reduce ‘institutional congestion’.
- **Ensuring high-level attention and recognition:** Given that particularly NAMAs and NAPs have received relatively high level policy attention and recognition, establishing clear process-wise and policy level inter-linkages with these processes could enhance the political recognition of TNAs.
- **Financing and implementing TNA results:** A key obstacle with respect to implementation of TNA identified technologies and TAPs is attracting investors and lack of financing resources. Should TNA outputs be considered as NAMAs or under NAPs, funding and investment support allocated to NAMAs and/or NAPs would also, indirectly, support implementation of TNA results.
- Next to TNAs’ possible contribution in terms of providing inputs to NAMAs and NAPs, **harmonisation of processes** could also support the acceleration of implementing TNA results, more specifically the data could be allocated more efficiently to the harmonized process steps, and the TNA outputs could receive increased recognition by high-level public and private decision makers, which would then also support implementation of TNA outputs.
- **Establishing inter-linkages between TNAs, NAMAs and NAPs** would help a country rationalize the outputs from these processes. Non-harmonised processes could result in duplications and ‘blind spots’ or it could result in a patchwork of, potentially conflicting, messages to policy makers, financial entities, capacity building supporters and other stakeholders.

### How to possibly integrate TNA process with NAMAs, NAPs and technology roadmaps processes?

The Figure 6 clarifies the relationship among TNA and NAMA and NAP processes, and how the methodologies developed for TNA Phase I (prioritizing sectors and technologies, MCA), Phase II (Identifying barriers and measures) and Phase III (Plan of Action) can be possibly applied in NAMA and NAP processes, and vice-versa. The methodology used for roadmaps can be, for example, used to improve the Plan of Action, currently in phase III of the TNA.



Figure 6: Relations among TNAs and NAP and NAMAs



**Recommendations of the TEC to inform the planning process at national level, to avoid duplication of efforts of countries in the planning process, and to enhance the implementation of mitigation and adaptation actions**

[Process]

- (a) Governmental engagement in the TNA process is fundamental to deliver predictable policies and to create appropriate regulatory frameworks to enable environments for investments, and to participate in innovative funding instruments such as public–private partnerships,
- (b) Nationally focused technology development and implementation efforts should match existing sectorial and regional markets for ESTs,
- (c) Thoroughly defined criteria for the identification of sectors and technologies, such as GHG emission reduction potential, cost, contribution to socio-economic–environmental development, and technology maturity, should be the basis for the identification and prioritization of sectors and technologies,

[Results]

- (a) There is a need to enhance the guidance on the development of TAPs and project proposals, including by sharing experiences gained in their development. The use of TAPs was considered essential to provide a basis for the implementation of the TNA results,
- (b) Better matching projects with existing and future financial resources should be an immediate benefit of improved TNAs and TAPs, and early dialogue with funders is essential to ensure compatibility with their guidelines and funding criteria, as this is a basic criterion for project implementation.

[Interlinkages and integrations]

- (a) Parties should replicate efforts of those Parties which identified actions under NAMAs and NAPs in line with the results of their TNA reports, conducted in the second round.
- (b) The TNA should evaluate the technical, economic and financial viability of the priority technologies that may be considered when elaborating NAMAs and NAPs, and when elaborating concrete project proposals.