

Background note on project ideas identified from technology needs assessments.

I. Introduction

A. Background

1. The COP by decision 1/CP.16 decided that one of the functions of the Technology Executive Committee (TEC) is to provide an overview of technological needs and analysis of policy and technical issues related to the development and transfer of technologies for mitigation and adaptation.
2. The rolling work plan for 2012-2013 of the TEC included an activity to review technology needs from various sources with a view to strengthening the understanding of technology needs, complement process for national communications nationally appropriate mitigation actions, and national adaptation plans, and support the TEC in preparing its recommendations, guidance, policies and programmes.
3. At its thirty-fifth session, the Subsidiary Body for Scientific and Technical Advice (SBSTA) requested the secretariat to prepare an updated technology needs assessment (TNA) synthesis report for SBSTA 37, including TNAs conducted by Parties not included in Annex I to the Convention (non-Annex I Parties) under the Poznan strategic programme on technology transfer. By 31 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 Parties not included in Annex I to the Convention” (third synthesis report on TNAs) presented at SBSTA 39. The third synthesis report on TNAs also contains information on project ideas reported by most of Parties in their TNAs.

B. Scope of note

4. This background note provides a detailed description and analysis of the project ideas reported by Parties in their TNAs and technology action plans and project ideas report. The background note provides detailed information on types of projects reported by Parties for adaptation and mitigation, and provides regional considerations in the most prioritized adaptation and mitigation sectors. This note further introduces details of cross cutting issues of project proposals such as capacity building, and of specific elements of the project proposals such as risks and challenges, timelines and budgets. The background note concludes with efforts to link the proposed projects and activities with issues for further considerations which arose from the in-session workshop on TNAs organized in conjunction with the 7th meeting of the TEC.

C. Possible action by the Technology Executive Committee

5. The TEC may wish to exchange views on the information provided in this background note and identify any activities as part of its work plan for 2014–2015 on this matter.

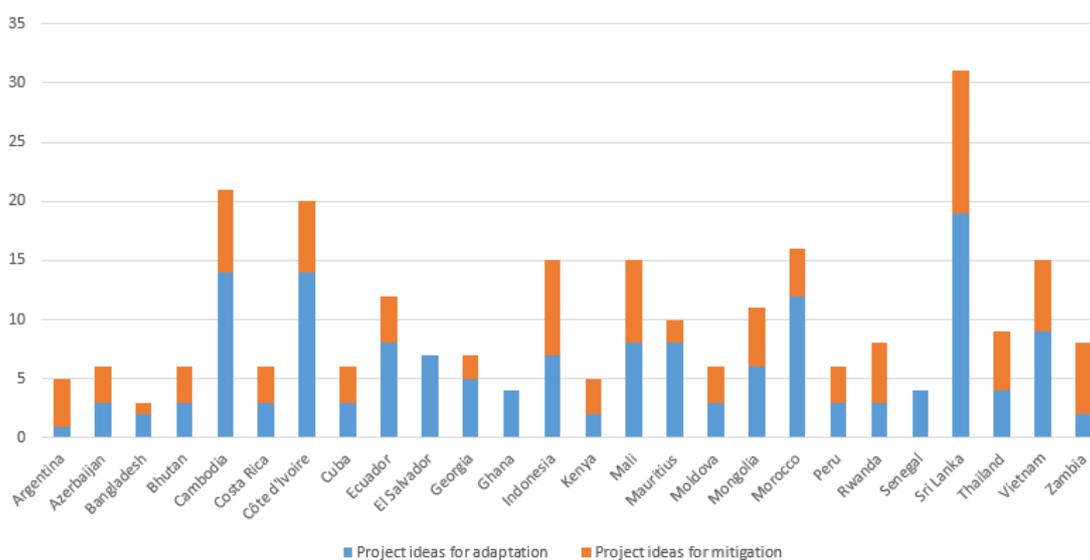
II. Project ideas identified from TNAs

A. General information

6. In the UNEP GEF TNA project there were in total 262 project ideas reported by 26 Parties. For adaptation 157 project ideas were submitted by 26 Parties. For mitigation 105 project ideas were submitted by 23 Parties.

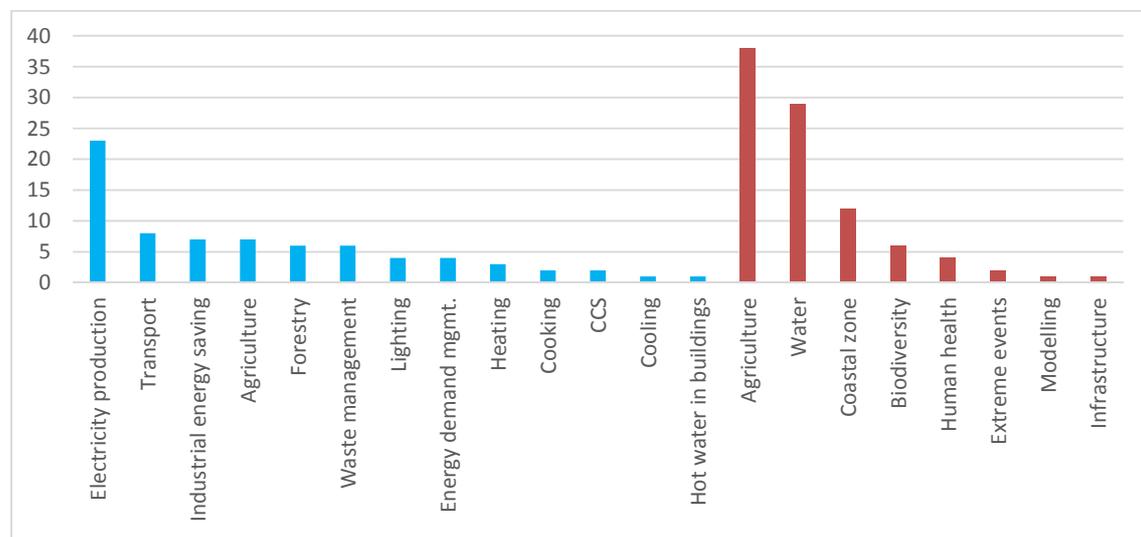
7. Figure 1 provides an overview of the number of adaptation and mitigation project ideas per Party. All the parties reported adaptation project ideas. Senegal, Ghana and El Salvador reported only adaptation ideas.

Figure 1. Number of mitigation and adaptation project ideas submitted per Party.



8. In adaptation most of the project ideas were reported in the agriculture and water sectors, followed by the coastal zone sector. In mitigation most of the project ideas were reported in the area of electricity production, followed by transport and energy industry. Figure 2 provides a distribution of project ideas in the mitigation and adaptation sectors.

Figure 2. Distribution of reported project ideas in mitigation and adaptation sectors



9. Figure 2 provides an overview of quantification of adaptation and mitigation project ideas per Party. All the parties reported adaptation project ideas, Senegal, Ghana and Ecuador reported only adaptation ideas. Mitigation project ideas were mostly prioritized by several countries, including Argentina and Rwanda.

10. Several project ideas were cross sectorial and in some cases reported in other sector than they would belong to (according to the IPCC classification of mitigation and adaptation sectors from 2006). For example in adaptation, some water related projects were reported in the agriculture sector. Also in mitigation, transport related project ideas were in some cases reported in the energy sector, such as for example project on plug-in hybrid electric vehicles. These projects were organized in this note, reflecting the sector where the technology belongs to according to the IPCC classification.

11. The new components of the TNA process were the preparation of technology action plans and project ideas. The technology action plan is consisting of a group of measures to address identified barriers to the development and transfer of technologies. Project ideas proposed concrete actions for the implementation of the technologies. Since both technology action plans and project ideas reports were not described in detail in the TNA Handbook, the elaboration of these deliverables has not been bound by strict guidelines.

12. The structure of the project ideas commonly contained the following elements:

- (a) Introduction and background,
- (b) Project objectives,
- (c) Measurable outputs,
- (d) Relationship to the countries sustainable development priorities,
- (e) Project deliverables,
- (f) Project scope and possible implementation,

- (g) List of project activities,
- (h) Timeline for activities,
- (i) Measurement and evaluation,
- (j) Possible complications and challenges,
- (k) Responsibilities and coordination, and
- (l) Budget and resource requirements.

13. Most of the Parties reported their projects following the above structure, some of the Parties did not include some elements, most often measurement and evaluation.

B. Project ideas reported for adaptation

14. There were 26 Parties who reported project ideas in TNA, technology action plans and project ideas reports with a total of 157 proposals in adaptation area. Most of the project ideas reports were reported in the agriculture and water sectors.

15. Most of the project ideas were developed in the **agriculture sector**. The following adaptation technologies were commonly requested by Parties in the agriculture sector per region:

16. Asian Parties:

- (a) New crop species resistant to climate change in arid zones with very low rainfall and desert or semi-desert terrain,
- (b) Crop diversification and precision farming, rehabilitation of existing embankments, dykes and dredging,
- (c) Salinity tolerant and short maturing rice variety,
- (d) Training on farming practise for crops,
- (e) Specialized agricultural R&D and technology dissemination centres,
- (f) Land management and land use planning.

17. African Parties:

- (a) Integrated nutrient management technology to farmers,
- (b) Agricultural extension services in regions,
- (c) Drought tolerant sorghum in arid and semi-arid lands,
- (d) Micro irrigation technologies.
- (e) Agro-forestry and radical terraces,
- (f) Rainwater harvesting for agriculture applications in dry provinces,
- (g) Conservation farming to increase resilience of farmers,
- (h) Integrated farming systems.

18. Latin American Parties

- (a) Agroforestry,
- (b) Rice production systems, agricultural and water management,
- (a) Drip irrigation systems,
- (b) Irrigation efficiency through training.

19. **Eastern European Parties:**

- (a) Conservation system of soil tillage without herbicides for winter wheat,
- (b) Vetch field as green fertilizer into five year crop rotation.

20. Second largest amount of project ideas were developed in the **water sector**. The following adaptation technologies were commonly requested by Parties in the water sector per region:

21. **Asian Parties:**

- (a) Water saving drip and sprinkler irrigation technologies in arid zones,
- (b) Rehabilitation and restoration of minor tank networks,
- (c) Rainwater harvesting from rooftops,
- (d) Boreholes and tube wells as drought intervention,
- (e) Rehabilitation of existing embankments, dykes and dredging,
- (f) Monitoring of sea level rise, tidal fluctuation, and coastal erosion,
- (g) Tidal river management.

22. **African Parties:**

- (a) Rainwater collection from ground surfaces,
- (b) Rainwater harvesting in small reservoirs and micro catchment,
- (c) Post construction support for community managed water systems,
- (d) Water harvesting and drip irrigation in communities,
- (e) Boreholes and tube wells for domestic water supply,
- (f) Implementation of desalination technologies,

23. **Latin American Parties**

- (a) Water recovery in rural areas
- (b) Water quality monitoring systems,
- (c) Exploitation of wells for water extraction

24. The other sectors where project ideas reports were delivered by Parties were **health, biodiversity, and coastal zones**. The proposals reported in these sectors included following adaptation practices and technologies¹:

¹ The regional distribution of project ideas was provided for the first two most identified adaptation sectors.

25. Health:
- (a) Provisional posts of medical emergency care and prompt rehabilitation during critical periods of heat,
 - (b) Early warning systems and networking for information exchange on extreme weather and climate change related events,
 - (c) Transfer of knowledge and skills to health personnel to improve performance with regard to climate change related events,
 - (d) Management of healthcare waste.
26. Biodiversity:
- (a) Restoration of degraded areas inside and outside the protected area network to enhance resilience,
 - (b) Connectivity of climate change critical areas through corridors, landscape improvement and management,
 - (c) Management, and increase extent of protected areas, buffer zones and create new areas in vulnerable zones,
27. Coastal zones:
- (a) Restoration of sand dunes to develop soft barriers against sea level rise,
 - (b) Rehabilitation of mangroves to protect coastal communities against sea level rise,
 - (c) Restoration of coral reefs as a soft coastal barrier against sea level rise,
 - (d) Wetland protection,
 - (e) Rock revetment,

28. Some regional considerations around the project ideas reported in agriculture, water projects are provided below:

Agriculture related projects:

29. In Asia, Africa and Latin America regions most of the reported project ideas include crop management technologies and drought resistant technologies and approaches. This reflects the key adaptation needs in agriculture in numerous developing countries.

30. Another important area for project ideas is land management. While in Africa agricultural extension services are needed to enhance crop and livestock agriculture, in Asia there is need to develop research and development centres to cope with issues around the land management.

31. In Eastern Europe there were project ideas proposed for environmentally friendly soil treatment such as soil tillage without herbicides and using green fertilizer within crop rotation cycle.

Water related projects

32. In Asia and Africa regions irrigation and water harvesting and collections seem to

be of paramount priorities. In both regions the reported projects include irrigation drip and sprinkler technologies, and rainwater collection roofs, ground, and micro catchment from small reservoirs technologies, as well as development of boreholes and tube wells in rural areas. In Africa desalination processes were also reported. Water recovery and quality control are issues for many Latin American parties.

C. Project ideas for mitigation

33. There were 23 Parties who reported project ideas in TNA, technology action plans and project ideas reports with a total of 105 proposals in mitigation area. Most of the project ideas reports were reported in energy, industrial processes, transport and waste sectors.

34. In mitigation area most of the project ideas were developed in the **energy sector**. The following mitigation technologies were commonly requested by Parties in the energy sector per region:

35. Asian Parties:

- (a) Solar thermal energy at municipal level,
- (b) Biogas technology in rural communities,
- (c) Effective stoves in remote rural communities,
- (d) Co-firing of biomass and coal,
- (e) Compact biogas digesters for urban households,
- (f) Light emitting diode (LED) lighting, compact fluorescent lamp (CLF) and linear fluorescent lamp (LF) lighting,
- (g) Smart grid technology balancing solar, wind and hydro energy inputs,
- (h) Solar based air-conditioning,
- (i) Solar home photovoltaic technology,
- (j) Natural gas combined cycle technology,
- (k) Advanced pulverized coal technology,

36. African Parties:

- (a) Solar home systems and solar dryers to replace fossil fuels,
- (b) Biogas technology,
- (c) Small hydro power technology in rural areas,
- (d) Geothermal energy for electricity production,
- (e) Combined cycle gas turbine,
- (f) Biomass based gasifier for off grid electricity generation,
- (g) Energy efficiency and management systems for industry, commerce and municipalities.

37. **Latin American Parties:**

- (a) Electricity generation from waste,
- (b) Sawmill waste gasification

38. **Eastern European Parties:**

- (a) Internal combustion engine CHP plants,

39. The other sectors where project ideas reports were delivered by Parties were **industrial processes, transport and waste sectors**. The proposals reported in these sectors included following mitigation technologies²:

40. Industrial processes:

- (a) Waste heat recovery implementation model based on pilot project,
- (b) Increase efficient motor usage in industry,
- (c) Increase amount of variable speed drives in industry,
- (d) Industrial biomass CHP plant.

41. Transport:

- (a) Application of intelligent transport systems,
- (b) Implementation of plug-in hybrid electric vehicles,
- (c) Integration of non-motorized transport,
- (d) Promote carpooling and park and ride systems,
- (e) Electrification of the national railway.

42. Waste:

- (a) Increase use of waste based biogas technology for households,
- (b) Municipality solid waste gasification plant,
- (c) Solid waste management – promotion and enhancing of composting.

43. Some regional considerations around the project ideas reported in energy related projects are provided below:

Energy related projects

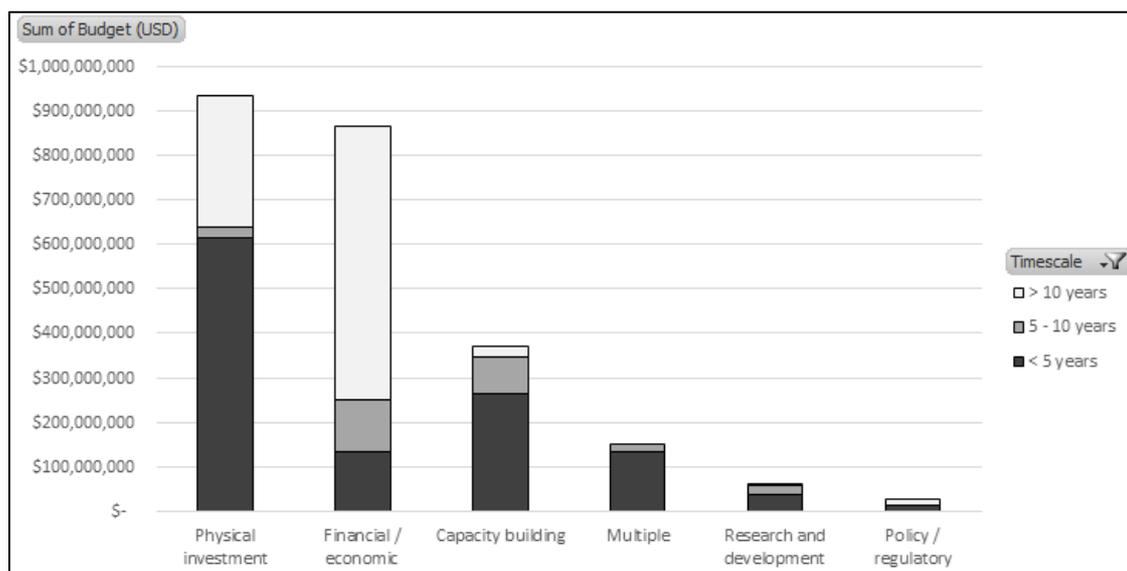
44. Solar technologies for electricity and heating and cooling were reported in project ideas reports from Asia and Africa. In Asia there was a demand for several modern technologies including balancing solar electricity, wind electricity and hydroelectricity inputs into grid, implementation of lighting technologies using fluorescent lamps, and pulverised coal technology. In African regions small hydro power plants were considered priority. In all three regions there were projects reported which included biogas technology producing electricity.

² The regional distribution of project ideas was provided for the most identified mitigation sector.

D. Capacity building

45. Building of local capacities in relation to transfer, effective operation and maintenance of delivered technologies was a significant element of numerous reported project ideas. This is well reflected in the financial requirements for capacity building reported by Parties. As seen in the figure 3 below, the short term, up to 5 years, financial requirements for capacity building are directly following physical investment.

Figure 3. Budget for capacity building and its timeline compared with other relevant financial needs.



46. Capacity building was requested for various target groups including political decision makers, implementing entities, professionals at community level, researchers, and civil society.

47. A need for training of various target groups, including technology users and operators, community level professionals, political decision makers, representatives of financing institutions was reported by many Parties. The training was often presented as a tool to get familiarized with a technology or new practice. Some of the trainings requested were enhancing technical knowledge and skills, other training were requested to familiarize with particular techniques around technologies such as water systems, or integrated nutrient management to farmers, or advantages of technologies, which were previously not used in the region or community, such as drought tolerant crops.

48. Requested budget for capacity building around the reported project ideas was the third largest after physical investment and financial and economic needs. Most of the capacity building budget requirements fall into the timeline from 1 to 5 years. The overview of the budget for capacity building is provided in Figure 3.

III. Some specific elements of the project ideas

A. Risks and challenges

49. Most of the Parties reported risk and challenges to the implementation of the proposed projects. They included risk and challenges related to:

- (a) Public decision makers – lack of institutional coordination, lack of institutional capacity, lack of political goodwill, low political priority,
- (b) Legislation – insufficient legal and regulatory framework,
- (c) Finance - untimely finance, poor loan recovery measures, lack of soft loans or tax rebates, insufficient involvement of the private sector,
- (d) Human capacities - lack of qualified personnel in districts, low willingness of community members to participate at the projects, limited human resources,
- (e) Decision making process – insufficient involvement of stakeholders in the decision making process,
- (f) Technology - lack of acceptance of new technology, lack of incentives to adapt technology, high price of technology, poor availability of technology, poor site selection for technology implementation,
- (g) Monitoring and evaluation – lack of monitoring and evaluation of project implementation.

50. In some cases the reported projects included a technology or practices which were not previously used in the target region or community, and in some cases feasibility studies were requested to assess the appropriateness of a technology for the selected region or community. The top down approach has been used in many TNAs in selecting and prioritizing technologies or practices, without involvement of their potential users and operators.

B. Timelines of project ideas

51. Most of the adaptation projects ideas were reported with timeline from 1 to 5 years. Several reported Project had the timeline from 5 to 10 years. The average timeline of the adaptation project ideas is about 5,5 years.

52. Most of the mitigation projects ideas were reported with timeline from 1 to 5 years. Few mitigation projects were reported with timeline from 5 to 10 years. Seven mitigation projects were reported with timeline 20 to 25 years. The average timeline of the mitigation project ideas is about 7,8 years.

C. Budgets of projects

53. From 262 project ideas there were 248 project ideas accompanied with budget. The total budget of project ideas in adaptation and mitigation was more than 25 billion USD. Although the budgets of individual project ideas were very different, from 20.000 USD to more than 4 billion USD, the average budget per project idea was more than 116

Million USD irrespective of adaptation or mitigation project area.

54. From 157 project ideas in adaptation there were 149 accompanied with budget. The total budget of project ideas in adaptation was almost 12 billion USD. The budgets of individual adaptation project ideas were very different, from 20.000 USD to more than 4 billion USD. The average budget per adaptation project idea was about 85 million USD.

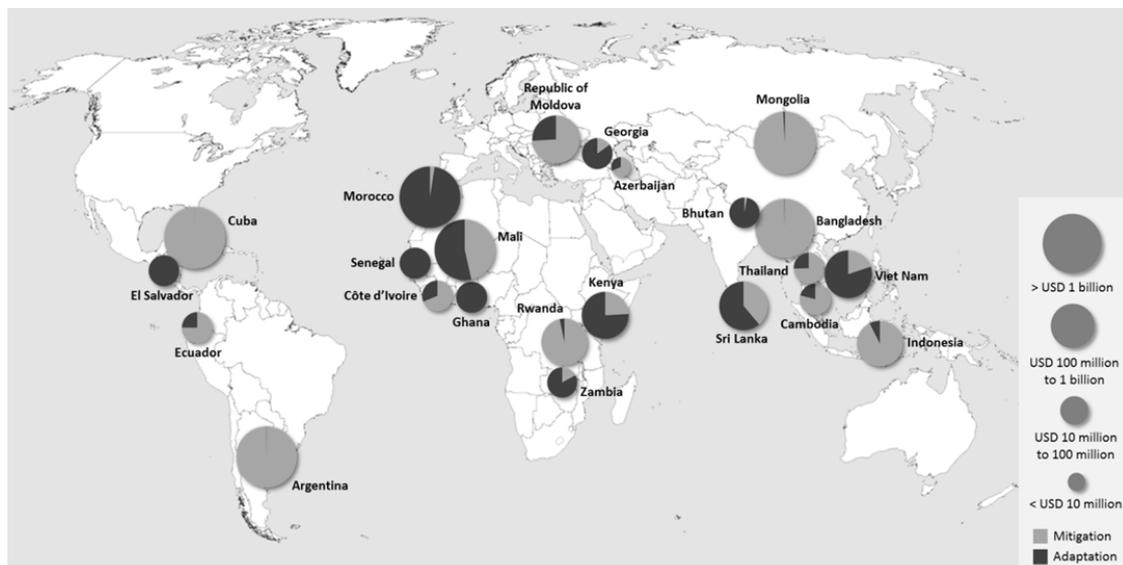
55. There were about 50 adaptation projects ideas with budget request under 1 million USD and vast majority of adaptation project ideas requested budget under 10 million USD. Four project ideas had budgetary needs of more than 1 billion USD.

56. From 105 project ideas in mitigation there were 99 accompanied with budget. The total budget of project ideas in mitigation was more than 13 billion USD. The budgets of individual mitigation project ideas were very different, from 50.000 USD to some 3,7 billion USD. The average budget per mitigation project idea was about 141 million USD.

57. There were about 25 mitigation projects ideas with budget request under 1 million USD and majority of mitigation project ideas requested budget under 10 million USD. Four project ideas had budgetary needs of more than 1 billion USD.

58. Several project ideas included co-financing from 5% to 50% of the total project costs. The co-financing came either from domestic financial resources through a special purpose programmes, or directly from the state budget, or from international financial institution through a special purpose programmes. The map shown in figure 4 provides a visualization of the required budgets for all the project ideas of each Party.

Figure 4. World map showing Parties' budgets for the project ideas identified as part of their technology needs assessments



IV. Issues for further consideration

59. Several project related issues were raised during the in-session workshop on TNAs, which took place in conjunction with the seventh meeting of the TEC in September 2013

in Bonn. They included:

- (a) There is need to elaborate project ideas in a more comprehensive way,
- (b) Importance of interlinking TNAs with other planning processes under the Convention, including NAMA and NAP processes,
- (c) There is opportunity for the CTCN to work on the project ideas identified in the TNAs, to facilitate implementation of the TNA results,
- (d) National designated entities should be engaged in the TNA process,
- (e) A monitoring and evaluation step could be included in the TNA process.

60. Concerning the implementation of the results of TNA the guiding question at the workshop was: *“How could the TNA process be enhanced to achieve greater implementation of technology development and transfer activities?”* The following issues arose from the related discussion during the workshop:

- (a) Linking specific project proposals to the existing related processes to scale-up their implementation,
- (b) Involving the financial community as early as possible into the process,
- (c) Strong inter-ministerial and cross sectorial ties to foster the implementation,
- (d) Linking TNA with CTCN activities,
- (e) A need for capacity building to enable developing countries to come up with adequate project ideas,
- (f) Bundling of different public bonds to distribute investment risk in various layers,
- (g) The time frame for national planning often only allows for short term planning,
- (h) The national TNA coordination needs to be built on a strong institutional structure and a country ownership including during and after the TNA process,
- (i) Linking the TNAs to new financing mechanism and the GCF.

61. The above issues may be considered for further consideration by the TEC when discussing the implementation of the results of the TNAs.