Statistical data and detailed analysis of surveys on needs, gaps, challenges, enablers and measures to develop and enhance endogenous capacities and technologies

Note: This document is to be read in conjunction with the Final Report on Needs, gaps, challenges, enablers and measures to develop and enhance endogenous capacities and technologies (TEC22 meeting document TEC/2021/22/10, available in https://unfccc.int/ttclear/tec/meetings.html). Each section of this annex refers to a section in the main report. Numbering of figures and tables presented here in the annex are different than those in the main report.

I. Statistical data and analysis of surveys related to section 2.1 - Respondent characteristics

A. Countries and regions

All three surveys asked which country the respondent was from, and in which region that country is located. Table 1 shows the number of countries represented by the survey respondents. Table 2 shows the distribution of those countries across the five regions recognized by the United Nations.

Table 1

Respondent home countries

	Survey 1	Survey 2	Survey 3
Number responding	46	31	27
Number of countries reported	39	25	19

Table 2

Regions in which respondent countries are located

Regions	Survey 1	Survey 2	Survey 3
African States	44%	12%	35%
Asian States	26%	32%	31%
Eastern European States	12%	9%	4%
Latin American and Caribbean States	14%	12%	12%
Western Europe and Other States	5%	35%	19%
Number responding	43	34	26
Number of countries	39	25	19

In general, the regions of members and observers were different from those of the other two groups. Seven out of ten of the responding NDEs and TNAFPs were from African (44%) or Asian (26%) states. Numbers were similar for the practitioners of Survey 3 (African 35%, Asian 31%). In contrast, fewer than half of the members and observers were from African (12%) or Asian (32%) states. More than a third of the Survey 2 respondents reported they were from Western Europe and Other States (35%), while fewer Survey 1 (5%) or Survey 3 (19%) respondents were from that area. None of the groups had many respondents who reported being from Eastern Europe or Latin America or the Caribbean.

Practitioners were asked an additional question about countries where they have worked.

In which country have you had the most experience with endogenous capacities and technologies?

The regions where practitioners had worked lined up very closely with the regions where they lived. The main exception was that more reported experience in Latin American and Caribbean States (22%), and fewer had gained their experience in Western Europe and other States (4%).

B. Languages

Understanding language preferences is critical to effective communication. All three surveys asked about language competencies and comfort.

Which languages do you speak? (Check all languages that you speak.)

Table 3 shows the languages that respondents reported they could speak. At leastnine out of ten respondents to each of the surveys reported that they speak English. No other language was spoken by more than a third of any group.

Table 3

Languages spoken by respondents

Languages spoken	**Survey 1**	**Survey 2**	**Survey 3**
Arabic	13%	6%	0%
Chinese	0%	12%	0%
English	91%	100%	96%
French	20%	32%	25%
Russian	11%	6%	0%
Spanish	13%	15%	11%
Other	28%	41%	46%
Number responding	46	34	28

The surveys also asked about preferences among the UN languages.

Which United Nations language do you feel most comfortable using? (Please select only one UN language. Feel free to skip this question if you prefer not to respond.)

Table 4

Use of United Nations languages

United Nations languages	**Survey 1**	**Survey 2**	**Survey 3**
Arabic	7%	0%	0%
Chinese	0%	3%	0%
English	67%	82%	82%
French	15%	3%	11%
Russian	4%	3%	0%
Spanish	7%	9%	7%
Number responding	46	34	28

Table 4 shows the results. Two-thirds of the Survey 1 respondents and more than four out of five of the respondents to the other two surveys indicated they are comfortable using English. An additional 15% of the Survey 1 group said they were most comfortable with French. Note that the surveys were administered entirely in English, so people uncomfortable with the English language may have avoided participating in the surveys.

C. Roles relating to UNFCCC and climate technologies

Each survey asked additional questions about the roles respondents have played in the UNFCCC process or in working with climate-related technologies.

Survey 1: NDEs and TNAFPs

Roles and experience

Information was sought about multiple roles that NDEs and TNAFPs play in the UNFCCC process. Their responses appear in Table 5.

In which of the following roles do you serve? Please check all roles involving climate technologies in which you currently serve.

Table 5

Roles in UNFCCC process – Survey 1

Current Roles	**Percent**
National Designated Entity	80%
Technology Needs Assessment Focal Point	38%
UNFCCC Focal Point	11%
Global Environment Facility Focal Point	0%
National Designated Authority	4%
Other government position related to the UNFCCC (please specify)	10%
Number responding	45

Four out of five (80%) of the respondents currently serve as NDEs, and 38% serve as TNAFPs. Fourteen people (31%) serve in both roles.

Survey 1 asked NDEs and TNAFPs about their years of experience in those roles.

If you currently serve as a National Designated Entity, how many years have you served in that position?

If you currently serve as a Technology Needs Assessment Focal Point, how many years have you served in that role?

Table 6 presents the number of years reported by the two groups.

Table 6

Years of experience as NDE or TNAFP

Years in role (calculated using 36 current NDEs and 22 current TNAFPs)	**NDEs**	**TNAFPs**
Less than 1 year	3%	9%
1 year	3%	23%
2 years	22%	27%
3 years	17%	18%
4 years	11%	9%
5 or more years	44%	14%
Number of responses	36	22

Median years	4	3

Of the 36 current NDEs, their median years of experience is 4 years. TNAFPS tend to have slightly less experience, with a median of 3 years. Fewer than one in ten of either group reported they had less than a year of experience.

Survey 2: Members and Observers

Survey 2 asked respondents about the roles they play in the UNFCCC process. Their responses are shown in Table 7.

In which of the following roles do you currently serve or have you previously served? Please check all roles involving climate technologies in which you currently serve.

Table 7

Roles in UNFCCC process – Survey 2

Roles	**Number**	**Percent**
TEC member	13	39%
TEC observer	12	36%
TEC task force member	6	18%
CTCN AB member	5	15%
CTCN AB observer	5	15%
PCCB member	4	12%
PCCB observer	1	3%
Country negotiator	12	36%
Other role related to UNFCCC	7	21%
Number of respondents	33	--

Most of the Survey 2 respondents are TEC members (39%) or TEC observers (36%). Fewer than one in six reported that they are a Climate Technology Centre and Network Advisory Board (CTCN AB) member (15%), CTCN AB observer (15%), or Paris Committee on Capacity Building (PCCB) member (12%).

More than one in three respondents reported that they are currently or had been country negotiators (36%). Of these, twelve people said they were or had been TEC members and six others reported that they are or had been TEC observers. Seven negotiators said they were CTCN AB members or observers.

Survey 3: Practitioners

Survey 3 respondents have experience working on the ground with climate-related technologies and are less likely to be directly involved in UNFCCC processes. One question did ask about CTCN membership, but the main questions focused on types of experiences with climate technology-related work rather than on specific roles within the UNFCCC.

CTCN membership

The CTCN is the practice arm of the technology framework. Many climate practitioners are members of the CTCN Network. The survey was sent to the CTCN membership, as well to other practitioner groups,

such as those subscribing to the newsletter for the Nairobi Work Programme (NWP) and individuals identified by UNFCCC constituencies representing observer organizations. The survey enquired about CTCN membership. Responses are presented in Table 8.

Are you a CTCN Network member?

Table 8

CTCN membership

CTCN Network member	**Percent**
Yes	26%
Not sure	37%
No	37%
Number of respondents	27

Just over one in four (26%) of the responding practitioners said they are members of the CTCN Network, 37% stated no, while more than a third (37%) were not sure. It is not clear from this particular response if the respondents were unsure because they do not know whether their organization is a member of CTCN network or if they are unfamiliar with the CTCN Network.

Experience with climate technologies

Survey 3 also asked practitioners about their experience with climate technologies, which illuminates the types of roles they have played. Responses are presented in Table 9.

Please check all activities involving climate technologies in which you have experience.

Table 9

Experience with climate technologies – Survey 3

Climate technology activities	**Percent**
Promoted good practices in use of climate technologies	71%
Designed or developed project involving climate technologies	57%
Adapted climate technologies to meet local needs and conditions	54%
Implemented project involving climate technologies	50%
Trained people in using climate technologies	50%
Researched climate technologies	46%
Collaborated in public/private partnership involving climate technologies	36%
Collaborated in South-South or triangular cooperation involving climate technologies	36%
Developed new climate technologies	25%
Other activities related to climate technologies (please specify)	21%
Represented climate technology company	14%
Number of respondents	28

Most of the responding practitioners have promoted good practices in uses of climate technologies (71%). More than half have designed or developed a project involving climate technologies (57%), and half reported they have implemented a project involving climate technologies (50%). Respondents were

more likely to have adapted climate technologies to meet local needs or conditions (54%) than to have developed new climate technologies (25%). More than a third have participated in collaborative efforts such as public/private partnerships (36%) or South-South or triangular cooperation (36%).

D. Employment

All three surveys included questions about respondents' main and secondary employers.

Who is your primary employer? Please check only one option.

Table 10 shows the primary employers reported by the three groups of respondents.

Table 10

Primary employer

Primary Employer	Survey 1	Survey 2	Survey 3
National government	85%	29%	4%
Sub-national government	0%	0%	0%
Intergovernmental organization	0%	3%	11%
Academia	4%	24%	18%
Business or industry	0%	9%	7%
Non-governmental organization	2%	15%	46%
Consulting firm	7%	12%	4%
Other	2%	9%	11%
Number responding	46	34	28

Survey 1, which was sent to national representatives, confirmed that most respondents work for their national government (85%). The remainder work mainly for consulting firms (7%) or academia (4%).

Members and observers were more varied, with more than half working either for their national government (29%) or academia (24%). Non-governmental organizations (15%) and consulting firms (12%) employ a few more.

The practitioners reported a different set of employers. Almost half work for NGOs (46%), with the next most frequent employer being academia (18%). Almost none of the practitioners work primarily for business and industry (7%), their national government (4%) or consulting firms (4%).

None of the respondents on any of the surveys reported working primarily for a sub-national government, although one person from Survey 1 and one from Survey 3 said they had a secondary employer below the national level. Local and municipal governments are heavily engaged in climate action, and their employees may deserve a separate survey in any future work on endogenous capacities and technologies.

The surveys also asked for the roles that respondents play with their primary employer. This was an open-ended question. A list of responses will be available in the expanded report to be presented at TEC 22.

What is your primary role with this employer?

An additional question addressed other employment. Responses are summarized in Table 11.

If you work for more than one entity, please check any other types of organizations for whom you currently work.

Table 11

Other employers

Other Employers (percentages based on the number from that survey who responded to this item)	**Survey 1**	**Survey 2**	**Survey 3**
National government	78%	9%	13%
Sub-national government	4%	0%	6%
Intergovernmental organization	0%	0%	13%
Academia	22%	15%	38%
Business or industry	9%	9%	13%
Non-governmental organization	4%	21%	50%
Consulting firm	9%	6%	31%
Other	4%	6%	25%
Number responding	23	15	16

Some of the NDEs and TNAFPs have secondary jobs. While only 4% work primarily for academia, 22% reported that they have a secondary academic role. None said they work primarily for business and industry, but 9% reported a secondary role. Many of the respondents to Surveys 2 and 3 also reported secondary employment.

II. Statistical data and analysis of surveys related to section 3 – Findings on needs and gaps

As part of analyzing measures that can promote endogenous capacities and technologies, the surveys sought to investigate and analyze current gaps and needs in country's endogenous capacities from different perspectives. Information was also collected relating to perceptions about current skill and capacity needs.

A. Gaps in current capacities

To determine perceptions about capacity needs in particular areas, all three surveys included the following question.

Using the definitions of endogenous capacities and technologies described at the beginning of this survey, please rate the level of [Survey 1: your country's, Survey 2: country, Survey 3: country where you have the most experience] current capacities in the climate technology areas listed below.

A list of 22 climate technology areas was provided for the ratings. The areas were identified as falling under Mitigation (M), Adaptation (A), or Cross-cutting (X), and included examples for each area (not included in the table). The complete list of areas, including examples, can be found in the survey questionnaires. Respondents were asked to use the following scale for their ratings.

- Very weak capacities
- Somewhat weak capacities
- Somewhat strong capacities
- Very strong capacities

The **identification of needs and gaps requires information about areas of weakness**. Table 12 shows the percentages of respondents who chose either "Very weak" or "Somewhat weak capacities," implying a strong need for capacity building in that area.

Table 12

Weaknesses in current capacities

Current Capacities	Survey 1	Survey 2	Survey 3
M: Carbon fixation & abatement	80%	62%	43%
M: Transport	85%	53%	36%
M: Energy efficiency	46%	26%	57%
M: Renewable energy	43%	32%	68%
M: Waste management	80%	47%	25%
M: Forestry	46%	29%	39%
M: Agriculture	78%	50%	18%
M: Industry	78%	41%	39%
A: Early warning and environmental assessment	70%	53%	32%
A: Agriculture and forestry	54%	35%	39%
A: Water	63%	59%	29%
A: Human health	78%	62%	29%

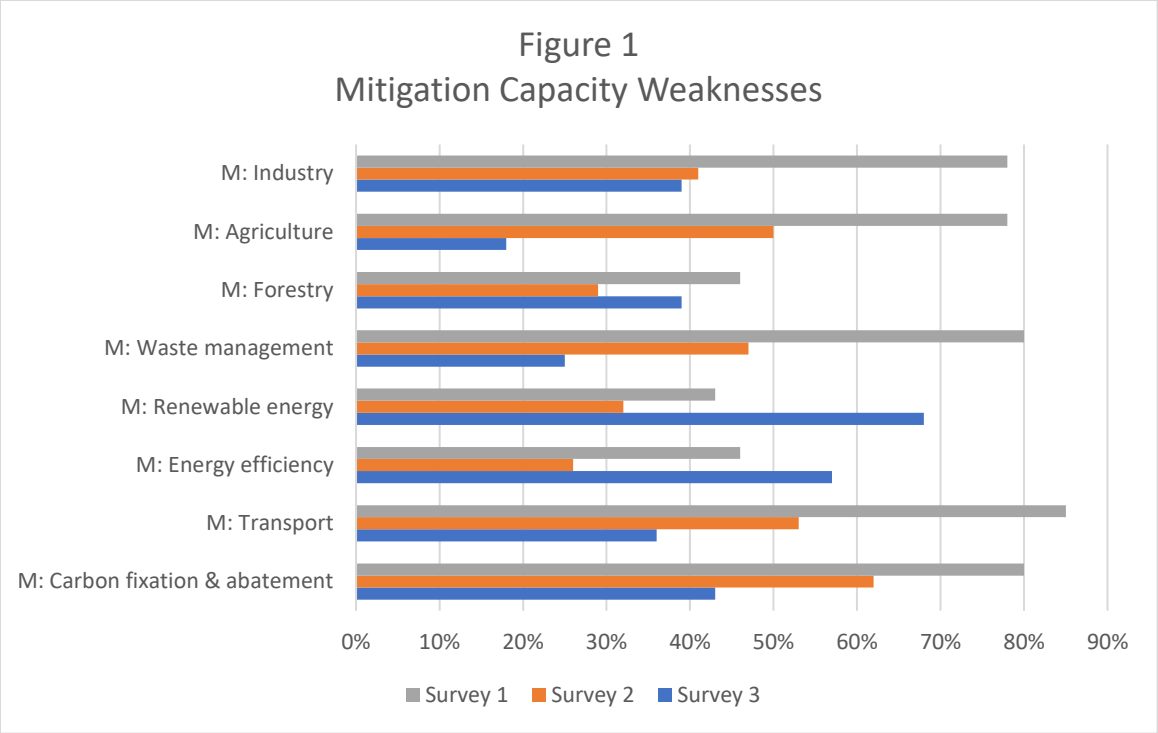
A: Infrastructure and urban planning	76%	53%	25%
A: Coastal zones	65%	44%	18%
A: Marine and fisheries	74%	44%	18%
X: Governance and planning	63%	53%	29%
X: Financial management	65%	47%	32%
X: Monitoring and reporting	65%	53%	46%
X: Communication	59%	50%	57%
X: Legal and regulatory	59%	59%	32%
X: Engaging affected stakeholders	46%	65%	50%
X: Gender responsiveness	63%	65%	39%
Number of respondents	45	34	28
Range	43%-85%	26%-65%	18%-68%
Median	65%	53%	32%

Overall, the NDE/TNAFPs reported the highest levels of weakness compared to other respondent groups. More than half of the Survey 1 respondents rated 18 of the capacity areas as very or somewhat weak. The eight mitigation areas were rated among the most or least weak of the areas, with the adaptation and cross-cutting issues falling in between. Five mitigation areas were perceived to have the weakest capacities, along with one cross-cutting area, X:Engaging affected stakeholders (46%). M: Transport (85%), M: Carbon fixation and abatement (80%), and M: Waste Management (80%) were the areas rated as having the weakest capacities in the respondents' countries. Mitigation also showed up among the areas seen as least weak. M: Renewable energy (43%), X: Engaging affected stakeholders (46%), and M: Forestry (46%) were perceived to be less weak

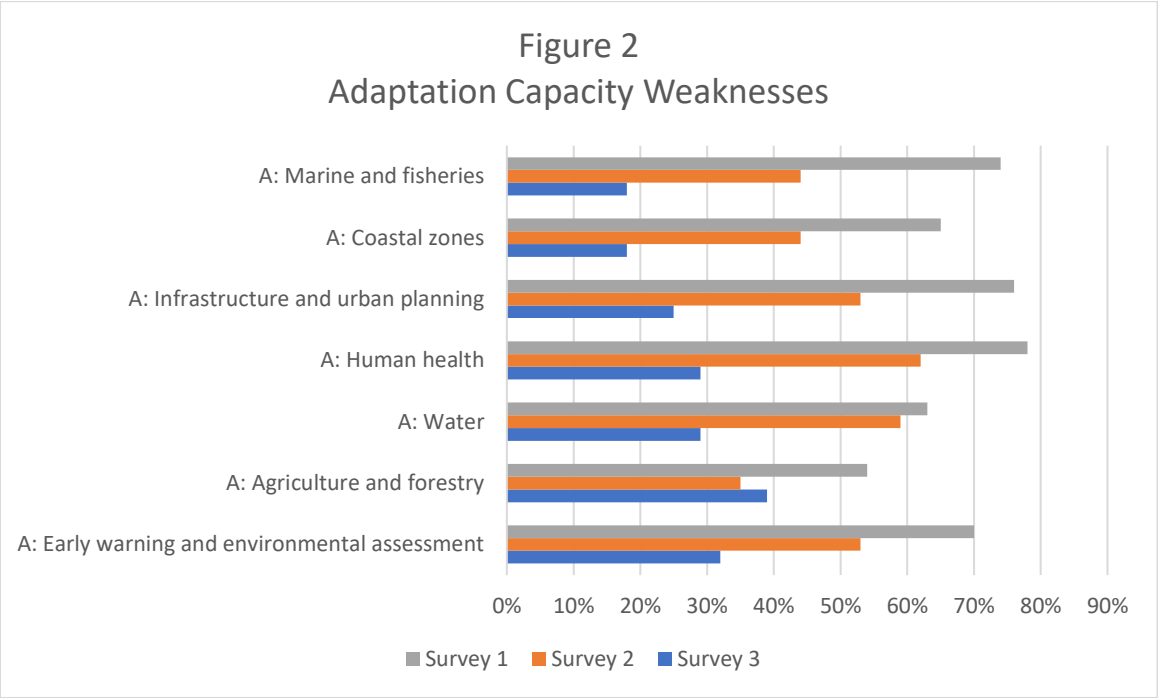
Members and observers, who were not focusing on a particular country, saw somewhat less weakness, although there were still 13 areas rated as weak by at least half the Survey 2 respondents. They focused less on weaknesses in mitigation and more on human issues, finding that X: Gender responsiveness (65%), X: Engaging affected stakeholders (65%), M: Carbon fixation and abatement (62%), and X: Human health (62%) were the areas where countries have the weakest capacities. They saw the least levels of weakness in three mitigation areas: M: Energy efficiency (26%), M: Forestry (29%), and M: Renewable energy (32%).

Practitioners, focusing on the countries where they had the most experience, tended to see even less weakness. Only four areas were seen as weak by half or more of the respondents. These included M: Renewable energy (68%), X: Communication (57%), M: Energy efficiency (57%), and X: Engaging affected stakeholders (50%). Areas they rated as least weak included A: Coastal Zones (18%), A: Marine and fisheries (18%), and M: Agriculture (18%).

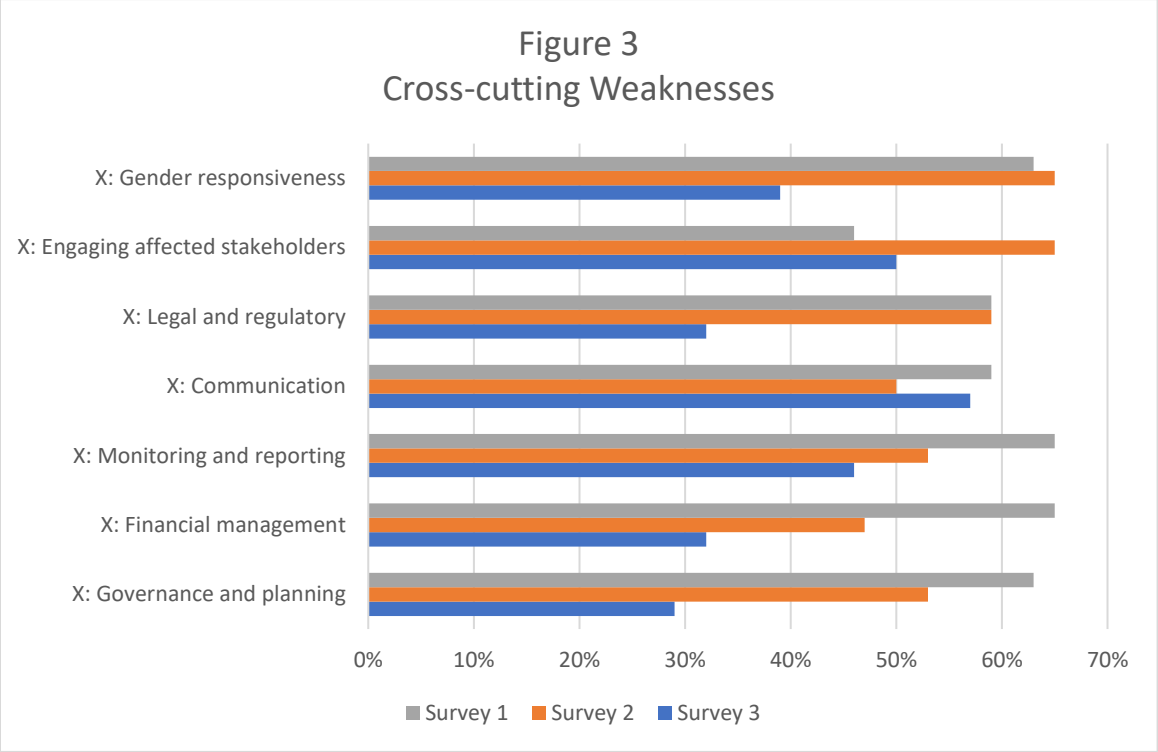
Responses across the three surveys were quite diverse. Three figures present bar graphs showing the differences in ratings. Figure 1 shows responses on Mitigation, Figure 2 on Adaptation, and Figure 3 for Cross-cutting issues.



Of the three groups, national representatives saw the highest level of weakness on all mitigation issues except renewable energy and energy efficiency, where practitioners saw greater weakness. Members and observers were in between the other two groups on all mitigation items.



Results were similar for adaptation. Survey 1 respondents consistently perceived more weaknesses than the other two groups. Survey 3 showed the least concern about weaknesses on all adaptation items except for agriculture and forestry, when Survey 3 recorded slightly more weakness than for Survey 2.



Responses were more varied for cross-cutting issues. Again, Survey 1 respondents tended to see more weakness on most issues, but Survey 2 equaled or exceeded Survey 1 estimates of weakness on engaging affected stakeholders, gender responsiveness, and legal and regulatory issues. Survey 1 greatly exceed Survey 3 ratings of weakness on most issues, especially on financial management and governance and planning. Surveys 1 and 3 were very sinilar on communication and engaging affected stakeholders.

Further study might explain the strong differences between national representatives and practitioners. Perhaps it is because the Survey 1 respondents have a broad view of different issues, while the Survey 3 practitioners are focused more on a particular project.

Open-ended question on capacity needs

Following the ratings on current capacities, all three surveys asked respondents to list areas where capacity building is needed. Table 13 shows the number of responses from each group.

Please list up to five areas in which you think [Survey 1: your country, Survey 2: countries, Survey 3: country you are focusing on] needs to enhance its capacities to develop new technologies; to adapt existing technologies to local needs and conditions; or to help implement your NDCs, NAPs, or national priorities. You may use the list from the previous question or describe something different.

Table 13

Responses to open-ended question on capacity needs

Capacity needs	Survey 1	Survey 2	Survey 3	Total
Number of respondents	41	29	26	96
Number of capacity needs listed	197	126	109	432

Open-ended question on NDE capacity needs

Survey 1 also included a question about individual needs to build capacities. This question was included because in previous work NDEs had indicated they had personal capacity building needs. The number of their responses is recorded in Table 14.

In the previous TEC survey, NDEs indicated a need to enhance their own capacities. Please describe any areas in which you would like to enhance your own skills and knowledge in relation to your role(s) in the UNFCCC process.

Table 14

Responses to open-ended question on NDE personal capacity needs

NDE personal capacity needs	Survey 1
Number of respondents	38
Number of personal needs listed	>60

The 38 NDEs and TNAFPs who responded to this question described more than 60 personal capacity needs, sometimes listing several different needs in the same line. These have been broken apart and sorted into categories. Table __ shows capacity needs listed at least five times.

Table15

NDE/TNAFP personal capacity needs

Personal capacity need	Times listed
Technologies	7
UNFCCC process and negotiations	7
Financing	6
Mitigation	5
Monitoring, evaluation, and impacts	5

B. Skills and knowledge needs

All three surveys also asked for perceptions about needs for specific skills and knowledge.

Rate the level of [Survey 1: your country's, Survey 2: country, Survey 3: country you have chosen] needs for skills and knowledge relating to endogenous capacities and technologies. Leave blank any areas in which you have no opinion.

Each survey then presented 24 skills and knowledge areas to be rated using the following scale.

- No needs
- Weak needs
- Moderate needs
- Strong needs
- Very strong needs

Table 16 shows the percentage of those responding to this section who chose either "Strong needs" or "Very strong needs."

Table 16

Skill and knowledge needs

Skills and knowledge	**Survey 1**	**Survey 2**	**Survey 3**
Assessing local community needs for climate tech	78%	62%	68%
Selecting appropriate technologies	78%	62%	68%
Importing technologies	60%	35%	18%
Installing technologies	80%	50%	61%
Maintaining technologies	82%	65%	57%
Adapting technologies to local needs and conditions	87%	71%	71%
Operating technologies safely and efficiently	76%	62%	64%
Recycling technologies at end of use	91%	79%	57%
Improving supply chains	84%	62%	54%
Making development more sustainable	87%	76%	79%
Drafting legal and regulatory approaches to tech	76%	53%	71%
Dealing with intellectual property issues	67%	44%	46%
Evaluating social/econ/env impacts of technologies	71%	62%	75%
Managing interdisciplinary teams	51%	56%	71%
Working with external industries and consultants	58%	35%	39%
Managing finances relating to technologies	71%	59%	50%
Encouraging development/adaptation for local needs	82%	71%	64%
Avoiding unintended consequences	56%	62%	50%
Estimating useful lives of technologies	58%	41%	46%
Engaging various stakeholders	58%	68%	46%
Utilizing local and indigenous knowledge	80%	68%	61%
Empowering social capital	73%	62%	68%
Assessing gender impacts of technologies	71%	62%	64%
Boosting national and community ownership	71%	62%	71%
Number of responses to this section	45	34	28
Range	51%-91%	35%-79%	18%-79%
Median	76%	62%	64%

The national entities of Survey 1 saw the strongest needs for skills and knowledge in recycling technologies at end of use (91%), adapting technologies to local needs and conditions (87%), and making

development more sustainable (87%). Those respondents saw the least needs for skills and knowledge in managing interdisciplinary teams (51%) and avoiding unintended consequences (56%).

Survey 2 members and observers rated the highest needs for skills and knowledge in the areas of recycling technologies at the end of use (79%), making development more sustainable (76%), adapting technologies to local needs and conditions (71%), and encouraging development and adaptation of technologies to meet local needs (71%). This group saw much lower needs in the areas of importing technologies (35%), working with external industries and consultants (35%), and estimating useful lives of technologies (41%).

The practitioners of Survey 3 reported the highest needs are in making development more sustainable (79%) and evaluating the social, economic, and environmental impacts of technologies (75%). They saw much lower needs for skills and knowledge in importing technologies (18%) and working with external industries and consultants (39%).

C. STAKEHOLDER PARTICIPATION

The groups involved in planning and implementing projects and programs can affect the way issues are framed, the problems addressed, and the solutions chosen. Findings from the previous TEC survey indicated that adopting a participatory approach could enhance endogenous capacities and technologies. The three surveys were used to gather information about the groups involved in or that should be involved in making climate technology-related decisions.

Survey 1 included the following question.

Findings from the previous TEC survey indicated that adopting a participatory approach could enhance endogenous capacities and technologies. To what extent have each of the following groups been involved in the planning, development, and deployment of climate-related technologies in your country? Please leave blank any area in which you have no opinion.

Surveys 2 and 3 asked about who *should* be involved through a more general normative question.

To what extent do you believe each of the following groups should be involved in the planning, development, and deployment of climate-related technologies?

Table 17 presents the percentages of respondents to each survey who said a group was (Survey 1) or should be (Surveys 2 and 3) somewhat or significantly involved.

Table 17

Stakeholder participation

Stakeholder groups	Survey 1	Survey 2	Survey 3
National government	80%	94%	86%
Local and municipal governments	42%	97%	89%
Intergovernmental organizations	62%	76%	86%
Civil society	67%	100%	86%
Indigenous peoples and local communities	47%	91%	86%
Women	64%	97%	93%

Business and industry	69%	97%	82%
Entrepreneurs	56%	85%	79%
Financial institutions	44%	85%	93%
People most vulnerable to climate impacts	51%	94%	86%
Universities and other research institutions	62%	100%	89%
Number responding	45	34	28
Range	42%-80%	76%-100%	79%-93%
Median	62%	94%	86%

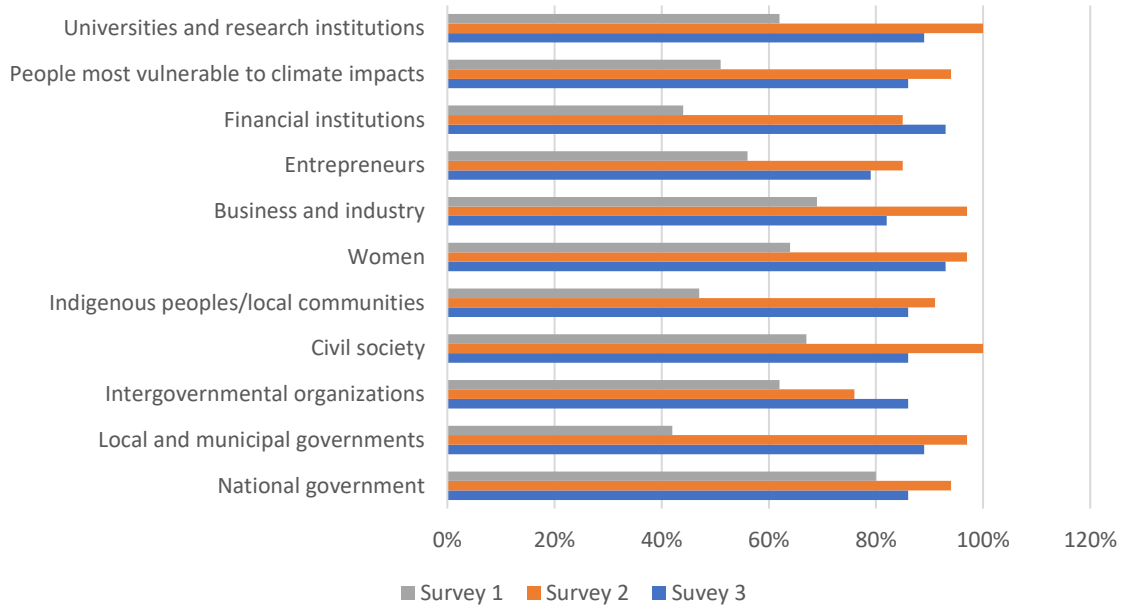
Four out of five (80%) of the respondents to Survey 1 said that national governments were involved in such activities in their country. Respondents reported that business and industry (69%) were the next most involved group, followed by civil society (67%). The least involved groups were reported to be local and municipal governments (42%) and financial institutions (44%).

The members and observers responding to Survey 2 supported high participation by everyone. All of the Survey 2 respondents supported the involvement of both civil society and university and other research institutions. The only groups supported by fewer than 90% of the Survey 2 respondents were intergovernmental organizations (76%), entrepreneurs (85%), and financial institutions (85%).

The Survey 3 practitioners were slightly less supportive than Survey 2 respondents of involvement by all but two groups. Practitioners saw more need for involvement for intergovernmental organizations (86%) and financial institutions (93%). While practitioners saw slightly lower needs for involvement by most groups, more than four out of five of the practitioners supported involvement by each of the groups. The only exception was entrepreneurs (79%).

Survey 1 reports about actual group involvement indicate that participation generally is much lower that the Survey 2 and 3 respondents think it should be. These differences are shown in Figure 4. For every single group, the national representatives of Survey 1 reported lower levels of involvement in their country than respondents to the other surveys had advised. From these results, it appears that aspirations for stakeholder's involvement are much higher than the reality.

Figure 4
Stakeholder Participation



III. Statistical data and analysis of surveys related to section 4 – Findings on enablers, challenges and measures to enhance endogenous capacities and promote endogenous technologies

Promoting endogenous development of new technologies and the adaptation of existing technologies requires enabling environments, and the ability to deal with challenges to such work. The three surveys included questions to assess the importance of various enabling factors, and to identify significant challenges.

Previous studies have found that similar factors sometimes are cited as both enablers and challenges. The task force on enabling environments and capacity building suggested that the responses to the open-ended question about challenges be sorted into the same categories as the ratings questions presented on enabling environments. This was done, with the addition of a few categories to accommodate responses about challenges that did not fit into the enabling environments categories.

The actual numbers in each category are not comparable for enablers and challenges. The percentages for enabling environments are based on the total number of responses to each ratings question. The percentages for challenges are based on the total number of challenges in all categories that were provided on each of the three surveys. The percentages for challenges are consequently much smaller than those for the enabling environments ratings. The rankings of the ratings and responses provided for enablers and challenges matter more than the percentages themselves.

A. Enabling strategies

The TEC and other constituted groups have long been concerned with identifying the factors that enable certain behaviors and outcomes. The surveys in this study included questions about enabling strategies that can help build and improve country capacities to develop and adopt climate technologies. All three surveys included the following close-ended question:

For each of the following, [Survey 2: no specification, Survey 3: and based on your experiences in your focus country], please indicate the degree to which strategies in that area can enable environments for enhancing climate capacities and technologies [Survey 1: in your country].

The question was followed by a list of 17 factors. For each one, respondents were asked to indicate whether that factor:

- Does not enable
- Enables slightly
- Enables moderately
- Enables significantly

As with previous questions, the only difference across the three surveys was in the country or countries they were asked to consider.

Table 18 shows the percentage of respondents for each of the three surveys who indicated that a factor "Enables moderately" or "Enables significantly."

Table 18

Strategies for enabling environments

Enabling strategies	**Survey 1**	**Survey 2**	**Survey 3**
Collaboration: Internal	89%	97%	96%
Collaboration: External	87%	100%	82%
Economic issues	69%	88%	79%
Financing	82%	91%	96%
Legal and regulatory structures: Domestic	76%	94%	82%
Legal and regulatory structures: International	69%	82%	64%
Institutional and organizational issues	80%	88%	86%
Information: Research	80%	94%	82%
Information: Contextual	69%	74%	68%
Human resources: Technical skills	84%	97%	93%
Human resources: Management skills	71%	82%	86%
Human resources: Analytical skills	67%	94%	79%
Governance: Decision-making	78%	88%	82%
Governance: Financial	80%	79%	82%
Education: Domestic	87%	88%	86%
Education: International	76%	71%	61%
Communication	89%	91%	79%
Number of respondents	45	34	28
Range	67%-89%	71%-100%	61%-96%
Median	80%	88%	82%

In general, respondents saw all of the listed factors as enablers. Survey 2 respondents (members and observers) tended to see factors as slightly more enabling than did respondents to the other two surveys. At least 67% of the respondents rated all factors as moderately or significantly enabling.

The Survey 1 national representatives saw collaboration (internal 89%, external 87%), communication (89%), and domestic education (87%) as the most enabling of the factors. They were least likely to rate analytical skills (67%), contextual information (69%), international regulatory issues (69%), and economic issues (69%) as enabling.

Members and observers also saw collaboration (external 100%, internal 97%) as an enabling factor, joined by technical skills (97%). They were least likely to rate international education (71%), contextual information (74%), and financial governance (79%) as enabling.

Practitioners also saw internal (96%), but not external (82%), collaboration as highly enabling, along with financing (96%) and technical skills (93%). They were least likely to rate international education (61%), contextual information (68%), communication (79%), and economic issues (79%) as enabling.

To complement and expand upon the ratings results, all three surveys asked respondents to describe enabling factors in their own words. Table 19 shows the number who responded and the number of factors that were listed, while Table 20 presents some examples of responses provided. These samples

are not intended to be representative or inclusive of all the responses but are simply to illustrate some of the thoughts of the respondents.

Please describe up to five factors that you believe contribute significantly to enabling environments to enhance [Survey 2: in-country, Survey 3: endogenous] climate capacities and technologies [Survey 1: in your country]. You may use the categories listed above, or describe a different enabler.

Table 19

Responses to open-ended question on enabling environment factors

Enabling factors responses	Survey 1	Survey 2	Survey 3	Total
Number of respondents	40	27	23	90
Number of enabling factors listed	184	114	88	386

Table 20

Examples of responses on list of factors that contribute to enabling environments

Survey 1
• integrated collaboration among stakeholder
• collaboration with researchers, funders, or practitioners from outside
• active communication with CEO's and awareness raising campaigns, like workshops, networking-events, websites (like for instance: www.ecotechnology.at, cleaner-production.eu, LinkedIn etc.
Survey 2
• Collaboration is very important, so that not different people work to try the same problem themselves. I really think that it's important to collaborate since climate change is a global problem and we need to tackle it together
• Collaboration with external researchers, including academia and students
• Interdisciplinary development, deployment and monitoring of technologies
• technical education and training - data analysis, technological
Survey 3
• Collaboration with users/communities
• All satakeholders at every level
• Private Oil and Gas Sector

B. Challenges

The flip side of enabling environments involves challenges that can impede progress. The three surveys only used an open-ended question to gather perceptions about challenges to the development of new technologies or modification of existing technologies. As in most other questions, NDEs and TNAFPs were asked to focus on their own country, while members and observers and practitioners were asked a more general question.

Please list up to five challenges that are likely to hinder [Survey 1: your country's, Survey 2: in-county, Survey 3: endogenous] development of new technologies or modification of existing technologies to meet local needs and conditions.

As suggested by the task force, the same categories of enabling strategies were used to group responses to the open-ended question on challenges to facilitate comparisons. Three new categories were added for challenge responses that did not fit well into the categories for enabling environments, namely "technologies," "research and innovation," and "other."

Table 21 shows the percentage of challenges that fell into different categories for each of the three groups. Percentages were determined by dividing the number of challenges listed in a category by the total number of challenges provided by respondents to that survey. The areas in bold are the general categories used, usually followed by sub-categories in normal type. Percentages for sub-categories are not reported because they are so small.

Table 21

Challenges to development or modification of technologies

Challenges	**Survey 1**	**Survey 2**	**Survey 3**	**Total**
Collaboration	**6%**	**11%**	**7%**	**8%**
Internal (includes stakeholder engagement)				
External				
Economic issues	**4%**	**3%**	**1%**	**3%**
Financing and other resources	**17%**	**13%**	**11%**	**14%**
Legal and regulatory structures	**7%**	**5%**	**4%**	**6%**
Domestic				
International				
Institutional and organizational	**3%**	**3%**	**11%**	**5%**
Policy				
Other				
Information	**15%**	**9%**	**12%**	**12%**
Research				
Contextual (includes politics)				
Human resources	**18%**	**9%**	**11%**	**14%**
General capacities (new sub-category)				
Technical skills				
Management skills				
Analytical skills				
Governance	**7%**	**10%**	**10%**	**9%**
Decision-making (includes planning)				
Financial				
Education	**0%**	**3%**	**1%**	**1%**
Communication	**4%**	**3%**	**5%**	**4%**
Technologies (new category)	**9%**	**19%**	**14%**	**13%**
General				
Assessing and adapting to local needs				
Evaluation of impacts				

Specific technologies				
Research and innovation (new category)	**10%**	**10%**	**11%**	**10%**
Other (new category)	**1%**	**0%**	**2%**	**1%**
Number of respondents	42	28	25	95
Total comments	186	116	100	402

In general, challenges were spread out among the categories. No more than one in five challenges for a particular survey fell into any one of the categories.

For the NDEs and TNAFPs, only three areas were cited as challenges by more than 10% of the respondents. Human resources (18%) were listed most often as challenges. This category includes general statements about capacities, as well as more specific areas such as technical, training, and analytical skills. More than half of the Survey 1 human resources challenges fell into the general capacity category.

Financing (17%) was the second challenge area most often cited by NDEs and TNAFPs. Most of these responses just provided one or two words, such as ”finance” or “funding,” but a few referred to resources, such as “availability of resources: financial, human, economic.”

Information (15%) was the third most frequently listed challenge on Survey 1. This category included access to information, which was cited by six respondents. The remaining 21 information challenges addressed contextual factors such as general country characteristics, cultures, and politics.

For the Survey 2 members and observers, issues relating to technologies (19%) were cited as challenges most frequently. Of these, seven people cited issues relating to assessing and adapting to local needs and conditions.

Financing (13%) again was the second most frequently cited challenge. Most comments cited something like “lack of funding,” but some were more specific, such as “costs of technologies.”

Collaboration (11%) was the third most frequent challenge listed by Survey 2 respondents. Almost all of these referred to internal issues, including general stakeholder engagement (“fragmentation of stakeholders”). A couple of responses referred to cooperation with the private sector or academia.

The Survey 3 practitioners also listed issues relating to technologies (14%) more than any other challenge. Four of the technology challenges mentioned the need to assess local needs and match them to technologies.

Challenges relating to information (12%) were the next most frequently cited in Survey 3. These were focused mainly on various contextual variables.

No one challenge stands out as significant. Respondents cited many interesting challenges but provided no consensus on challenges of concern.

C. Measures to enhance capacities to develop new technologies and to adapt technologies to local needs

Additional information was needed to determine whether developing new climate technologies and adapting existing technologies might require different types of measures. Respondents were asked to rate the importance of various measures for working in the two areas. Two questions were presented.

How important are the measures listed below to enhancing [Survey 1: your country's; Surveys 2 & 3: endogenous] capacities to develop new climate technologies?

How important are the measures listed below to enhancing [Survey 1: your country's; Surveys 2 & 3: endogenous] capacities to adapt existing technologies to local needs and conditions?

The measures listed tend to be more specific than the general strategies listed for enabling environments discussed in the previous section, and separate responses were required for: **developing new technologies** and for **adapting existing technologies to local needs and conditions**.

The same rating scale was used for both questions.

- Not important
- Slightly important
- Moderately important
- Very important

Capacities to develop new technologies

Table 22 shows the percentages of respondents to all three surveys who chose "Moderately important" or "Very Important" for each measure to enhance in-country capacities to develop new technologies.

Table 22

Measures to enhance capacities to *develop new technologies*

Measures to enhance country capacities to develop new technologies	**Survey 1**	**Survey 2**	**Survey 3**
Access to additional funding	100%	88%	96%
Training in research, development, innovation process	100%	91%	93%
Educational programs in a variety of fields	100%	100%	89%
Collaboration with external researchers	93%	97%	89%
Collaboration with external industries	91%	97%	85%
Public/private partnerships	91%	85%	85%
Participation on international collaboration teams	89%	91%	81%
Access to peer-reviewed literature	76%	85%	78%
Access to existing databases	89%	88%	81%
Exchange programs for students and faculty	84%	74%	74%
Fellowships for students and faculty	89%	71%	78%
Travel to international conferences for researchers	89%	56%	74%
Ability to deal with intellectual property rights	87%	82%	81%
Number of respondents	45	34	27
Range	76%-100%	56%-100%	74%-96%

Median	89%	88%	81%

All three groups said almost all the measures listed were important. Only one item was rated important by fewer than seven out of ten respondents (Survey 2, travel to international conferences for researchers (56%)). The three groups were very similar in their highest and lowest ratings.

The survey 1 respondents saw everything on the list as important. At least three out of four rated every item as at least of moderate importance. All 45 of the Survey 1 respondents saw access to additional funding; training in research, development, and innovation; and educational programs as moderately or very important. The lowest rating went to access to peer-reviewed literature (76%). Exchange programs (84%) and ability to deal with intellectual property (87%) also were viewed as less important.

Survey 2 respondents also unanimously rated educational programs as important but gave their next two highest ratings to collaboration with external researchers (97%) and collaboration with external industries (97%). Survey 2 respondents saw the least importance in experiences likely to be outside of a country, including travel to international conferences for researchers (56%); fellowships for students and faculty (71%), and exchange programs for students and faculty (74%).

The Survey 3 practitioners rated access to additional funding (96%), training in research, development, and innovation (93%), educational programs (89%), and collaboration with external researchers (89%) as the most important measures relating to the development of new technologies. They saw exchange programs (74%), travel to International conferences (74%), and fellowships (78%) as less important.

Capacities to adapt existing technologies to local needs and conditions

Tables 23 below shows the percentages of respondents to all three surveys who chose "Moderately important" or "Very Important" for each measure to enhance in-country capacities to adapt existing technologies to local needs and conditions.

Table 23

Measures to enhance capacities to adapt existing technologies to *local needs and conditions*

Measures to enhance country capacities to adapt technologies to local needs and conditions	**Survey 1**	**Survey 2**	**Survey 3**
Access to additional funding	98%	88%	100%
Training in research, development, innovation process	98%	85%	93%
Educational programs in a variety of fields	95%	97%	82%
Collaboration with external academic researchers	84%	88%	86%
Collaboration with external industries	84%	88%	82%
Public/private partnerships	93%	91%	75%
Participation on international collaborative teams	86%	74%	82%
Access to peer-reviewed literature	70%	71%	68%
Access to existing databases	82%	74%	75%
Exchange programs for students and faculty	82%	62%	64%
Fellowships for students and faculty	84%	59%	75%
Travel to international conferences for researchers	84%	47%	61%
Ability to deal with intellectual property rights	86%	65%	79%
Number of respondents	44	34	28
Range	70%-98%	47%-97%	61%-100%

Median	84%	74%	79%

The national entities of Survey 1 continued to see all areas as important and gave their highest ratings to the same three measures: access to additional funding (98%), training in research, development, and innovation (98%), and educational programs (95%). Their lowest importance ratings went to access to peer-reviewed literature (70%), access to existing databases (82%), and exchange programs (82%).

Members and observers again saw educational programs (97%) as the most important measure. Public/private partnerships (91%) jumped into second place in importance. They gave their lowest importance ratings to the same three areas as for developing new technologies.

Survey 3 practitioners kept access to funding (100%) at the top of their list, followed by training in research, development, and innovation (93%). Seen as least important were travel to international conferences (61%), exchange programs (64%), and access to peer-reviewed literature (68%).

IV. Statistical data and analysis of surveys related to section 5 – Findings on cross-cutting issues

Different aspects of issues were addressed in different sections of the three surveys. This section takes prominent issues and follows them throughout the survey results, including both the ratings and responses to open-ended questions. Ratings have already been discussed section by section, with comparisons of results across all three surveys. For cross-cutting issues, information has been pulled from each section so that discussion can combine results on a particular topic across needs, gaps, enablers, challenges, and measures. In addition to comparing ratings across groups for all issues on a particular topic, this section considers where a topic stood relative to other issues on each of the three surveys. Presenting a compilation of information for particular topics provides a richer basis for understanding perceptions about each issue. Topics analyzed include:

- RESEARCH and INNOVATION SYSTEMS
- FINANCE and ECONOMIC ISSUES
- STAKEHOLDER ENGAGEMENT
- GENDER
- INDIGENOUS PEOPLES and LOCAL COMMUNITIES
- COLLABORATION and PARTNERSHIPS
- GOVERNANCE
- LEGAL, and REGULATORY ISSUES

Responses to open-ended questions provide additional information about how respondents viewed specific topics. Sample responses are displayed within each section, excluding generic comments or repetitions of items already rated. These responses have been copied verbatim from the surveys, with no attempt to correct errors or clarify meaning. The only exception is that a few comments made in Spanish are accompanied by translation to English.

A. RESEARCH and INNOVATION SYSTEMS

This entire study is about how to enhance endogenous innovation, both with respect to developing and modifying climate technologies. A few areas focused more specifically on systems designed to promote research and innovation within countries. The surveys asked about the extent to which institutional and organizational issues, including policies, programmes, and organizational structures, can enhance enabling environments.

Challenges

The open-ended challenges question produced the largest number of responses relating to research and innovation systems. About one in ten respondents in each group cited a challenge relating to research or innovation systems. Country lack of encouragement for development of technologies was seen as a problem by two respondents. One Survey 2 respondent cited “Lack of research, or (financial) support for research, development and demonstration of climate technologies. A Survey 3 respondent pointed to “The challenge of taking endogenous technologies to a level that international technologies are.” Examples of responses related to challenges in research and innovation are presented in table 24.

Table 24

Sample responses on research and innovation challenges

Survey 1 (11 of 186 responses)
• Technical capabilities of innovators
• inefficient R&D institutes and their disconnect from needs of industry
• Low budget allocation by the state towards technology advancement in the country
• Financial startups for Small Medium Enterprises
• Lack of country tailored studies, impact assessment
Survey 2 (11 of 116 responses)
• weak national innovation system, low information sharing
• Lack of an innovative environment to develop new and improve existing climate technologies
• Lack of research, or (financial) support for research, development and demonstration of climate technologies.
• Incentives, Taxes and finance
• weakness in research and knowledge management
Survey 3 (11 of 100 responses)
• Lack of a venture capital sector
• Limited finances to support development, modification and dissemination of endogenous development technologies.
• Innovation capabilities and technology readiness

Measures to enhance capacities

The two sections on measures to enhance country capacities to develop new or to modify existing technologies asked about training in the research, development, and innovation process. This was one of the highest rated measures. All (100%) of the Survey 1 respondents rated this measure as moderately or very important. It was also the most important area for practitioners (93%). Survey 2 respondents rated this measure as slightly less important (91%).

The numbers were similar for the importance of measures to enhance capacities to adapt existing technologies to local conditions. Training in research, development, and innovation was tied for the top rating on Survey 1 (98%) and was seen as important by all of the practitioners responding to Survey 3 (100%). The percentage of Survey 2 respondents was only slightly lower (85%).

B. FINANCE and ECONOMIC ISSUES

Both finance and economic issues were addressed in items throughout the surveys. Respondents to all three surveys perceived finance to be a major issue in dealing with endogenous capacities and technologies, although financial and related economic issues did not always receive top ratings within particular survey sections.

Current capacities

The list of current capacities to be rated included the cross-cutting issue “Financial management (such as accessing funding and managing budgets).” When asked to rate current capacities, almost two of three (65%) of the NDEs and TNAFPs rated financial management capacities in their countries as weak or

very weak, but they rated nine other capacities as even weaker. Just under half (47%) of the members and observers saw financial management capacities as weak, but the respondents rated thirteen other areas as even weaker. Practitioners placed financial management capacities as twelfth on the list, with about one in three (32%) saying capacities in financial management were weak or very weak in a country where they had worked. Table 25 below summarises the findings on capacity weaknesses in finance.

Table 25

Financial capacity weakness

	Survey 1	Survey 2	Survey 3
Percentage weak or very weak	65%	47%	32%
Weakness ranking	10 of 22	14 of 22	12 of 22

Respondents were asked to list up to five areas in which countries need to enhance capacities to develop new technologies, modify existing technologies, or help to implement NDCs, NAPs, or national priorities. NDEs and TNAFPs listed twelve needs relating to finance; members and observers listed ten, and practitioners described six. Financial issues were among the top five capacity needs listed for all three groups. Several of the comments suggest that respondents were thinking more about the importance of financing in general rather than the need to build finance-related capacities (see table 26)

Table 26

Sample financial and economic responses on capacity building needs to develop new technologies or modify existing technologies

Survey 1 (n=12 of 196 responses)
• Improvement of resource mobilization and financial management strategy
• Establishment of a permanent platform of energy and environmental technology among financial institutions.
Survey 2 (n=10 of 127 responses)
• Development of financial instruments to accelerate technologies' development and uptake
• Mobilise private sector involvement and direct private capitals towards sustainable investments
Survey 3 (n=6 of 107 responses)
• Funding and Access to Funding
• Financial 28vailab for the private sector

Personal capacity needs

In describing their personal capacity needs, NDEs and TNAFPs mentioned finance-related issues in six out of the more than sixty needs that they listed. Four of the comments addressed specific issues, such as a need for funding to hire technological experts or consultants, to increase awareness among stakeholders about the use of technologies, and to enhance the adoption, uptake, and deployment of technologies. Respondents also want assistance in "navigating the financial institutions"; one respondent specified a need for access to the Green Climate Fund. Financing issues ranked third among

the personal needs described, just behind issues relating to general technology and the UNFCCC process and negotiations.

Skills and knowledge

All three surveys included "Managing finances relating to technologies" in a list of skills and knowledge. Respondents were asked to rate the level of need for each area in dealing with endogenous capacities and technologies. Responses ranged from "No needs" to "Very strong needs." At least half of all three groups rated financial management as a strong or very strong need but saw even stronger needs in other areas.

Seven out of ten of the Survey 1 respondents reported a strong or very strong need for financial management skills and knowledge, but this was only fourteenth out of the areas listed. At least half of the respondents to Survey 2 and Survey 3 also saw financial management as a strong or very strong need. Neither group placed it in the top two-thirds of skill and knowledge needs. Table 27 summarises the needs for skills and knowledge related to financial management.

Table 27

Needs for financial management skills and knowledge

	Survey 1	Survey 2	Survey 3
Percentage strong or very strong	71%	59%	50%
Strength ranking	14 of 24	17 of 24	18 of 24

Participation

Financing can require engagement with a number of different types of institutions. The section on stakeholder engagement included "Financial institutions" in a list of eleven stakeholder groups. Surveys 2 and 3 asked whether these groups should be involved in the planning, development, and deployment of climate-related technologies, while Survey 1 asked the degree to which each group actually had been involved in those activities in the NDE or TNAFP's country. Summary of involvement of financial institutions across three surveys is presented in table 28 below.

Table 28

Involvement of financial institutions

	Survey 1	Survey 2	Survey 3
Percentage should be or were involved	44%	85%	93%
Participation ranking	10 of 11	9 of 11	1 of 11

Almost all of the members and observers and practitioners thought that financial institutions should be somewhat or significantly involved. The two groups varied in their rankings for involvement, with members and observers rating financial institutions as only ninth out of the eleven stakeholder groups. In contrast, practitioners listed financial institutions, along with women, as the two groups that should be most involved.

Actual involvement differed from goals for engagement. Fewer than half of the NDEs and TNAFPs reported that financial institutions had actually been involved in working with climate-related technologies in their country. Only one other group, local and municipal governments, was reported to have less involvement. Apparently actual participation by financial institutions is considerably lower than members and observers and practitioners think would be desirable.

Enabling environments

Respondents were asked to rate the degree to which each of seventeen strategies can enable environments for enhancing climate capacities and technologies. The section on enabling environments included two strategies related to financing, along with an additional strategy relating to economic issues.

- Financing: (such as access to funding for capacity building, planning, and technologies)
- Governance: Financial (such as where funds are deposited, procedures for budgeting and spending)
- Economic issues: (such as market conditions of the high cost of capital)

Table 29

Enabling strategies relating to finance and economic issues

Strategy	Survey 1	Survey 2	Survey 3
Financing	82%	91%	96%
Governance: financial	80%	79%	82%
Economic issues	69%	88%	79%

Table 29 summarises how respondents rate strategies related to finance and economic across the three surveys. While all three respondent groups saw financing and economic strategies as moderately or significantly enabling, there were some differences across the groups. Financing was regarded as highly enabling by members and observers and by practitioners, with slightly lower ratings given to economic issues. Fewer of the national representatives saw financing or economic issues as enabling than the other two groups. Responses were almost identical across the three surveys for financial governance, with about four out of five responses seeing it as enabling.

The NDEs and TNAFPS regarded financial and economic factors as enabling but did not rate these among the top five of the factors presented as possible enablers. The same was true for members and observers. Practitioners, who work with projects on the ground, gave financing top ratings as an enabling factor, tied with internal collaboration.

The NDEs and TNAFPs confirmed their opinion of the importance of financing in their responses to the open-ended question. When asked to describe enabling factors, they listed some sort of financing or funding twenty-two times. Table 30 gives some examples of responses to these questions. A few additional responses mentioned internal and external resources, which also may contain funding. Two other responses referred to economic issues. Members and observers also emphasized funding, with nineteen references to financing and four to economic issues as enabling factors. Practitioners mentioned financial issues eleven times but did not name any economic factors as enablers.

Table 30

Sample responses about finance and economic issues as enablers

Survey 1 (n=24 of 183 responses)
• 31vailability of funding to undertake the work
• Market conditions
Survey 2 (n=23 of 115 responses)
• International financial support used through local contracts with established institutions to build capacity (instead of only using short-term consultants)
• Support from developed countries or Financial mechanism
• Financing at the local level
• sustainable finance to support R&D, dissemination/diffusion, etc.
Survey 3 (n=11 of 89 responses)
• Development funding
• adequate funding for research and development

Challenges

All three surveys used an open-ended question to gather perceptions about challenges that can hinder progress in developing new technologies or modifying different technologies. Respondents were asked to list up to five challenges. Almost none of the challenges listed related to financial governance or to economic issues. Financing and related resource issues were seen as more challenging and were included by at least one in ten respondents in all three groups. Financing and other resource issues were among the most frequently cited challenges by all three groups. Table 31 presents examples of responses indicating finance as challenges.

Table 31

Sample responses relating to finance and resource as challenges

Survey 1 (n=32 of 186 responses)
• Financial scarcity
• Lack of funding for technology monitoring and maintenance
• Investments costs in technology
Survey 2 (n= 15 of 116 responses)
• unstable and small financial support
• Expensiveness of advanced technologies
Survey 3 (n=11 of 100 responses)
• lack of financial resources

Measures to enhance capacities

Separate sections addressed respondent perceptions about the importance of measures to develop new technologies or to modify existing technologies to meet local needs and conditions. The same list of thirteen measures was presented in each section, including “access to additional funding.” Table 32

summarises the importance of access to additional funding as a measure to enhance endogenous capacities.

Table 32

Importance of access to additional funding

Purpose of funding	Survey 1	Survey 2	Survey 3
Develop new technologies	100%	88%	96%
Adapt existing technologies	98%	88%	100%

Respondents in all three groups saw access to funding as very or somewhat important for both developing new technologies and modifying existing technologies. All of the NDEs and TNAFPs saw financing as important to enhance capacities to develop new technologies, and all but one had the same opinion about modifying existing technologies. These national representatives rated financing as the most important measure for both activities, in concert with training and education. Practitioners also saw funding as of top importance for both new technologies and modifying existing technologies. Almost nine out of ten members and observers noted the importance of financing in the development and modification of technologies, but they saw other measures as even more important. They ranked funding sixth in importance among measures for developing new technologies, and third on the list for modifying existing technologies.

Summary

All three respondent groups consistently rated access to finance and financial management as important and in need of attention. Economic issues such as market conditions received slightly lower ratings. The surveys were not designed to gather information about successful attempts to raise or manage funds.

C. STAKEHOLDER ENGAGEMENT

Climate change will affect everyone around the globe but the costs and benefits of climate change will be distributed differentially across many groups. Location, wealth, health, cultures, roles, and many other factors affect impacts. Planning to address climate change involves engagement of many of these groups. Findings from previous TEC work indicated that a participatory approach could enhance endogenous capacities and technologies. This study consequently included numerous questions to explore perceptions about various aspects of engagement in climate-related activities. Some of these questions were generally about stakeholder engagement. Others addressed specific groups of stakeholders, such as issues involving gender or indigenous peoples. Still others mentioned types of engagement, such as partnerships and collaboration. These more specific aspects of stakeholder engagement are treated in three separate sections below.

Current country capacities

All three surveys asked for ratings of current capacities in twenty-two areas, including “Cross-cutting: Engaging affected stakeholders (such as involving local communities, indigenous peoples, and the most vulnerable in project planning).” Results showed different perceptions across the three groups. In terms of the actual ratings, the members and observers of Survey 2 saw more weakness in engagement

capacity than respondents to the other two surveys. Almost two-thirds of the members and observers rated the capacity for stakeholder engagement as weak or very weak. Only about half of NDEs and TNAFPs and practitioners rated this capacity as weak. See table 33 below for summary of responses with regard to weaknesses in relation to stakeholder engagement.

Table 33

Stakeholder engagement capacity weakness

	Survey 1	**Survey 2**	**Survey 3**
Percentage weak or very weak	46%	65%	50%
Weakness ranking	19 of 22	1 of 22	4 of 22
Number of open-ended responses	19 of 196	1 of 127	4 of 107

Results are quite different when rank orders are considered. The Survey 2 respondents saw stakeholder engagement as one of the two weakest of the capacities listed. In contrast, on Survey 1, respondents perceived eighteen other areas to have weaker capacities than stakeholder engagement. Survey 3, which tended to see less weakness in most areas, rated stakeholder engagement as the fourth weakest capacity.

The reasons for the discrepancies are not clear. It may be related to the fact that respondents to Surveys 1 and 3 were rating capacities in particular countries, while Survey 2 respondents were rating capacities in general.

The section just discussed asked respondents to rate the strength and weaknesses of current capacities, not to rate the importance of different capacities. A follow-up section invited respondents to list up to five areas in need of enhancement of "capacities to develop new technologies; to adapt existing technologies to local needs and conditions; or to help implement […] NDCs, NAPs, or national priorities." Again, Survey 1 asked NDEs and TNAFPs to consider needs in their own country. Survey 2 directed members and observers to consider general country needs. Survey 3 asked practitioners to consider needs in the country in which they have worked most extensively.

Stakeholder engagement was not often mentioned in the list of needs. It appeared only five times in Survey 1, eight times in Survey 2, and five times in Survey 3 (see table 34 below)

Table34

Sample listings of capacity needs relating to stakeholder engagement

Survey 1 (n=5 of 196)
• Multistakeholder Engagement & Management
Survey 2 (n=8 of 127)
• Involvement of young people in developing national plans and strategies for developing and implementing climate technologies
• Bottom up participatory and inclusive approaches
Survey 3 (n=5 of 107)

- Local communities must be included in decisions on siting of renewable energy installations (solar, wind, geothermal, hydro), and have benefits that at least compensate for the change in land-use that affects them. The benefits should be long-lasting and can include job opportunities, affordable power supply, and infrastructure as better water supply. Renewable energy installations shall create local development.

Personal capacities

In a previous survey some NDEs reported that they had personal capacity needs. Survey 1 provided space for NDEs and TNAFPs to describe "any areas in which you would like to enhance your own skills and knowledge in relation to your role(s) in the UNFCCC process." Only two of the more than sixty personal capacity needs listed involved stakeholder engagement. Apparently, these national representatives do not feel a strong need for additional work on their personal ability to engage different stakeholders.

Skills and knowledge

The next section asked respondents to rate "needs for skills and knowledge relating to endogenous capacities and technologies," using a scale from "No needs" to "Very strong needs." "Engaging various stakeholders" was among the twenty-four areas of skills and knowledge that were listed. Table 35 presents the rating of the three surveys with regard to skill and knowledge in engaging stakeholders.

Table 35

Strengths of skills and knowledge relating to stakeholder engagement

	Survey 1	Survey 2	Survey 3
Percentage strong or very strong needs	58%	68%	46%
Strength of needs ranking	20 of 24	5 of 24	22 of 24

Again, Survey 2 expressed the strongest needs for engagement, with two of three respondents saying there was a strong or very strong need for engaging various stakeholders. Only four areas were rated as having a stronger need. Survey 1 was not far behind, with almost three of five seeing strong or very strong needs, although nineteen other areas were rated as having a stronger need. On Survey 3, just under half of the practitioner respondents saw a strong or very strong need to engage groups, with almost all other areas rated as having stronger needs.

Participation of different groups

The surveys included a section to determine the extent to which various groups should have been or actually have "been involved in the planning, development, and deployment of climate-related technologies in […] country." Survey 1, which involved NDEs and TNAFPs who help to coordinate national climate technology activities, asked about who has been involved in such activities in their country. The other two surveys focused on aspirations, and asked respondents the extent to which they

think groups should be involved in such activities. Responses ranged from "Not at all involved" to "Significantly involved."

Table 36

Stakeholder participation

Stakeholder groups	**Survey 1**	**Survey 2**	**Survey 3**
National government	80%	94%	86%
Local and municipal governments	42%	97%	89%
Intergovernmental organizations	62%	76%	86%
Civil society	67%	100%	86%
Indigenous peoples/local communities	47%	91%	86%
Women	64%	97%	93%
Business and industry	69%	97%	82%
Entrepreneurs	56%	85%	79%
Financial institutions	44%	85%	93%
People most vulnerable to climate impacts	51%	94%	86%
Universities and research institutions	62%	100%	89%
Number responding	45	34	28
Range	42%-80%	76%-100%	79%-93%
Median	62%	94%	86%

As presented in table 36, responses indicate that aspirations for involvement are very high. Members and observers thought virtually all of the eleven groups listed should be at least somewhat involved in climate technology-related activities. More than nine of ten of the Survey 2 respondents thought that eight of the groups should be involved. Even the lowest rated group, intergovernmental organizations, had its engagement supported by three of four of responding members and observers.

Practitioners gave highest support for involvement to women and financial institutions, with more than nine of ten respondents saying they should be somewhat or significantly involved. All other groups received substantial support for involvement.

Results on the ground do not seem to live up to aspirations. Of the NDE and TNAFP respondents, eight of ten reported that national governments have been at least somewhat involved in activities in their country. Next highest reported involvement is from business and industry and civil society. The groups reported to be least involved are local and municipal governments, financial institutions, indigenous peoples/local communities, and people most vulnerable to climate impacts.

The survey reports of actual involvement indicate that some of the groups most likely to be affected by climate change, including vulnerable populations and local communities, may be the least engaged in climate technology-related activities. Additional study could uncover reasons why these groups are less involved.

Stakeholder engagement as an enabler

The surveys included a section on enabling environments for endogenous capacities and technologies. Respondents were asked to consider how strategies "can enable environments for enhancing climate capacities and technologies." Response choices ranged from "Does not enable" to "Enables significantly." Two of the areas listed referred to collaboration.

- Internal (such as collaboration among national and local governments, civil society, indigenous peoples, businesses and others within […] country
- External (such as collaboration with researchers, funders, or practitioners from outside […] country."

While collaboration and partnerships are addressed in a separate section of this report, responses to these questions also relate to stakeholder engagement. This section considers stakeholder group engagement, while the collaboration section discusses how different groups can work together. Table 37 summarizes responses in three surveys with regard to stakeholder engagement as enablers.

Table 37

Stakeholder engagement as an enabler

	Survey 1	**Survey 2**	**Survey 3**
Collaboration: Internal			
Percentage enables moderately or significantly	89%	97%	96%
Enabler ranking	1 of 17	2 of 17	1 of 17
Collaboration: External			
Percentage enables moderately or significantly	87%	100%	82%
Enabler ranking	3 of 17	1 of 17	7 of 17

All three respondent groups saw internal collaboration as a strong enabler, with nine out of ten or more rating internal collaboration as at least a moderate enabler. Responses for external collaboration were similar for Survey 1 and Survey 2; internal and external collaboration were among the top three enablers for both of these groups. Practitioners gave a slightly lower rating for external collaboration as an enabler, dropping this to sixth place on their list of enablers.

The surveys also provided an opportunity for respondents to "describe up to five factors that you believe contribute significantly to enabling environments to enhance [your country's, in-country, endogenous] climate capacities and technologies. Table 38 presents examples of responses that list stakeholder engagement as an enabler.

Table 38

Sample responses listing stakeholder engagement as an enabler

Survey 1 (n=7 of 183) (16 others mentioned collaboration)
• private sector engagment
• Community Involvement and ownership
• Entorno habilitante de los 36ctors claves (enabling environment for key actors)
Survey 2 (n=5 of 115) (19 others on collaboration)

• Participation of local communities
• incentives for private sector
• community participation
Survey 3 (n=14 of 89) (3 others on collaboration)
• Local involvement
• All satakeholders at every level
• Private Oil and Gas Sector
• Involvement of grassroots communities from start to finish
• People Most Impact

The NDEs and TNAFPs described more than twenty enablers that involved collaboration, engagement, and/or partnerships. Members and observers described twenty-four enablers relating to collaboration and participation. They put more emphasis on engaging academia and the private sector than the other groups. Practitioners listed fourteen enablers that involve engagement, with another three involving collaboration. They placed emphasis on local involvement. One noted that people most impacted contributed to enabling environments.

Stakeholder engagement challenges

While few challenges were listed relating to stakeholder engagement, the ones that were described a variety of issues. There was concern expressed about the coordination of involved groups. Governments from the local to the national level should be engaged. Empowering stakeholders may be challenging. Table 39 presents examples of responses listing challenges relating to stakeholder engagement.

Table 39

Sample responses listings of challenges relating to stakeholder engagement

Survey 1 (n=4 of 186)
• National engagement concerning the matter to be developed
• Stakeholder engagement at national and sub national
• Limited coordination among different stakeholder
• Lack of sustainable mechanisms for community involvement and participation in climate technology development and transfer
Survey 2 (n=7 of116)
• Fragmentation of stakeholders
• A challenge is to find and engage stakeholders (youth, women, local communities, indigenous population, etc.), because those groups can give very valuable inputs on how to adapt and modify the technologies to local needs
• involvement of local government and stakeholders into the process
• Empowering social capital
Survey 3 (n=3 of 100)
• Empowering social capital

Summary

In general, all three respondent groups expressed strong support for participation and inclusion, but the level of support varied for different stakeholders. As mentioned in the ratings section on Participation, actual participation often did not reach aspirational levels.

This study did not investigate the types of roles that different stakeholders might play in planning for, implementing, and enhancing endogenous capacities and technologies. This is an area to be considered for further study.

D. GENDER

The UNFCCC has directed all constituted bodies to mainstream gender into their work. The Technology Framework under Article 10, paragraph 4, of the Paris Agreement sets out numerous ways in which gender should be considered in work relating to climate technologies. (FCCC/PA/CMA/2018/3/Add.2). In its rolling workplan for 2019 to022, the TEC committed to incorporating gender considerations into its work.

This study included gender issues in numerous sections of all three surveys. Gender issues take on many forms, and responses to the surveys demonstrate concerns about a variety of gender issues, as well as different perceptions about the status of those issues in the context of endogenous capacities and technologies.

Capacity needs

"Gender responsiveness" was included in the list of twenty-two endogenous capacities. When respondents were asked to rate the strength of each area, almost two of three members and observers rated gender responsiveness, along with engaging stakeholders, as the two weakest capacities. A similar percentage of NDEs and TNAFPs said gender responsiveness was weak or very weak, but they found twelve other areas to be even weaker. Practitioners tended to rate most capacities as stronger than did the other groups, and only about four in ten rated gender responsiveness as weak, with six other areas perceived to be even weaker. Table 40 summarizes rating of gender responsiveness as capacity needs across three surveys.

Table 40

Gender capacity weakness

	Survey 1	Survey 2	Survey 3
Percentage weak or very weak	63%	65%	39%
Weakness ranking	13 of 22	1 of 22	7 of 22

While there were relatively few gender-related responses to the accompanying open-ended responses, they demonstrate some of the different approaches to gender issues. The survey 1 and Survey 3 responses were fairly generic. Members and observers provided more varied comments, citing weak capacities in gender equality, attitudes, and differential impacts, as well as responsiveness. Table 41 presents examples of gender-related responses relating to current capacities.

Table 41

Samples of gender-related responses relating to current capacities

Survey 1 (5 of 196)
• Addressing gender disparities
Survey 2 (6 of 127)
• gender equality
• Positive approach to gender and differential impacts
• Improve the reporting on differential impacts of technologies on women and men
Survey 3 (2 of 107)
• Gender responsiveness

Skill and knowledge needs

"Assessing gender impacts of technologies" was one of the twenty-four skills and knowledge areas presented. Respondents were asked to rate the strength of needs in each area.

Table 42

Strength of need for assessing gender impacts of technologies

	Survey 1	Survey 2	Survey 3
Percentage strong or very strong needs	71%	62%	64%
Strength ranking	14 of 24	8 of 24	10 of 24

Table 42 summarizes the ratings of assessing gender impacts of technologies across three surveys. At least six out of ten of the ratings from each group expressed a strong or very strong need for assessing gender impacts of technologies. The highest numerical rating came from Survey 1, but both of the other groups ranked gender assessments of impacts slightly higher than Survey 1.

Participation

"Women" were among the eleven stakeholder groups listed in the section on Stakeholder participation. Surveys 2 and 3 asked about the extent to which each group should be involved in the planning, development, and deployment of climate-related technologies. Both groups expressed very strong support for participation by women, placing them in the top three groups that should be involved. The NDEs and TNAFPs were asked about the extent to which each group actually has been involved. Just under two out of three reported that women have been involved in climate technology-related activities in their country, but women were the fourth highest group in actual participation. As with every other stakeholder group, actual participation seems to be occurring at a lower level than the other two groups of survey respondents would recommend.
Table 43 summarizes the rating of participation of women across three surveys.

Table 43

Participation of women

	Survey 1	Survey 2	Survey 3
Percentage have been/should be involved	64%	97%	93%
Participation ranking	4 of 11	3 of 11	1 of 11

Enabling environments and challenges

The section on strategies to create enabling environments did not include an item on gender issues. Respondents were given an opportunity to describe enabling strategies. None of the 188 Survey 1 responses referred to gender issues. Survey 2 produced 115 comments, none of which refer to gender. Three of the practitioners cited gender, out of 89 comments submitted. While other questions indicate that all three respondent groups believe gender issues are important, respondents to Surveys 1 and 2 apparently do not see gender issues among the factors most likely to enable environments for climate technologies. Practitioners were the one group with individuals who listed gender in the top five enablers.

A separate open-ended question addressed challenges that are likely to hinder development of new or modification of existing technologies. The NDEs and TNAFPs listed two challenges relating to gender, while members and observers and practitioners each cited one. The responses refer to gender impacts, equality, and integration. A practitioner also wrote of social constraints that restrict involvement by women. Table 44 presents examples of responses on challenges relating to gender.

Table 44

Challenges relating to gender

Survey 1 (n=186)
• Assessing gender impacts of technologies
• Gender issue integration in climate change
Survey 2 (n=116)
• Fostering gender equality
Survey 3 (n=100)
• Lack of women involvement in technology development due to social constraints

Respondents were given an opportunity to provide additional comments at the end of each survey. A practitioner provided the following response. "Involve women since they are the most vulnerable and burden bearers."

Summary

Respondents in all three groups expressed strong support for participation of women in activities related to climate technologies. Respondents also showed awareness of various aspects of gender issues, such as disparate treatment, impacts of technologies, attitudes, and participation. Further study would be needed to provide details about these issues.

E. INDIGENOUS PEOPLES and LOCAL COMMUNITIES

The creation of the Local Communities and Indigenous Peoples Platform (LCIPP) in 2015 demonstrates the commitment of the UNFCCC to the inclusion of these traditional groups and their traditional knowledge in climate-related activities. This study collected relevant information by referring to these groups in numerous questions and reporting on results.

The terms "indigenous" and "endogenous" are often confused. The introduction to each survey tried to clarify understanding of different terms by asking the respondents to regard "endogenous technologies" as those that are developed or modified at least in part within a country. "In-country skills and knowledge" were defined as those contributed by a variety of groups within a country, including "local communities and indigenous groups with traditional knowledge."

Several responses to the open-ended questions address indigenous peoples. Others mentioned local communities, but it was not clear whether they meant traditional communities or anyone who currently lives in a local area. These responses have been included when they might refer to or at least include more traditional local communities.

Capacity needs

None of the current capacities listed in the surveys specifically addressed indigenous peoples or local communities, although one item referred to engaging affected stakeholders. Responses to the open-ended question on capacities produced one relevant comment on Survey 1 and two on Survey 2. Table 45 presents some examples of responses related to indigenous peoples and local communities.

Table 45

Sample responses to on capacity needs relating to indigenous peoples and local communities

Survey 1 (1 of 196)
• Indegenous Communities involvement in Climate Change issues
Survey 2 (2 of 127)
• Recognition and dialogue with traditional/indigenous knowledge
• Involve indigenous people in decision making processes and use their knowledge

Responses to open-ended question on current capacity needs included three references to local communities and indigenous peoples. The comments addressed participation, including participation in decision-making, and the use of traditional knowledge.

Skills and knowledge

In this section, "Utilizing local and indigenous knowledge" was one of the twenty-four skill and knowledge areas listed. Respondents were directed to rate the level of need of each area relating to endogenous capacities and technologies.

At least three out of five of the respondents in each group rated the need to use local and indigenous knowledge as strong or very strong. While NDEs and TNAFPs saw the greatest need for traditional knowledge, members and observers ranked it slightly higher, including such knowledge in the top five

strongest skill and knowledge needs. Practitioners provided the lowest perceptions of need. Table 46 summarizes rating of need for utilizing local and indigenous knowledge across three surveys.

Table 46

Need for utilizing local and indigenous knowledge

	Survey 1	Survey 2	Survey 3
Percentage of strong or very strong needs	80%	68%	61%
Strength ranking	7 of 24	5 of 24	13 of 24

Participation

"Indigenous peoples and local communities" were included in a list of eleven stakeholder groups. Survey 2 and Survey 3 asked the degree to which each group should be involved in the planning, development, and deployment of climate-related technologies. Survey 1 asked about the level at which each group actually had been involved. Table 47 presents rating of level of participation of indigenous peoples and local communities across three surveys.

Table 47

Level of participation of indigenous peoples and local communities

	Survey 1	Survey 2	Survey 3
Percentage should be/have been involved	47%	91%	86%
Participation ranking	9 of 11	8 of 11	5 of 11

More than four out of five practitioners indicated that indigenous peoples and local communities should be somewhat or significantly involved in climate technology programs. Members and observers supported even higher levels of involvement, although they aspired to even greater involvement for seven other groups.

NDEs and TNAFPs, who were asked the extent to which groups in their country actually have been involved, indicated that participation by local communities and indigenous groups has not reached desired levels. Just under half reported that these groups had been somewhat or significantly involved in climate technology activities in their country. They indicated that eight other groups have enjoyed a higher level of participation.

Enablers and challenges

Indigenous peoples and local communities were not listed as a separate enabling strategy, but indigenous peoples were listed as an example of several groups that could collaborate on efforts within a country. This was rated as one of the top two enabling strategies on all three surveys.

Almost none of the responses to the open-ended question on enablers involved indigenous peoples and local communities. Survey 1 included one relevant response, "Respetar creencias ancestrales" (respect ancestral beliefs). Surveys 2 and 3 produced no such responses. The absence of comments in this

section indicates that respondents do not consider indigenous peoples and local communities to be in the top five enabling factors but say nothing about the involvement of such groups or the use of their specialized knowledge in projects relating to endogenous capacities and technologies. Table 48 presents examples of responses relating to indigenous peoples and local communities.

Table48

Sample responses on challenges relating to relating to indigenous peoples and local communities

Survey 1 (n=186)
• Utilizing local knowledge (3)
• Social empowering (including groups such as indigenous)
Survey 2 (n=116)
• Fair and respectful dialogue with local and indigenous knowledge
• limited utilization of local and indigenous knowledge
Survey 3 (n=100)
• Utilizing local and indigenous knowledge

Open-ended responses relating to challenges more frequently addressed relevant issues. Numerous respondents mentioned challenges relating to meeting local needs and conditions. In addition, seven comments related to indigenous peoples and local communities. Five of them focused on local and indigenous knowledge. The remaining response mentioned social empowerment as a challenge.

Other

Respondents were given a chance to provide additional feedback at the end of the surveys. One of the national representatives wrote “Reforzar técnicas de cultivos ancestrales en las comunidades“ (Reinforce ancestral farming techniques in the communities).

Summary

Respondents were supportive of participation of local communities and indigenous peoples, as well as of the use of traditional knowledge in conducting climate technology activities. This study did not collect detailed information about issues relating to needs, roles,contributions, or other issues relating to local communities and indigenous peoples.

F. COLLABORATION and PARTNERSHIPS

In addition to general stakeholder engagement, questions were asked about collaborating across groups and forming partnerships to plan and take actions relating to climate technologies. Items relating to collaboration and cooperation were included in questions about practitioner experience, skills and knowledge, enabling environments, and measures to enhance capacities to develop new technologies and to adapt existing technologies to local needs and conditions. Collaboration and partnerships were also mentioned in responses to some of the open-ended questions.

Practitioner experience

Practitioners, the group most likely to have been involved with on the ground action, were asked to indicate whether they had experience with collaborative programs. Just over one-third (36%) reported that they had collaborated in public/private partnerships involving climate technologies. The same number (36%) reported experience with South-South or triangular cooperation.

Skills and knowledge

In evaluating country needs for skills and knowledge, more than half of all three groups rated managing interdisciplinary teams as a strong or very strong need. Practitioners were more likely to see this as a strong need (71%). Working with external industries and consultants showed similar ratings (58%) from Survey 1 respondents. Respondents to Survey 2 (35%) and Survey 3 (39%) were somewhat less likely to see this as a strong need. All of these results were below the median for that group, except for the practitioner ratings for managing interdisciplinary teams.

Enabling environment factors

Collaboration and cooperation were rated as some of the most important strategies to support enabling environments for enhancing climate capacities and technologies. Internal collaboration, including collaboration among national and local governments, civil society, indigenous peoples, businesses, and others within the country, was rated as the top enabler by Survey 1 (89%), and Survey 2 (96%) respondents, and the second highest by Survey 2 (97%). External collaboration, including collaboration with researchers, funders, or practitioners from outside the country was seen as an enabler by 100% of the Survey 2 respondents, and was the third highest enabler for Survey 1 (87%). Practitioners rated external collaboration right at the median of enablers (82%).

Challenges

On the flip side, collaboration was much less likely to be regarded as a challenge to developing new technologies or modifying existing technologies to meet local needs and conditions. Only 8% of the many challenges listed involved internal or external collaboration. Table 49 presents examples of responses on challenges relating to collaboration and partnership.

Table 49

Sample responses on collaboration and partnership challenges

Survey 1 (7 of 186 responses)
• Conflicts between sectors across the same issue to be developed.
• Weak Cooperation of the key Stakeholders
• Lack of favorable conditions and investment climate for private sector participation in climate technology development and transfer
• Working with external industries and consultants
• Partnership coordination at national level.
• Low level of links between R@D, educational institutions and businesses for climate technology development and transfer
Survey 2 (4 of 116 responses)
• Inter-agency and inter-disciplinary cooperation

• Working with external industries to boost internal industrial capacity
• lack of incentives for private sector
• Lack of cooperation with academia and companies
Survey 3 (2 of 100 responses)
• How to synergize between government, oil and gas companies, power sectors, heavy industries in reducing and monetizing GHG emissions together.
• Connection (relation development and industry needs)

Measures to enhance capacities

The questions about the importance of measures to enhance country capacities to develop new or modify existing climate technologies included four measures involving collaborations. Table 50 presents rating of cooperative measures to enhance endogenous capacities across three surveys.

Table 50

Cooperative measures to enhance endogenous capacities

	Survey 1	Survey 2	Survey 3
New technology: Moderately or very important			
Collaborate with external academic researchers	93%	97%	89%
New tech importance ranking	4 of 13	2 of 13	3 of 13
Collaborate with industries in other countries	91%	97%	85%
New tech importance ranking	5 of 13	2 of 13	5 of 13
Public/private partnerships	91%	85%	85%
New tech importance ranking	5 of 13	8 of 13	5 of 13
Participation on international collaborative teams	89%	91%	81%
New tech importance ranking	7 of 13	4 of 13	7 of 13
Existing tech: Moderately or very important			
Collaborate with external academic researchers	84%	88%	86%
Existing tech importance ranking	7 of13	3 of 13	3 of 13
Collaborate with industries in other countries	84%	88%	82%
Existing tech importance ranking	7 of 13	3 of 13	4 of 13
Public/private partnerships	93%	91%	75%
Existing tech importance ranking	4 of 13	2 of 13	8 of 13
Participation on international collaborative teams	86%	74%	82%
Existing tech importance ranking	5 of 13	7 of 13	4 of 13

For developing new technologies, almost all respondents rated collaborative projects with researchers in other countries as moderately or very important (Survey 1 (93%), Survey 2 (97%), Survey 3 (89%). The importance of collaboration with external researchers was rated slightly lower for the adaptation of existing technologies to local needs and conditions (Survey 1 (84%), Survey 2 (88%), Survey 3 (86%)).

The importance of collaborative projects with industries in other countries also received high ratings from all three groups. Importance ratings for developing new technologies were quite high: Survey 1

(91%), Survey 2 (97%), Survey 3 (85%). For adapting technologies, ratings dropped slightly: Survey 1 (84%), Survey 2 (88%), and Survey 3 (82%). Public/private partnerships also were seen as important.

Summary

Overall, all three respondent groups recognized the importance of and need for collaboration and cooperation. They were less likely to see strong needs for skills and knowledge, but more likely to recognize the importance of collaboration and partnerships in creating enabling environments.

G. GOVERNANCE

Governance takes on many substantive forms, including policies, institutions, laws, and regulations. It also involves many process issues such as transparency and planning. Politics and corruption often complicate governance. All of these issues were either presented in the survey questions or mentioned in response to open-ended questions. Governance is treated as the overall concept in this section. Legal and regulatory issues are addressed separately because they often appeared in specific questions and were frequently mentioned in responses to open-ended questions.

Current capacity weaknesses

"Governance and planning (such as assignments of responsibility and oversight)" was one of the twenty-two capacities listed in this section. Respondents to Surveys 1 and 2 rated this as a weaker area than the respondents to Survey 3. The members and observers ranked it higher in terms of weakness than the other two groups. Tables 51 and 52 present the rating related to governance and planning weakness and examples of governance related responses on enhancing capacities, respectively.

Table 51

Governance and planning weakness

Somewhat or very weak capacities	**Survey 1**	**Survey 2**	**Survey 3**
Governance and planning	63%	53%	29%
Weakness ranking	13 of 22	7 of 22	14 of 22

Table 52

Samples of governance-related responses on enhancing capacities

Survey 1 (8 of 196 responses)
• Developing project proposals
• Promote and mobilize resources for the NAPs implementation
• Assess and Upgrading Technical Institutions
Survey 2 (10 of 127 responses)
• coordination among related ministries and agencies
• Urban planning and governance, implementation and monitoring is the problem
• Support beyond project cycle

Survey 3 (9 of 107 responses)
• Policy development at a country level
• Installed capacity at government level
• Resource access for strategy and policy development

Skill and knowledge needs

The Skills and knowledge section contained no items specifically related to governance. The closest one was "Boosting national and community ownership," which would require governmental leadership (see table 53).

Table 53

Skill and knowledge need for endogenous capacities and technologies

Strong or very strong need	**Survey 1**	**Survey 2**	**Survey 3**
Boosting national and community ownership	71%	62%	71%
Strength ranking	14 of 24	8 of 24	13 of 24

Participation

The section on Stakeholder participation asked about levels of participation for National government, Local and municipal governments, and Intergovernmental organizations. Surveys 2 and 3 asked about the level at which each group should be involved in the planning, development, and deployment of climate-related technologies. Survey 1 asked about the extent to which each group actually had been involved in such activities.

Close to nine of ten of the respondents to Surveys 2 and 3 said that national governments should be at least somewhat involved with activities relating to climate technologies. Both groups placed national governments in the top half of groups that should be involved. The NDEs and TNAFPs, who are representatives of national governments, reported that national governments were more involved in such activities than any other stakeholder.

Local and municipal governments showed a different pattern. Both Survey 1 and 2 respondents thought local and municipal governments should be even more involved than national governments. The discrepancy came in the Survey 1 reporting of actual participation, with local and municipal governments rated last on the list.

Survey 1 and 2 responses differed with respect to intergovernmental organization. While practitioners put them in the top half of groups that should be involved, members and observers rated their involvement last in importance. The NDEs and TNAFPS reported that intergovernmental organizations are in the top half of group involvement. Table 54 presents rating of participation by governments across three surveys.

Table 54

Participation by governments

Somewhat or significantly involved	Survey 1	Survey 2	Survey 3
National government	80%	94%	86%
Involvement ranking	1 of 11	6 of 11	5 of 11
Local and municipal governments	42%	97%	89%
Involvement ranking	11 of 11	3 of 11	3 of 11
Intergovernmental organizations	62%	76%	86%
Involvement ranking	5 of 11	11 of 11	5 of 11

Enabling environment factors

The enabling environments section included three items directly related to governance.

- Institutional and organizational issues (such as policies, programmes, and organizational structures)
- Governance: Decision-making (such as assignment of responsibility, lines of authority)
- Governance: Financial (such as where funds are deposited, procedures for budgeting and spending)

All three groups generally saw these governance functions as moderate or significant enablers. Each group gave similar ratings to the three functions, although members and observers saw the financial governance function as less of an enabler than the other two. While this may seem inconsistent with the importance of finance noted elsewhere, this item referred specifically to the way budgets and finances were handled, not how they were obtained.

Practitioners ranked institutional and organizational issues as more enabling than the rankings from the other two groups. Only three other factors were seen as more enabling to the practitioners.

Responses to the open-ended question on enablers provides further hints of why governance is an important enabler. NDEs and TNAFPs mentioned government involvement, decision-making, and policies. Members and observers were more concerned with clarity. Practitioners mentioned the role of government and policy, and the need to keep systems simple. Table 55 presents rating of enabling environments relating to governance across three surveys. Table 56 presents examples of open-ended question responses relating to governance as enabling environments.

Table 55

Enabling environment factors relating to governance

Enables moderately or significantly	Survey 1	Survey 2	Survey 3
Institutional and organizational issues	80%	88%	86%
Enabler ranking	7 of 17	9 of 17	4 of 17
Governance: Decision-making	78%	88%	82%
Enabler ranking	10 of 17	9 of 17	7 of 17
Governance: Financial	80%	79%	82%
Enabler ranking	7 of 17	15 of 17	7 of 17

Table 56

Sample responses on governance in enabling environments

Survey 1 (13 of 183)
governance-decision making
Government participation
Collaboration inside government
Government policies to inform decision making at national level.
Survey 2 (11 of 115)
Clear policy directions - domestic and international
Competence of decision makers
Clarity on the line of authority
Clear government strategy
Coherent policy frameworks
Survey 3 (11 of 89)
Institutionnal actors; Government
Governance (Laws, Policies, Decision Support System)
Making the administrative systems simple

Challenges

All three groups were asked to list up to five challenges that are likely to hinder development of new technologies or modification of existing technologies to meet local needs and conditions. More than ten percent of the challenges listed on each survey related to governance.

NDEs and TNAFPS mentioned country instability, institutional weakness, and inadequate policies. Members and observers focused on policies and planning and how decisions are made; one person also mentioned corruption. Practitioners mentioned lack of vision and coordination, and frequent changes in policies and direction. All three groups had at least one response that referred to political issues. Table 57 presents examples of responses on challenges associated with governance issues.

Table 57

Samples of governance-related challenges

Survey 1 (24 of 186)
• Instability
• Military Occupation
• Corruption
• Poor governance and planning
• Administrative barriers
• Inadequate institutional infrastructure, management, and human skills
• strengthening Institutional network
• Absence of adequate infrastructure (legislation, tax incentives, training, availability of funds, etc.)

• Policy of the country
• political backing or lack off
Survey 2 (18 of 116)
• inadequate infrastructure
• Corruption Challenge
• Lack of state support in developing or modifiying technologies, even when the areas are announced to be high priority
• Lack of strategical and tactical plans and firm steps how to implement them on state and regional level
• Top-down decision making
• Coordination between central and local governments' assessment and selection of technologies
• inadequate intra government coordination
• Use of external consultants instead of doing it themselves
• lack of institutions
• Policy implementation and monitoring
• Political instability
Survey 3 (23 of 100)
• Perception of executive responsible for governance
• Lack of coordination
• Policy formulation dominated by central Government
• Lack of vision at the requisite levels
• Missing link between Acreditted Entities (AEs) and ,Executing Entities (EEs)
• Informal cross institution involvement
• Continous Change in Government and national goals
• Short term policy evaluation and framing
• Absence of incentives for rural world to reform
• lack of political motivation

Measures to enhance capacities

This section did not include items relating to governance.

Summary

Governance was broadly defined for this section, and the responses cover many different elements. The three groups had somewhat different views of different levels of government, possibly based on their own experience. NDEs and TNAFPs are national representatives who work constantly for and with national governments. Members and observers may be the most familiar with intergovernmental organizations. Practitioners, who work on more local issues, may be the group most likely to be in contact with local and municipal governments.

One of the more discrepant findings of the study involved local and municipal governments. Respondents to Surveys 2 and 3 both ranked these governments as third in participation importance. Yet the NDEs and TNAFPs rated them as last in actual participation.

H. LEGAL and REGULATORY ISSUES

Current capacity weaknesses

The section on current capacities asked for ratings of "Legal and regulatory (such as revising regulatory structures and protecting intellectual property)." The pattern of responses was similar to "Governance and planning." Almost six of ten NDEs, TNAFPs, and members and observers rated legal and regulatory capacities as somewhat or very weak. Again, practitioners saw less weakness. Members and observers ranked legal and regulatory capacities as one of the top four weaknesses in current capacities. Tables 58 and 59 present rating of legal and regulatory capacities and examples of responses on legal and regulatory capacity needs, respectively.

Table 58

Capacities relating to legal and regulatory

Somewhat or very weak capacities	**Survey 1**	**Survey 2**	**Survey 3**
Legal and regulatory	59%	59%	32%
Weakness ranking	16 of 22	4 of 22	12 of 22

Table 59

Samples responses on legal and regulatory capacity needs

Survey 1 (8 of 196 responses)
• Technical barriers (mainly taxes at customs level)
• Legal and regulatory (such as revising regulatory structures and protecting intellectual property)
Survey 2 (11 of 127 responses)
• Legal and policy frameworks
Survey 3 (5 of 107 responses)
• Implementation of formulated policies and bylaws on climate change mitigation
• Legal capacity and resources to transform old laws
• Improving regulatory compliance of existing provisions as well as formulation of legal and regulatory framework of energy technologies and resources. This include regulatory compliance of natural gas and oil resources to be able to effectively manage extraction and exploitation, have clear revenue distribution, eradicate corruption, and set sunset dates in line with the Paris Agreement and the renewable energy scenario. It also includes enforcement of standards and regulations for renewable energy, in particular solar technologies, to avoid sub-standard equipment.

Skill and knowledge needs

Legal and regulatory skills and knowledge needs included both drafting skills and issues relating to intellectual property. More than seven out of ten NDEs and TNAFPs, as well as practitioners, saw strong or very strong needs for drafting skills. Only about half the members and observers saw drafting as a

strong need. Practitioners seemed particularly concerned with legal and regulatory drafting skills, ranking it the third strongest need out of the 24 listed.

Dealing with intellectual property issues was seen as a less strong need. While two out of three NDEs and TNAFPs rated this as a strong need, it ranked only eighteenth out of the list of skills and knowledge. Fewer than half of the other two groups saw a strong need for skills in dealing with intellectual property. Table 60 summarizes on skills and knowledge relating to legal and regulatory issues.

Table 60
Skills and knowledge relating to legal and regulatory

Strong or very strong need	**Survey 1**	**Survey 2**	**Survey 3**
Drafting legal and regulatory approaches	76%	53%	71%
Strength of need ranking	11 of 24	19 of 24	3 of 24
Dealing with intellectual property issues	67%	44%	46%
Strength of need ranking	18 of 24	21 of 24	20 of 24

Enabling environment factors

The section on enabling environments included both domestic and international legal and regulatory structures as possible enabling factors. International structures were low on the list for all three groups. Views were more divided on domestic frameworks. Members and observers thought only three other issues were more enabling than domestic legal and regulatory structures. Practitioners also ranked this factor in the top half. NDEs and TNAFPs provided a lower ranking. Tables 61 and 62 present rating of legal and regulatory as enabling strategies and examples of open-ended question responses on legal and regulatory factors as enabling environments, respectively.

Table 61
Legal and regulatory as enabling strategies

Enables moderately or significantly	**Survey 1**	**Survey 2**	**Survey 3**
Domestic legal and regulatory structures	76%	94%	82%
Enabler ranking	11 of 17	4 of 17	7 of 17
International legal and regulatory structures	69%	82%	64%
Enabler ranking	14 of 17	13 of 17	16 of 17

Table62

Samples of legal and regulatory factors for enabling environments

Survey 1 (8 of 183)
• strengthen the institutional and legal framework
• Clear regulatory frameworks which provides legal security for investors.
stability and reliability of governmental financial support for R&D
• Supporting laws and regulations: Incentives
• Arreglos institucionales ,locales y centrales (institutional, local, and central arrangements)
Survey 2 (11 of 115)

• Legal framework
• enabling regulatory and legal background
• Policy and legal frameworks
• property rights
• Removal of IPR barriers
Survey 3 (5 of 89)
• Legal and regulatory capacity support
• Legal and Human rights factors

Challenges

Many fewer of the listed challenges referred to legal and regulatory issues. A few mentioned weak laws in specific areas, such as land tenure, start-ups, and renewable energy, while others talked of generally weak legal and regulatory systems. Intellectual property issues were listed as challenges at least once on Survey 1 and 2. One practitioner listed enforcement of existing laws as a challenge. Table 63 presents examples of responses of challenges relating to legal and regulatory issues.

Table 63

Samples of legal and regulatory challenges

Survey 1 (13 of 186)
• Inhibiting policies, laws and instruments
• land tenure
• poor legislation and rules for innovations and startups
• Legal and regulatory constraints
• Dealing with intellectual property issues
Survey 2 (6 of 116)
• weak regulatory framework
• poor or absent legal and regulatory frameworks
• lack of regulation to exclude not appropriate technology
• IPB and Barriers
• Management of intellectual property rights for it not to be a barrier
Survey 3 (4 of 100)
• Developing legal and regulatory processes
• Law enforcement
• The regulatory process for renewable energy project development is overly long and complex, involving several government bodies, permits and licenses.

Measures to enhance capacities

Developing new technologies and modifying existing technologies sometimes encounter restrictions or charges relating to patents and other intellectual property. Both sections asked how important different measures were to enhance a country's capacities to develop or modify climate technologies. The ability to deal with intellectual property rights was one of the thirteen measures listed.

On Surveys 1 and 3, perceived importance was almost identical for developing new technologies and modifying existing technologies, but there were differences in rankings. The NDEs and TNAFPS put intellectual property rights for modifying existing technologies in the top half of the most important measures, while IPRs for developing new technologies was ranked much lower. Members and observers saw IPRs for existing technologies as less important than for new technologies, but the rankings for the two were identical, and not in the top half. Practitioners gave almost identical ratings and rankings to both developing new technologies and modifying existing technologies. Table 64 summarizes rating of intellectual property rights as measures to enhance endogenous capacities.

Table64

__Intellectual property rights as measures to enhance endogenous capacities

Moderately or very important	**Survey 1**	**Survey 2**	**Survey 3**
New technology intellectual property rights	87%	82%	81%
New technology importance ranking	11 of 13	10 of 13	7 of 13
Existing technologies intellectual property rights	86%	65%	79%
Existing technology importance ranking	5 of 13	10 of 13	7 of 13

Summary

Respondents to all three surveys saw legal and regulatory issues as important, but generally not as a top level of concern, with a few exceptions. Members and observers ranked legal and regulatory capacities as much weaker than did the other two groups. Practitioners saw a strong need for legal and regulatory drafting skills. Respondents to Surveys 1 and 3 put intellectual property rights relating to the modification of existing technologies in the top half of measures of importance; practitioners gave the same ranking to IPRs for developing new technologies.