

General Assembly Consultative Workshops on:
“Development, transfer and dissemination of clean and environmentally sound technologies in developing countries”

United Nations Headquarters, New York City

30 April, 1, 30 and 31 May 2013

DRAFT SUMMARY

Four Workshops were convened by the President of the 67th Session of the United Nations General Assembly **Mr. Vuk Jeremić** on the subject of the development, transfer and dissemination of clean and environmentally sound technologies in developing countries as mandated by the General Assembly Resolution 67/203 (21 December 2012). They were held at the United Nations Headquarters in New York City, on 30 April and 1, 30 and 31 May 2013. They were chaired by **Ambassador Dr. A.K. Abdul Momen** of Bangladesh in his capacity as Acting President of the General Assembly.

These workshops were designed to be an occasion for the General Assembly membership to draw in knowledge and perspectives from thinkers and practitioners from academia, research organisations and other non-governmental institutions on the subject at hand. The workshops thus benefited from presentations delivered by more than twenty notable experts on the subject, reflecting a wide range of experiences at international and national levels in developed and developing economies, including the least developed countries. These, together with keynote addresses by the Acting President of the General Assembly and **Mr. Wu Hongbo** (Under Secretary-General, Department of Economic and Social Affairs, UN) have been successful in generating interactive discussions with the participation of Member States, Major Groups and UN System representatives attending the events. A summary of the main points is provided in this document, and draws in part on the work of **Professor Ambuj D. Sagar** of the Indian Institute of Technology, who has made a valuable contribution with his participation in all four Workshops in this cycle and his presentations synthesising the discussions at successive stages. The panellists’ presentations can be accessed at the Workshops web page:

<http://sustainabledevelopment.un.org/technology/2013workshops>

The Workshops did not seek to and have not necessarily generated a convergence of views amongst UN Member States on options for a way forward in this area. But, perhaps, they elevated the sense of awareness and understanding amongst participants of one-another’s different perspectives and the analyses on which these are based. While the written statements read out during the meeting by representatives of different UN constituencies reconfirmed well established positions, the interactive discussions, during Q&A sessions, and especially in the final half-day session on the way forward, seemed to underline the importance of overcoming impasses in this field and reflected a growing willingness to engage in a dialogue on this important issue area.

WORKSHOP 1

Technology Needs of Developing Countries and Options to Address them:

Focus on science and R&D capabilities

30 April 2013

Workshop 1 provided an overview of developing countries' needs in relation to establishing basic scientific and technological capabilities necessary to undertake research and development (R&D) and absorb foreign technologies relevant for sustainable development. Specific sessions focused on needs in agriculture and energy and options to address them. Key messages included:

- Technology offers great potential for simultaneously addressing development and sustainability challenges – but realising the potential of technology is non-trivial, given relatively weak S&T and innovation capabilities in most developing countries
- Needs vary from country to country but many needs and issues are cross-cutting.
- Leveraging technology requires paying attention to the full innovation cycle (R&D, demonstration, commercialization) and large-scale deployment – ultimately technologies have to be deployed at scale to yield the desired outcomes.
- There is an enormous number of actors generally involved in technology development and deployment – national governments, firms, academia, financial actors, inter-governmental agencies, and civil society – with different actors playing roles in different stages of the innovation cycle (and those roles varying across technologies and countries).
- Technology is embedded in a larger social, economic and institutional context (e.g., agricultural markets). To enable an effective leveraging of technology, policy must focus on all key elements – technology, finance, markets and other institutions – across the full innovation cycle.
- There is a need to integrate knowledge and input from various sources and stakeholders.

A summary of the individual presentations and the discussions is given below.

Opening Session

H.E. Dr. A.K. Abdul Momen, Ambassador and Permanent Representative of Bangladesh to the United Nations, speaking in his capacity as Acting President of the 67th Session of the United Nations General Assembly, opened the Workshop with an introduction focusing on the mandate and objectives of the workshops. He recalled the Secretary-General's Report A/67/348 of 4 Sept. 2012 entitled "Options for a facilitation mechanism that promotes the development, transfer and dissemination of clean and environmentally sound technologies", as well as the subsequent discussions in the Second Committee, and underlined the importance of further in-depth and interactive discussions in these workshops. He also stressed that the outcomes of these discussions will feed into a further report by the Secretary-General on the way forward, to be presented at the 68th Session of the UN General Assembly.

Mr. Wu Hongbo, Under-Secretary-General for Economic and Social Affairs, United Nations introduced the programme of the consultative workshops. He emphasized the areas where the workshops should aim to develop a clear understanding, including: 1) good practices and models replicable in developing countries; 2) the challenges developing countries continue to face in terms of developing, importing or disseminating clean and environmentally sound technologies; and 3) best available options to support developing countries in promoting science and technology for sustainable development, with a view to better understand where the priorities lie.

Session 1.1:

Science and technology needs and options for poverty eradication and socio-economic development: focus on agriculture

The universe of technology transfer discussions tends to be dominated by a focus on renewable energy in the context of addressing global climate change concerns. An effort was made in the first Session to generate a discussion focused on technology issues as they relate to poverty eradication. In the words of **Mr. Nikhil Seth** (Director, Division for Sustainable Development, Department of Economic and Social Affairs - DESA), who moderated this session, the focus of the session on agriculture is germane as this activity necessitates an integrated look at many issues where technology solutions are relevant, from water to land use to biotechnology. Mr Seth also stressed the importance of integrated decision-making and the key role of states in meeting science and technology needs of developing countries.

Mr. Daniele Giovannucci (President, Committee on Sustainability Assessment – COSA) stressed the importance of markets and consumers as one of the main drivers of change towards clean and environmentally sound technologies. In this context, COSA’s mission is to advance transparent & global measurement tools to understand, manage and accelerate real sustainability. Other key points:

- The role of eco-labels & certification in achieving the above objective. Better sustainability outcomes and higher returns associated with eco-labelling.
- But eco-labelling works in countries with good markets – a lot remains to be done to ensure that the poor have access to markets where there is demand for eco-labels.
- Four key factors contribute to successful projects: 1) partnering with local institutions 2) aligning with global norms 3) applying state-of-the-art impact assessment science 4) developing flexible local solutions based on data & facts.

Q&A and comments (*A: denotes reply from one or more panellists*):

Q: Argentina raised concerns that eco-labels could be used as tools for protectionism to harm market access. Are there any international standards to help people understand what the good labels and bad labels are? **Gabon** also commented on the problem of access to global markets for some very important commodities such as cotton and coffee.

A: Consequences for market access, particularly of the poor, remain a challenge. Market mechanisms are in evolution towards sustainability but they are not particularly created for the poor. A study by the WTO finds that eco-labels have, thus far, not constituted a trade barrier. If you have a good approach embedded in a product, whether it is certified or not, consumers are increasingly willing to pay more for that. Transparency and communication is critical.

Q: Mr. Nikhil Seth asked if there is any data or insights on the impact of consumers on development and dissemination of clean and environmentally sound technology.

A: The initial shaping of demand is not from consumers but big firms in their effort to manage reputational risks. Eco-labels are considered a proxy for sustainability. For example, McDonald’s is investing heavily to look at how to make its supply chain more sustainable.

Mr. Hans R. Herren (President, Millennium Institute and Associate Fellow TWAS – The Academy of Sciences for the Developing World) stressed that the food system is a social-economic problem, an energy/planetary-boundary problem, a natural resource problem as well as being a social problem. Other key points:

- Need for a fundamental paradigm shift on agri-food system policy with institutional change, capacity development and investment, in order to move towards a sustainable production system and consumption patterns and an agriculture that is multifunctional and addressing resilience needs of the small-scale and family farmers.

- Adoption of a systemic and holistic approach which treats the causes not the symptoms.
- Reference to “Agriculture at a Crossroad” report (<http://www.agassessment-watch.org/>), which led to paragraphs 111 and 115 in the Rio+20 outcome document.
- Proposed affordable areas for investment towards a sustainable agriculture system: pre-harvest losses, agriculture management practices, R&D, and food processing.
- Better planning tools are required to empower local decision makers to align with national vision and national development plans.

Q&A and comments:

Q: Kenya commented on the presentation with an emphasis on the need to change production and consumption patterns. **A:** Production and consumption go hand in hand. There is a lot to be done with consumers to make the shift.

Ghana posed a question on the coherence of different UN system entities and how to align their efforts for example on the topic of urbanization vs. a greater need for jobs in the agricultural sector. **A:** Urbanization should build on successful models of adding values along the value chain. Farmers should share in the benefits of value addition. Their concerns for security of land ownership and tenure, access to credit and inputs, also need to be tackled.

Tanzania, connecting the first two presentations, pointed out the need to reconcile market driven mechanisms and the needs of the poorest countries, particularly those of small-scale farmers. **A:** Developing local market is extremely important. 70% of the total food consumption is produced locally.

India commented on the tendency of market towards mono-culture and the proposal of Mr. Herren on the need for multi-functional agriculture system. Also raised a question, noting that tropical regions would be most affected by climate change: what are the technologies available to solve their problems and how do we collaborate more to develop environmentally sustainable technologies for agriculture? **A:** The market alone actually doesn't promote diversity and it doesn't help create resilience to climate change. Consumers can, however, help the transition away from large mono-crop systems that are resource demanding, but a lot of capacity-building is needed.

Iceland, considering the current task of defining a set of sustainable development goals, asked for Mr. Herren's recommendations on goals and targets to make the necessary paradigm shift. **A:** We need to focus on the long-term for sustainability of the system. Reporting and measurement should go in the same direction, focusing on long-term. A wrong system will be very expensive to correct.

Mr. Ephraim Maduhu Nkonya (Senior Research Fellow, Environment and Production Technology Division, International Food Policy Research Institute – IFPRI) emphasized the crucial role of investing in agriculture for poverty eradication in LDCs. It is seen that countries relying on low technology and on raw materials mostly remain poor. Other key points:

- Lessons learned include 1) science and technology should be produced locally; 2) needs to reach farmers through tech advisory services; 3) market access and incentives are important; 4) supportive policies are crucial.
- The problems in Sub-Sahara Africa are that 1) traditional technology is ignored and labelled “backward”, while new technologies are not widely available; 2) the current agricultural technology advisory services unfortunately focus on production and forget post-harvest and marketing components; 3) on the production side, they do not focus much on organic inputs, which would be less costly and also most useful to combating climate change, but rather on chemical fertilizers.

- Recommendations: 1) increasing investment and the investment in agricultural technology should be accompanied by investment in other rural services such as roads; 2) technology advisory services should be holistic.
- Case study of a failure: The example of Sasakawa Global 2000 in Ethiopia, on the unintended consequences of externalities brought in the absence of a holistic approach.

Q&A and comments:

Q: Liberia commented on the Sasakawa case, arguing the project should have been designed with sufficient knowledge on its effects on the demand side. On the role of other rural services, the delegate asked for clarification on the contribution of mobile phones to poverty eradication. ***A:*** Help comes with good intentions. Better build with a forward-looking element and to address market needs too.

India asked if there are relevant assessments of needs on technology and other development fronts in the SSA region. ***A:*** Assessments have been done many times. Investments are required to follow up on their implementation.

Gabon found the example of organic fertilizer vs. chemical fertilizer interesting and asked what type of cooperation would be the most useful and appropriate in this. ***A:*** North-South cooperation is very important; the market is of course a driver too.

Guyana stressed the need to link technology with other non-technology related issues. Too much concentration on production could be dangerous and the integration of different dimensions is critical.

Iceland said telecommunications is a perfect example of leapfrogging. Ten years ago nobody would imagine mobile phones in Africa. Can the SSA region be helped to leapfrog in other ways to get the right sort of services? ***A:*** Cell phones do help, and can even be used for transferring money, which is very helpful without sufficient banking services in rural areas.

Benin How do you analyze the policy that is implemented? In Sub-Saharan Africa, they continue to use chemical fertilizers in commodities for export at a time where there is a growing food crisis. Also there are a lot of agricultural products that get wasted, so what do you propose when there are many countries that don't have the means to conserve them? ***A:*** Subsidies should be improved and redirected towards sustainability.

France asked what incentives would be necessary to persuade firms in the "North" to transfer technologies. This question was not tackled by the panel.

Kenya emphasised the importance of monitoring climate change and weather patterns in planning for agriculture and adapting to local conditions.

GENERAL DISCUSSION (see Workshops web pages for statements)

Speaking on behalf of ***Group of 77 and China, Fiji*** delivered a statement and referred to the possibility of tabling a resolution on the subject of a technology facilitation mechanism.

The ***European Union*** announced that it will (a) significantly increase demand-led agriculture research by 2015; (b) refrain from promoting technologies which are not sustainable; (c) support greater participation of civil society; and (d) promote linkages between EU farmers' organizations and developing countries' farmers.

Benin, speaking on behalf of LDCs, and Morocco, Egypt, Bangladesh, Belarus, Argentina called for enhanced access to new technologies and a better utilisation of technologies, training programmes and institutional capacity building, North-South and South-South cooperation, the need to diversify food crops and address nutrition more effectively, and promotion of science and technology including in middle income countries

Session 1.2:

Science and technology needs and options in addressing sustainable development objectives and global sustainability challenges

The session was moderated by **Mr. Khalil Rahman** (Chief, Policy Development and Coordination, Monitoring and Reporting Service for the Least Developed Countries, Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries and Small Island Developing States, UN) and its focus was mainly on energy and climate. The Moderator stressed that:

- Technology issues are not new in the UN. But we are at a crossroads in this respect.
- We need new thinking. But new technologies may give rise to a tech divide.

It was noted that developing countries need to have adequate and affordable supplies of energy in order to meet developmental challenges since energy services are intimately interlinked with social, human, and economic development. The question of energy access is particularly critical – over 1.6 billion people are without electricity and 2.6 billion dependent on traditional biomass for their household cooking needs. Providing modern forms of energy – electricity and clean cooking energy – to these energy poor is an urgent need.

At the same time, the climate problem also is increasingly urgent. There is a significant ‘emissions’ gap between what cuts are needed to have some reasonable probability of avoiding a 2°C temperature rise and what has been pledged in recent Conferences of the Parties of the Climate Change Convention – we are about only halfway to where we need to be. And the more we delay, the more difficult this problem gets.

Dr. Jorge Rogat (Project Manager, Technology Needs Assessment (TNA) Project and Senior Economist, UNEP Risoe Centre) presented the TNA project, emanating from the Poznan conference, to identify sectors and select technologies to decrease CO₂ emissions. The project has mitigation and adaptation components. Other key points:

- The project concentrates on sectors in need of mitigation and adaptation in consultation with local stakeholders. Recommends enabling frameworks to facilitate the diffusion of environmentally sound technologies (EST). Has developed tech action plans and produced reports.
- In mitigation sectors, energy has been identified as priority. Countries have also prioritized agriculture, transport and industry.
- In adaptation sectors, water and agriculture represent the major focus of projects.
- A number of outputs have been produced on financing adaptation, financing mitigation, mitigation in the building sector and mitigation in the agriculture sector.
- Examples of implementation of results in national plans and NAMAs (Nationally Appropriate Mitigation Actions) can be found in Argentina, Costa Rica, Ecuador, Indonesia, Mauritius, Thailand, and Vietnam.
- Lessons learned: process has been quite useful for countries participating, but the level of commitment has varied among countries. Need to identify and involve key local partners for enhanced ownership. Capacity development has also been a challenge.

Prof. Ambuj D. Sagar (Dean, Alumni Affairs & International Programs and Vipula and Mahesh Chaturvedi Professor of Policy Studies, Department of Humanities and Social Sciences, Indian Institute of Technology) delivered a presentation on leveraging science and technology to address sustainable development and global sustainability imperatives in developing countries, focusing on the case of energy and climate issues. Other key points:

- Technology needs vary from country to country. Innovation gaps are different in different technologies. Both development and sustainability imperatives change over time. There is no simple model to apply to all.
- Important to connect local and global processes. The objective is to have technologies that are available globally but affordable to developing countries.
- A key challenge is to meet both the development and sustainability imperatives – in the required time frame and in a simultaneous manner.
- The role of technology is to advance development and sustainability, in particular for developing countries the development and diffusion of technologies relevant for unaddressed needs.
- Capabilities are found in countries that are already doing well. Need is highest in poor countries.
- Translating R&D into application requires progress on multiple paths: technology, finance, markets, policy/regulation and coordination, which need to move in parallel.
- To address needs and gaps, flexibility is key since no one shoe will fit all. Involvement of different stakeholders will be crucial at the local and international levels. Climate Innovation Centres (CICs) will be important in terms of focus on local needs.
- At the international level, most existing initiatives are focused on deployment and not on RD&D. There are few technologies for adaptation and most of them are focusing on major developing countries.
- There are different collaboration models and possibilities that have not been explored, which points to a potential role for a global facility or global networks.

Dr. Roberto Schaeffer (Energy Planning Program, COPPE, Federal University of Rio de Janeiro – UFRJ) focused on issues and challenges for major developing economies regarding low-carbon technologies. His major points included:

- The power sector, transport sector and industry can make a significant contribution to bridging the gap in mitigation of emissions of CO₂. The technology already exists. The key issue is deployment and not really research and development.
- Of particular importance is the spread of low-carbon technologies to the major emerging economies: Brazil, China and India.
- The relationship between efforts to develop low-carbon technologies and efforts to deploy them is complex, uneven, and varies by country. Some developing countries may pursue a low-carbon technology strategy that is driven largely by a desire to field world-leading clean energy industries. Low carbon energy R&D typically requires long-term horizons.
- Technological absorptive capacity of emerging countries needs to be better understood.
- The overall economic structure of each major emerging economy has significant consequences for the scale and speed of technology transfer and diffusion.

GENERAL DISCUSSION

China: Supported *Fiji* who had spoken on behalf of *G77 and China* in the previous session. Proposal: enhance the mechanism for bilateral and multilateral support for technology dissemination and transfer, based on the specific needs of each country; promote science and technology for sustainable development, including by building R&D capacity in developing countries, in particular South-South cooperation and partnerships in support of developing

countries. **A:** To address technology needs, huge investments are not needed; partnerships are key to involve the relevant actors; other innovative sources of financing should be explored; South-South cooperation has been undertaken with very fruitful results in biofuels (e.g., by Brazil and Central America). Biomass has also seen some cooperation. Wind energy has become more popular in developing countries. However, there is still a need for North-South cooperation.

Malaysia: What were the criteria for countries to be included in the UNEP project and what were the reasons for some countries' not completing the project? **A:** Selection of countries: the GEF sent invitation to all developing countries asking for a letter of interest or endorsement from GEF focal points in the countries. Reasons: level of commitment has a major impact in implementation. Bureaucracy also delays project implementation. Non-completion is most widespread amongst the LDCs.

Moderator: In this context should the LDCs wait for indigenous capacities to develop or take global technologies and adapt them to local context? Capacity is not only a successful use of a technology but also requires other capabilities to be implemented at scale to have an impact. Countries that have low R&D capacities cannot wait. Focus on building complementary capacities with the support of the international community but build local capability to implement technologies in the short term; one option does not exclude the other; important to take into consideration differences between countries, be they economic, cultural, social, etc.

India:

- Developing countries' needs are growing. They cannot wait thirty years for R&D to be developed. Lead must be taken by industrialized countries. Local solutions can only add in order to have a transformative impact.
- IPRs have faced a roadblock in the international discourse. There has to be a freer movement of technologies.
- How do you plan to take the conclusions of the UNEP project forward and how should it be linked to other financial institutions?

A:

- The importance of IPRs varies depending on different sectors' and technologies' characteristics. Collaboration is key to diffuse the challenges concerning IPRs.
- Product development partnerships could facilitate transfer of technologies to developing countries. Often businesses come together to work on a specific technology. Other collaborative models need to be explored. The question of financing (e.g., climate finance) is key and is not getting enough attention in terms of paying for incremental costs and financing innovation.
- Today the principal markets of technology are in the developing countries.

Belarus: Outcome document of Rio+20 refers to the middle income countries (MICs). Technology facilitation could also pay a particular attention to MICs. What is the role of the MICs in terms of transfer of tech in achieving of SD? **A:** MICs form a bridge between high innovation countries and countries without strong technological capabilities. They can become facilitators of partnerships with LDCs. MICs have provided bases for technology centres. MICs can play a useful role both by helping reduce the cost and make technologies available to other developing countries.

Peru: The framing of the problem has become essential. In the UN, development, transfer, and deployment of technology should frame our discussions. **A:** Issues which have high-impact development consequences should be prioritised. It is the responsibility of developing countries to give the emphasis where it is most needed; Adaptation technologies are not as

financially profitable as mitigation technologies. Therefore international collective action should prioritise support for adaptation technologies.

Morocco: *Reference to the range of UN conventions and other entities relevant in the field of clean technology. Need for reform of the Clean Development Mechanisms (CDM) to help build institutional synergies between the CDM and other entities to be able to serve developing countries. How can we ensure effective coordination among existing initiatives?*

A:

- *The technology transfer element of CDM has been very small. Only China, Brazil and India were major beneficiaries. With new CDM projects, requirements for projects involving LDCs must include a technology transfer component.*
- *The UNEP project collaboration brings together institutions with complementary resources and capabilities, which facilitates collaboration.*
- *But there is need to strengthen coordination in the field of technology at the highest political level to enable better synergies among the UN bodies, the World Bank and countries, for example, in the Sustainable Energy for All Initiative.*
- *There is an artificial divide in the world regarding climate mitigation vs. energy access. These issues should be interlinked and not separated. This should be an issue of climate justice. International assistance is focusing on polluters but we should concentrate resources on non-polluters/low emitters and foster their access to clean energy.*

Tanzania: *CDM has been largely irrelevant for Africa in the absence of the necessary resources to facilitate transfer of technology.*

Women Major Group:

- *How do the TNA process and the technology action plans actually capture the gender aspect? Such as in agriculture? A: The gender aspect has not been taken into consideration in the TNA, but it should.*
- *Are the TNA and TAP going to be a key requirement for access to key technologies? Are there examples or models for how the assessments of technology are integrated in the South-South and North-South collaborations and in the processes of R&D? A: Assessment of technologies is a complicated subject. Some countries have made great advances in it but others have not.*

WORKSHOP 2

Technology Needs of Developing Countries and Options to Address them: Moving from R&D to widespread adoption of environmentally sound innovation

1 May 2013

Workshop 2 provided an updated understanding of both the range of activities underway and the range of options available to do more in terms of facilitating the dissemination and widespread adoption of clean and environmentally sound technologies. Key points included:

- As illustrated in presentations in this and the preceding Workshop, there is an enormous range of activities already underway for technology facilitation (e.g., UNEP Technology Needs Assessment; IRENA Renewable Readiness Assessment; COSA Certification programs; World Bank Climate Innovation Centres; CGIAR; Brazil-Mozambique partnership on retrovirals; national-level programs; civil-society led programs (e.g., System of Rice Intensification; farmer-led Global Seed Diversification, etc.)
- As in Workshop 1, confirmation that different countries have different technology needs commensurate with their development needs and social, economic, institutional, and cultural context.
- Options to address those needs must encompass:
 - Technology assessment and prioritization ('what to do')
 - Technology readiness and implementation ('how to do it')
 - Monitoring and assessment ('how are we doing')
 - Learning and experience sharing ('how to do better')
- Different countries have very different capabilities and economic/industrial structures and therefore very different innovation gaps.
- There is a need for both a 'supply (technology) push' and a 'demand (market) pull'.
- Sharing of knowledge and practices (within and across countries) can play a key role.
- Many technologies to address development and sustainability imperatives already exist – technology transfer can play an important role. But developing countries still need local capabilities to adapt and be able to deploy the technologies.
- New technologies are also needed, especially for "unaddressed" needs, e.g., improved cookstoves, small-scale biomass energy, etc.
- Technology facilitation policy must integrate (and prioritize across) social, economic, and environmental dimensions.

The presentations and the ensuing discussion seemed to have strengthened support for the understanding that the issue of technology transfer in relation to clean and environmentally sound technologies needs to be taken up as part of a broader discussion on a range of capabilities that need to be built in the developing countries to foster the development, adaptation and dissemination of technologies relevant for sustainable development.

In the final session some developing country Member States underlined the need to build on what they considered to be a successful technical harvest on this issue, with a political harvest in the Workshops 3 and 4 coming up on 30 and 31 May. Speakers on behalf of the G77 reiterated their plans to "table a resolution" on this subject.

A summary of the individual presentations and the discussions is given below.

Session 2.1:

Successful models for clean and environmentally sound innovation and technology diffusion in developing countries

Moderated by **Mr. Andrew Allimadi** (Programme Officer, UN Regional Commissions New York Office – ECE, ESCAP, ECLAC, ECA, ESCWA), this Session built on the discussions focused on the energy sector in Session 1.2 by broadening them to cover needs and option across the full technology cycle. Presentations by experts shed light on the challenges, as well as on elements of different models for the diffusion and widespread adoption of technologies, including a discussion on the relative merits of more laissez-faire vs. more interventionist approaches.

Professor Carl J. Dahlman, (Henry R. Luce Associate Professor at the Edmund A. Walsh School of Foreign Service, Georgetown University) discussed the scope of environmentally sound innovation and offered some general lessons towards the development of a technology transfer mechanism. His specific observations included:

- Broad scope of innovation, including not only specific technologies but total systems, including know-how, organisational and management procedures, HR development and local capacity building for technology assessment.
- In order to have real impact, technology programmes should focus on the whole technology cycle: from initial R&D and innovation to scaling up and commercialization, and dissemination of technologies.
- That diffusion of innovation occurs through many channels, including technical assistance, FDI, connecting with the diasporas, and even pirating technologies.
- Multinational enterprises are the key global innovation agent, accounting for 27% of value added, 2/3rds of trade and 60% of R&D globally.
- Given the very rapid growth of the global stock of knowledge, countries may get a bigger increase in welfare from acquiring and adapting innovations that already exist elsewhere rather than innovating from scratch – hence, importance of tapping into global knowledge.
- Limitations of technology supply push efforts in the absence of developing countries' possessing the skills and complementary assets to be able to install, maintain, use and evaluate the benefits of those technologies.
- Useful to have a facilitation mechanism serving as a clearing house for information on environmentally sound technologies, with strong links to multiple agents/partners to get and disseminate relevant technologies, such as research centres and other technology developing centres, universities, governments and international development organizations, private firms, NGOs and communities.

Dr. Imran H. Ahmad (Senior Programme Officer of the International Renewable Energy Agency – IRENA), underlined that to increase awareness for technology one needs to have proper legislation, proper rules, and governments have a critical enabling role to play in this context. His specific observations included:

- Complementing the Technology Needs Assessment (TNA) process presented in Session 1.2, the Renewable Readiness Assessment (RRA) process by IRENA seeks to identify actions required to promote new and renewable energy.
- IRENA favours a “pincer” approach combining “supply push” (tax exemptions, subsidies, etc., which represent the prevailing approaches) with an effective “demand pull” (e.g.,

facilitating affordability, reliability, maintainability etc., from a consumer point of view) focusing on motivating private companies and incentivising private investment.

- For a combined approach to work there is the need for government targets, policies, and mechanisms at the national scale.
- International technology facilitation ought to support the technology diffusion at the country and regional level.
- Both North-South and South-South cooperation are important in this respect.
- Examples of successful deployment and diffusion (wind energy technologies in Brazil and India, Lighting Africa Project in sub-Saharan Africa) underline the importance of political commitment and adequate funding.
- Effective rule of law and transparency, including in the administrative and permits processes, a clear and effective pricing structure and an adequate financing sector represent other key success factors.
- “Technology exists”. The principal challenge is its diffusion. There is no-one-size-fits-all solution. Solutions have to be adapted to the needs and capabilities of the countries.

Mr. Claudio Huepe Minoletti, (Economist, Renewables & Environment, Centro de Energía y Desarrollo Sustentable, Universidad Diego Portales, Santiago de Chile) presented the case of Chile where a non-interventionist approach with respect to environmental technologies has resulted in piecemeal efforts and mixed results in terms of adoption. His main points were:

- A large potential is insufficient to drive green innovation and diffusion.
- Chilean examples of innovation efforts, such as in biofuels which were in response to market signals (high oil prices from 2008).
- Importance of public policy to enable big projects representing big innovations with demonstration effects.
- Importance of more systematic international cooperation to enable efforts going beyond political cycles
- Need to make international action less project-based and more “systemic”.

GENERAL DISCUSSION

Morocco:

- *The high cost of World Bank and/ foreign loans generally for renewable energy.*
- *Importance of reactivating innovative financing and applying it to the Secretary-General’s initiative on Sustainable Energy for All.*
- *Difficulties in dealing with multinationals and private companies when developing countries decide to convert to using renewable energy from fossil fuels through FDI or to receive technology from developed countries. A: Important to motivate the multinational companies to do more, because they are big players in technology transfer.*
- *The need for the international community to develop a code of conduct and/or guidelines for multinational companies. A: Developing the code of conduct for all companies may not be feasible. Developing sectoral ones (such as code of conduct for mining sector) seems to be a promising starting point.*

***Tunisia:** Importance of an international blueprint approach, which would be based on internationally agreed targets and goals, could be adapted to the national level, and should include training capacity, including a role for the UN.*

***Saint Kitts and Nevis:** The need to explore the possibility of replicating, in sectors such as renewable energy, the WTO agreement enabling countries that cannot make medicines themselves to import pharmaceuticals made under compulsory licence.*

***Egypt:** The observation that, while a great deal of international cooperation and debate is underway on technology facilitation, there have been no tangible results, except in medicines. What is the right starting point to get results in this area?*

In an interactive debate, some delegates and panellists expressed the pressing need for fundamental changes in various systems, such as pricing systems (“climate change not priced”) and regulatory systems, which also in many ways necessitates a culture change. In this respect, climate change should be seen as a fundamental challenge that concentrates the mind. In this context, a massive public campaign to raise awareness and change habits is important.

Session 2.2:

What forms of international cooperation can foster environmentally sound innovation and technology diffusion, including in smaller and or less developed economies?

Moderated by **Mr. David O’Connor** (Chief, Policy and Analysis Branch, Division for Sustainable Development, DESA, UN), this Session built on preceding ones mainly focused on national experiences towards a discussion on international initiatives (including bi-lateral ones) for technology facilitation, which were to be fully the focus of subsequent Workshops 3 and 4 to be held on 30 and 31 May 2013. Key issues include:

- The importance of helping developing country scientists to link to global research networks and generally helping the poor countries to benefit from the research.
- In this respect it is important to update continually our understanding on the roles of “South-South”, “North-South” and “Triangular” cooperation.
- Significant barriers and challenges exist to technology diffusion, particularly for LDCs.
- There may be merit in pursuing a portfolio approach in terms of a menu of options for international initiatives. To have a strategy makes a difference.
- There are some successful experiences, such as in China and India. But there is no one-size that fits all. Each country has a unique strategy and international efforts should aim to bolster national strategies.
- Overall, it is useful to think about an international cooperation framework for finance and technology for sustainable development, and to move beyond the existing constraints.

Ms. Elenita (Neth) Daño (Action Group on Erosion, Technology and Concentration – ETC Group) spoke on international cooperation in the area of environmentally sound technologies from the point of view of civil society, social movements and communities. While remaining active “on the ground”, these groups generally have limited ability to participate in international discussions. Her main points included:

- International cooperation should include direct participation of civil society, social movements and communities, and this must be supported by governments.
- The participation of end-users of environmentally sound technologies must be ensured in the processes for the identification of technology needs as well as technology assessment.
- Technology assessment should be seen as a safeguard, not as an obstacle.
- There are successful examples of civil-society-led cooperation for technology diffusion, such as the System of Rice Intensification (SRI), Climate Field Schools or Farmer-led Global Seed Diversification.
- Note that the UN Secretary General’s report A/67/348 of 4 Sept. 2012 on options for a facilitation mechanism includes a recommendation to set up an international network of technology assessment centres and/or national and global advisory groups on technology assessment and ethics.

Mr. George Dragnich (Consultant, UN Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries and Small Island Developing States) spoke on the technology needs and options of developing countries, with a focus on the Least Developed Countries (LDCs), and trends that might affect them. His main points were that:

- Developing countries as a whole have broken the triumphalism of developed countries in the area of technology and development in general, but the LDCs are an exception to this.
- Recent studies with a regional focus (e.g., a recent Bibliometric Study on the ASEAN region carried by Elsevier for the British Council) show significant differentiation of outcomes amongst developing countries.
- There are world class scientists everywhere. While some may be cut off from global collaboration networks, the Internet brings new possibilities. Fibre optic telecommunications network used to stop in Dakar – today it rounds Africa, and some countries such as Uganda and Rwanda have excellent access. Ditto South Asia.
- The situation is less encouraging for SIDS, which rely on expensive satellite links.
- There exist helpful examples of Public-Private Partnerships to support developing country access to scientific collaboration, such as www.research4life.org (with free access for LDCs to US\$10M-worth of literature) or www.scopus.com (search engine for scientific literature).
- What is lacking is a UN System-wide rollout of a comprehensive support package.
- Work is progressing to follow up the 2011 Istanbul Programme of Action on the LDCs with a proposal for a concrete technology facilitation scheme.

Ms. Lícia de Oliveira (Deputy Director, Regional Office in Africa, Fundação Oswaldo Cruz (Fiocruz), Ministry of Health, Brazil) presented a case study of Brazil’s technology cooperation with Mozambique in the area of antiretroviral medicine. Her key points included:

- The sheer scale of experience and capability that Brazil can leverage in the case of Fiocruz (founded in 1900 under the Ministry of Health, now with 22 scientific and

technological institutes, 12,000 staff included 900 PhDs, with a budget over US\$1B, with 1,800 projects generating over 1,000 scientific papers per year).

- The sheer scale of the challenge in Mozambique: 18% of population with HIV/AIDS, with treatment reaching less than 40% of adults and ¼ of children who are infected; 80% dependent on medicines supplied by foreign donations.
- Creating a public enterprise in Mozambique for sustainable production of antiretroviral and other medicines, including HR training, technology transfer and technical assistance in good manufacturing and management practices, international certification, etc.
- Assistance to strengthen the local regulatory agency and align other health policies.
- Joint financing by Brazil (public and private funds) and Mozambique. A significant example of “South-South” cooperation.
- Involvement of stakeholders, in particular to address issues in technology assimilation and capacity building. Local competencies thus generated opening possibilities for further technological and industrial development.

GENERAL DISCUSSION (*A: denotes reply from one or more panellists*)

India:

- *Need to go beyond small fixes, with big-impact initiatives, with funding, along the lines of the “green revolution” – in the absence of which, so many developing countries today would have been in great difficulty. Much of the lead has to come from the leading developed countries.*
- *Strongly support the recommendations contained in the UN Secretary General’s report A/67/348 of 4 Sept. 2012 on options for a facilitation mechanism.*

Mexico: *There is fundamental agreement that strengthening technology facilitation is a major outcome of Rio+20. There are major initiatives underway in the areas of food security and global environmental change, discussions on patents issues in WTO, and a new flexible platform on climate technologies led by UNEP. We should identify gaps, avoid overlaps and rely on existing institutions rather than creating new institutions.*

Liberia (*Supports India*): *What can be done to overcome the impasse on technology facilitation, especially vis-à-vis the LDCs?*

A: *There is a contradiction between the TRIPS Article 66.2 which obliges developed countries to promote technology transfer to LDCs and Article 66.1 which exempts LDCs from the obligation to provide National Treatment and Most-Favoured-Nation Treatment in the area of IP. There is merit in replicating something like the Enhanced Integrated Framework (www.enhancedif.org) on IP. Also need to encourage patent filing in developing countries.*

A: *Important to build on existing good models of technology diffusion and think outside the box regarding patents. Six companies hold 250 patents relevant for climate change. There is a need to promote codes of conduct and social responsibility.*

Canada: *UNSG’s 2012 report did not actually provide options. Need to elaborate on “South-South” cooperation, as more developing countries begin to lead in some technologies*

Egypt (*Supports India*): *There is a need for a systemic approach to bring about transformational change – something of scale which should represent an effort by the whole international community – and this needs to be part of the SDGs/post-2015 agenda.*

Morocco: *“This is a Workshop which whets the appetite.” Appreciation of the work of DESA, which enabled a rich “technical harvest” in these first two Workshops. This now needs to be complemented by a “political harvest” and discussion in the third and fourth Workshops,*

with strong participation from the private sector and major developing countries. There is also a need to link this discussion to the High-level Political Forum process.

Indonesia (supports Egypt, India): Appreciates the work of DESA. Recommends work to develop solutions “beyond the market place”. Technology being one of Means of Implementation (MOI) in the Rio+20 outcome, based on the UN Secretary General’s report A/67/348 of 4 Sept. 2012 on options for a facilitation mechanism, recommends an inter-governmental process to discuss this matter.

Republic of Korea: What was the motivation for private firms to take part in Brazil’s cooperative project with Mozambique? **A:** Social responsibility, and a desire for a longer and better life for all, was the main motivation.

Brazil: Appreciates the work of DESA, agrees the key role of technology as an MOI and is encouraged by discussions so far in these Workshops. It is important to focus on building on existing regimes for technology facilitation and thinking further about how to use them best. Agrees with Indonesia and Morocco on the need for a political follow up and the need to have a venue to discuss issues and good ideas emerging from these Workshops, including on IPRs.

WIPO: Underlines that (a) IP issues emerged in the discussions from time to time, and that (b) their role varies greatly from sector to sector. Highlights new models on managing IP issues, such as patent pools, and special initiatives to address technology needs in health.

Ms. de Oliveira: Reference to the role of IP issues in Brazil’s cooperation in the health sector, which focuses on generic medicines and involves regulated pricing. Going forward, Brazil is working on international public-private partnerships to enable transfer to Brazil of drug technologies which could then be disseminated to other developing countries.

Ms. Daño: On the question of building on existing mechanisms vs. creating new ones, it is important to bear in mind that existing structures exclude non-scientists.

Mr. Dragnich: Yes, LDCs need a special programme of assistance, “South-South” cooperation is key and the participation of civil society is necessary. But the world is not waiting. Some of this is already happening in fora like the Global Knowledge Initiative.

Concluding Remarks

H.E. Dr. A.K. Abdul Momen (Ambassador, Permanent Representative of Bangladesh to the United Nations, Acting President of the 67th Session of the United Nations General Assembly) concluded by observing that the Workshops have certainly been successful in at least one respect, namely in terms of generating an interactive discussion among invited experts, Member States and representatives of other stakeholder communities present. He noted reminders made by Member State representatives that the ultimate objective of these Workshops is to discuss, with a view to agreeing in the General Assembly, options for mechanisms that can facilitate and accelerate the generation and diffusion of clean and environmentally sound technologies in developing countries. Ambassador Abdul Momen underlined that the field of international technology facilitation is a rich and complex one, and reiterated a number of recurrent themes heard in the Workshops:

- "The technology is there."
- There is a need for "systemic solutions" to the problem of promoting the deployment of clean and environmentally sound technologies.
- Technology needs, issues and gaps are very much differentiated by country groups, be they income groups or regions. So are the potential solutions and capabilities. Indeed, the capabilities of countries and options vary significantly even within income groups.

He concluded the proceedings by announcing that the upcoming third and fourth Workshops are expected to discuss issues in capacity building and options for a way forward on technology facilitation.

WORKSHOP 3

Capacity Building

30 May 2013

Workshop 3 included a consideration of the role of intellectual property with respect to technology facilitation – with some panellists emphasising its facilitative role and others pointing to ways in which it can pose a barrier to technology transfer. The discussions shed light on the complexity of the issue and the need to consider IP on a case-by-case basis, since its importance either as facilitator or as barrier varies greatly from industry to industry and technology to technology. Also, IP systems vary greatly across countries, and countries have considerable discretion in designing systems they find best suited to their development.

The Workshop also heard presentations on the capacity building work of a number of UN agencies, including WIPO, UNCTAD, UNESCO, UNEP and UNIDO. The presentations highlighted the broad range of activities currently underway but also made clear that, with the exception of UNESCO's work, most capacity building relates to the later stages of the technology cycle – notably diffusion – while there is relatively little emphasis on strengthening capabilities of developing countries to undertake earlier stage activities like research and development.

Session 3.1

Focus on intellectual property considerations and related capacity building activities

Session 3.1 was moderated by **Mr. David Biello**, Associate Editor, Environment & Energy, *Scientific American* – a science journal founded in 1845, initially as a “patent watch” – and discussed the relative importance and role of intellectual property protection for facilitating the development, transfer and dissemination of clean and environmentally sound technologies in developing countries.

Mr. Ahmed Abdel Latif (Senior Programme Manager, Programme on Innovation, Technology and Intellectual Property, International Centre for Trade and Sustainable Development – ICTSD) provided a brief history of efforts to address IP issues in technology transfer at the multilateral level and observed that, as long as they are not addressed satisfactorily, IP issues continue to limit the credibility of global policy discussions on clean technologies. At the same time, there is a genuine possibility to go beyond a false dichotomy between avoidance of IP-related policy discussions (on grounds that this is a “private sector issue”) and demanding changes to the international legal framework. Based on joint empirical work by UNEP, EPO and ICSTD on *Patents and Clean Energy*, his main points included:

- Twenty percent p.a. growth in clean technology patenting since Kyoto; while 80% of clean energy patents owned by six countries (Japan, US, Germany, Rep. of Korea, France, UK).
- Licensing of clean technology to developing countries concentrated on big emerging economies. Majority of players never license to developing countries and cite factors other than IP protection (scientific capabilities, investment climate, etc.) as main reasons.

- Fast tracking clean tech patents is an option taken up by some countries, without changes to the duration of patent protection as such.
- Publicly owned patents (30-40% in clean energy) may offer other facilitation possibilities.
- The impact of IP varies by sector. Little is known on “adaptation” technologies. Most studies focus on energy generation technologies. Little is known beyond China and India. There is a need for more comprehensive [empirical] information on the needs of technology recipients in developing countries.
- All of the above implies that categorical conclusions on IP issues are unwarranted.
- The better known examples of bi- or pluri-lateral technology cooperation (EU-India, US-China, US-India, China-India, IBSA) do address IP issues.
- A possible way forward in this area requires agreement on the importance and urgency of the issue as well as recognition of its complexity.
- It also requires agreeing on how to discuss it, based on existing international rights and obligations and empirical evidence with an incremental, tailor-made approach.

Professor Carlos Correa (Director of the Centre for Interdisciplinary Studies on Industrial Property and Economics Law, University of Buenos Aires) argued that the very nature of IP granting exclusive rights and a legal monopoly on the technology makes it a barrier to technology transfer. He highlighted the following issues in particular:

- Heavy concentration of research: 78% in OECD area; China home to 53% of researchers in developing countries; less than 1% of global R&D in Africa (mainly South Africa).
- Reluctance to transfer the latest technologies to developing countries. High licensing fees.
- Restrictive practices (grant-back, tying clauses, export restrictions).
- Proliferation of patents. Questions about their quality.
- Trade secrets becoming an important issue in clean technology transfer.
- There is a need for the development, diffusion and transfer of climate technologies on a massive scale.

Ms. Lucinda Longcroft (Deputy Director, Development Agenda Coordination Division, World Intellectual Property Organization – WIPO) reaffirmed the importance of IP protection and related issues in the context of clean and environmentally sound technologies from the perspective of the WIPO. She underlined that the essential function of the patent system is full public disclosure of technological information and that the absence of a patent may or may not promote technology diffusion and transfer. Her main points included the following:

- Agreement on the importance and urgency of the issue and the desire to avoid getting stuck in a polarised debate.
- Studies indicate that an effective IPR system may be a pre-requisite for companies to enter into technology transfer agreements. More research and evidence needed.
- The challenge for policy makers is to seek an optimal balance regarding pre-grant issues (when to grant/when to deny protection) and post-grant issues (what forms of licensing and other access to technology to encourage, how to monitor and to regulate the actual use of patent rights in the marketplace and what forms of intervention are required).

- Capacity building by WIPO: e.g., Patentscope search service (28 million patent documents) helps avoid duplicative R&D, monitor new activities by potential competitors and facilitates partnerships among developers of complementary technologies.
- Related activities on norm-setting; progressive development and harmonization of IP laws, standards and practices among Member States; WIPO GREEN database (matchmaking platform designed to accelerate development and dissemination of green technologies); WIPO Re:Search (access to IP for pharmaceutical compounds and know-how and data for neglected tropical diseases, tuberculosis and malaria).
- Absence of a global IP system and global protection.

Dr. Krishna Ravi Srinivas (Associate Fellow, Research Information System for Developing Countries (RIS), New Delhi) argued that while IPR can be a barrier to technology diffusion it is part of a larger problem which includes the paucity of relevant technologies, low capacity to absorb existing ones and the absence of consensus on technology transfer related issues. Hence multiple solutions are needed and should not be contradictory to each other.

- There is a need to stop discussing technology transfer as a North-South issue, go beyond a dichotomy and use the UNFCCC to strengthen multilateral collaboration in technology development and dissemination, by developing “South-South” and triangular initiatives.
- CGIAR is a useful model to foster region-specific technology cooperation networks linked to the global network, and pooling together available technologies for energy-efficient development.
- On TRIPS Article 66.2 deadlock, there is a need to think about private sector incentives for technology transfer and fostering triangular cooperation (e.g., Denmark-India-LDCs). TRIPS Council could publish a list of permissible incentives and schemes for technology transfer under tri-lateral and bi-lateral collaboration schemes.
- With a more flexible stance by major developed and developing countries, the role of Article 66.2 in technology transfer could be enhanced within the WTO framework. FAO, UNCTAD and UNIDO should be brought in to promote this paradigm shift.
- There is a need to distinguish the use of IP by real users of technology as distinct from a maximization of licensing revenue.

GENERAL DISCUSSION

Egypt: The Session helped develop a better appreciation of the multi-dimensional nature of the IPR problem. Could we apply the model of the TRIPS arrangement for medicines, on the grounds that climate change represents the same level of urgency as HIV/AIDS?

*Speaking on behalf of **Group of 77 and China**, **Fiji** delivered a statement, underlining the increasing “fragmentation” of technology capacity building activities, the need for a “breakthrough” with respect to technology transfer, and, hence, the need for a new international mechanism for technology facilitation. They stressed the need for “transformational change” in the area of sustainable development, which cannot happen without an international enabling environment, including technology transfer and innovation. Among other things, they called for the formation of a Global Technology Development Fund.*

***United States** submitted a statement. Their other remarks included:*

- *Lessons from countries which have strong IP protection and generate a lot of IP.*
- *That in the United States IP protection is enshrined in the Constitution.*

- *The question whether the lack of IP protection in LDCs (facilitated by the exception from TRIPS rules) may be a reason behind their low technological development.*

Bangladesh expressed support for the statement by Group of 77 and China and asserted that the TRIPS waiver does not constitute a disincentive for innovation in LDCs.

India:

- *IPRs do constitute a barrier to rapid diffusion of environmentally sound technologies. Developing countries remain disadvantaged in energy- and capital-intensive technologies.*
- *Mixed view on IPRs: agreement with the US that IP is important as an incentive for innovation and that there are examples where IP protection does not pose a barrier to technology diffusion. At the same time, how should IP protection be balanced with an encouragement for collaboration? A combination of “South-South” and “North-South” collaborations is a way to overcome IP as a barrier issue.*

Tunisia delivered a statement and expressed support for the statement by the Group 77 and China, underlining the absence of Africa in the field of clean technology and the “fragmentation” of international support efforts, and asked what technology-related goals should be included in the SDGs – should there be numerical targets for patents in Africa?

Prof. Correa:

- *The Doha Declaration (2003) model may be useful for climate change-related technologies, but Doha did not go very far in recognising a special and differentiated treatment of developing countries.*
- *Today’s developed countries adapted their level of IP protection over time. In the 19th Century the US did not grant copyright protection to foreign authors; patent protection for pharmaceuticals came quite late in the developmental history of France and Switzerland. Innovation does take place in the absence of IP. TRIPS Article 30 does provide for a “balance” by framing the question of compulsory licensing.*
- *There is a need to “fix the patent system” and avoid large numbers of patents for unoriginal inventions.*
- *On TRIPS Article 66.2, an LDC should be exempt until it graduates out of the category.*

Mr. Abdel Latif:

- *In terms of urgency and the scale of challenge, clean technologies are comparable to HIV/AIDS technology, but the response does not have to be same model. Clean energy technologies are competing against fossil fuel technologies and are affected by energy price movements.*
- *(To the US): The US Clean Air Act does allow for compulsory licensing for pollution control technologies, but that has not yet been invoked.*
- *It is worth reflecting on lessons from countries with strong IP protection.*

Ms. Longcroft: *The field of IP is no longer divided along a “North-South” dichotomy and it is a field where there is increasing awareness and a great deal of policy space as well as innovation (e.g., IP-supported intangible assets being recognised by banks as collateral). Countries need a strong IP infrastructure to be able to benefit from patenting as incentive to innovation and maintain a right balance between private protection and public benefits.*

Session 3.2

Other international capacity building activities

Moderator: **Prof. Ambuj D. Sagar** (Dean, Alumni Affairs & International Programs and Vipula and Mahesh Chaturvedi Professor of Policy Studies, Department of Humanities and Social Sciences, Indian Institute of Technology)

Keynote Speech

Global Diffusion of Clean Energy Technologies:

Prof. Kelly Sims Gallagher (Associate Professor of Energy and Environmental Policy, Fletcher School, Tufts University) presented the findings of her forthcoming study on *The Global Diffusion of Clean Energy Technologies: Lessons from China*. Key messages:

- Empowering the private sector is necessary to reach the required scale for the diffusion and transfer of clean technologies. Thus, market formation policies creating incentives for cross-border movement of technology and the availability of low cost capital are key.
- Evidence shows that the barriers are less significant than the lack of incentives, making public policy a crucial ingredient. “Lack of policy is the number one problem.”
- Different dynamics of the global and national innovation systems create challenges, as in the end, all is put in practice at the national level.

Other points:

- While the study is based on the Chinese case, it could be applicable to other countries. China was chosen because (a) it has a significant air quality problem, (b) its environmental policy has changed rapidly in the last decade, and (c) it is an increasingly important market that should be well understood.
- Research based on four case studies: solar PV, coal gasification, natural gas turbines and batteries for advanced vehicles. All typical technology transfer mechanisms were used; bilateral and multilateral technology agreements were by far the least used components.
- Interviews with Chinese and foreign companies show divergence of views on barriers to the transfer of cleaner energy technology to and from China. There was more agreement on the incentives for technology transfer, especially concerning policy factors.
- Substantial divergence on financial issues: none of the Chinese firms interviewed had problems to access low cost finance, but the foreign firms had, making this a very important comparative advantage for the Chinese firms. She also found that incremental costs of cleaner technologies mattered but such barriers can be overcome when market formation policies are put in place.
- Conclusions: clean energy innovation has become globalised. Cost, lack of policy, and insufficient access to finance are the most important barriers for technology diffusion. The best incentives for diffusion are market formation policies and the provision of affordable finance.

United States observed that coal gasification has been a focus of US-China energy collaboration dating back to 1986.

A: Those instances of cooperation were very important, but actual technology transfer occurred through licensing. China went through a long process of learning and is now developing its own coal gasification technology which it is licensing to the US.

Mr. Abdel Latif: Reference to tariffs by the US (and now the EU) on Chinese solar PV.

Professor Lidia Brito (Director, Division of Science Policy and Capacity Building, United Nations Educational, Scientific and Cultural Organization – UNESCO) gave UNESCO’s perspective and described actions on Capacity Building for the development, adoption and use of environmentally sound technologies in developing countries. Her main points included:

- Global uncertainties and challenges in the developing world such as inequality, poverty, climate change, population growth, informality, weak infrastructure and disparate quality of high education, have implications on technology needs and require a paradigm shift.
- UNESCO promotes a culture of innovation based on economic growth and social cohesion. It invests in science and technology institutions through programmes such as UNESCO Chairs (Transfer of Technology; Climate Technology – Beijing; Technologies for Development; Renewable Energy); the International Science, Technology and Innovation Centre for South-South Cooperation; the International Research and Training Centre for Science and Technology Strategy; the International Sustainable Energy Development Centre; the Regional Center for Renewable Energy and Energy Efficiency; and the International Center on Qanats and Historic Hydraulic Structures.
- UNESCO’s capacity-building activities on quality education and science for all (e.g., Avicenna Virtual Campuses, GREET programme, Regional Annual Summer Schools.)
- Promoting strategic leadership for improving the quality and relevance of science and technology policies is an important ingredient of capacity building in UNESCO.

Dr. Raul Cuero (President and Founder, International Park of Creativity, Bogotá) underlined that the aim of knowledge and creativity was to serve the needs of human society. Capacity building in developing nations needs to address not only infrastructure issues but also human capacity. His other observations included:

- Decrease in the culture of creativity, and the general mixing up of invention versus innovation. In his view, 2% of the world’s population – the proportion working in science and engineering, of which 0.2% are inventors – create jobs for the remaining 98% and the lack of venture capital is a constraint to innovation in developing nations.
- The experience of the International Park of Creativity Invention Center, where high school students are taught to create “over and beyond” learning, interact with different types of science and invent, patent and license their inventions.
- Proposal to create a consortium of private companies from developed nations to establish partnerships with least developed countries to promote venture capital, invention, patenting, production, marketing and commercialization of technologies.

Ms. Marisa Henderson (Officer in Charge, New York Office, United Nations Conference on Trade and Development – UNCTAD) presented UNCTAD’s capacity building and other activities such as the *Technology and Innovation Reports* (2010, 2011). Other points:

- Proposal for technology sharing consortia, focusing on internal capacity and providing information on others’ capacities – 2012 T&I Report includes information on many such consortia. Related proposal by Turkey to create centres for technology and innovation for LDCs.
- Proposals for global and regional research funds dedicated to demonstration and deployment of renewable energy technologies and coordination of public-private efforts.
- Proposal for a global technology bank (see presentation by Dr. Altınörs in Workshop 4) for developing countries, pooling resources, facilitating better terms for licensing, including a waiver of fees and serving as a clearing house for licensed technologies.

- The need to build on successful "South-South" capacity building initiatives such as the "Lighten up Africa" project where China (with cooperation from UNIDO) helps build one hundred mini hydro-power stations in ten African countries, eventually expected to benefit 100,000 people.
- The crucial importance of building local technological capability.

In his first presentation in these Workshops, **Dr. Morgan Bazilian** (Deputy Director, Joint Institute for Strategic Energy Analysis (JISEA), National Renewable Energy Laboratory – NREL – United States), speaking on behalf of the **United Nations Environment Programme (UNEP)** and the **United Nations Industrial Development Organisation (UNIDO)**, presented the mandate and characteristics of the Climate Technology Center and Network (CTCN). The CTCN was negotiated by governments under the climate change talks and a small Secretariat is in the process of being established in Copenhagen.

- CTCN's mission is to stimulate technology cooperation and enhance the development and transfer of technologies by assisting developing member countries upon their request, in a demand-driven fashion, with a strong focus on reporting and evaluation.
- CTCN is co-managed by UNEP and UNIDO and represents a consortium bringing together think tanks, as well as academic, national and international institutions.
- Its knowledge management system aspires to be a library of information on technology availability, costs, performance, policies and financing; to capture experiences and results of technology cooperation activities; to collect, analyse, and communicate CTCN results and lessons learned, continuously to gather external feedback from stakeholders and partners; and to facilitate on-line training, peer-to-peer exchange, and expert advice.

GENERAL DISCUSSION

Egypt: *The need to carry out an impact analysis of UNESCO's capacity building work and put the many different activities within a sustainable development framework.*

United States: *(to UNESCO): Is there an effort to measure the impact of capacity building activity, including on patenting? (To Mr. Bazilian) Where does the CTCN fit in the larger ecosystem of climate technology cooperation?*

ETC Group: *"Disruptive technologies" are believed to increase unemployment (reference to an article in the Schumpeter column of The Economist, and the 2011 report Race Against The Machine by Erik Brynjolfsson and Andrew McAfee at the MIT). There is a need for technology assessment to understand whether the disruptions are good or bad.*

India: *Does CTCN have a built-in provision for funding?*

Professor Brito: *UNESCO carries out impact assessments with a five-year cycle; some UNESCO Chairs have been a big success, especially when part of a network. To be successful, capacity building needs to generate a critical mass.*

Dr. Bazilian: *CTCN is the result of years of negotiations and is meant to facilitate a more centralised approach, with branding, leveraging existing networks and competitive bidding. It has links with the Global Green Growth Institute (GGGI). Regarding funding, CTCN focuses more on technology support than large scale funding for hardware.*

Japan presented a statement, underlining that, like the United States, it opposes a new technology facilitation mechanism at the UN. Knowledge and technology are key to universal human development within planetary boundaries and the creative vitality of the innovation process should be maintained by striking a balance between fostering technology diffusion and maintaining incentives to invent and innovate, as intellectual efforts are ultimately the driver of economic growth of all countries, including developing countries.

WORKSHOP 4

The way forward: Strengthening the international architecture for clean and environmentally sound technology development, transfer and dissemination

31 May 2013

Workshop 4 continued the discussion with presentations on international technology cooperation efforts, including those of Belarus, Turkey, the European Union and the National Renewable Energy Laboratories (NREL) of the United States. Other countries spoke of their technology cooperation efforts involving developing countries.

In the afternoon of the final day, a panel consisting of Permanent Representatives of developed and developing countries, including least developed countries, as well as a representative of the business sector, shared their views on why a technology facilitation might or might not be needed and, if needed, what specifically it might do that is not currently being done by existing UN and other institutions. Views differed considerably on the need for and the scope of such a mechanism. Developing countries in general support creation of such a facilitation mechanism, though some emphasized the need to ensure that it does not duplicate what already exists. The predominant view among supporters of the mechanism was that there is considerable fragmentation among existing initiatives to which a mechanism could bring coherence. One developing country referred to the CGIAR model for international agricultural research as a possible model for such a mechanism. Some important developed countries and other stakeholders remained sceptical.

Session 4.1

Sharing of experiences on technology facilitation

Session 4.1 was moderated by **H.E. Ambassador Gyan Chandra Acharya** (Under-Secretary-General and High Representative for the Least Developed Countries, Landlocked Developing Countries and Small Island Developing States, United Nations) whose opening remarks stressed the importance of a global framework for science and technology for sustainable development, especially for the Least Developed Countries, Landlocked Developing Countries and Small Island Developing States. He also underlined the importance of indigenous technologies benefiting local communities who own them.

Dr. Alexandra Mallett (Assistant Professor, School of Public Policy and Administration (SPPA), Carleton University, Ottawa) started off by showcasing the example of a very simple technique developed in the Philippines to diffuse daylight inside slum dwellings on the basis of simple device: <http://www.youtube.com/watch?v=a9fpolCvM-8>.

While the purpose of this demonstration was to underline the need to be broad-minded on what might constitute a technology serving a need in a sustainable manner, it has generated interventions by some participants as well as the Moderator on the need for developing countries to be able to access the latest technologies in a given domain (full electrification of households in this case). Her key points were that there is more attention needed on the process of technology cooperation, and that, while some cooperation is happening, public policy action is needed to broaden its impact, especially vis-à-vis SMEs. Her other points included:

- Complementary measures in fields such as trade, FDI or industry policies are essential for technology facilitation.
- Importance of engaging local partners early on in technology facilitation.
- Importance of international involvement, which increases the pace of diffusion.
- The need to combine “South-North” and “South-South” cooperation.
- Importance of policy coherence across jurisdictions and issues.
- Importance of international collaborative R&D and demonstration and diffusion (including “creative ways to address IPRs”) as a way to move forward.

The presentation by **Mr. Errol Levy** (Research and Innovation Counsellor, Delegation of the European Union, Washington, D.C.) focused on the EU’s international technology cooperation funding programmes, with examples from the 7th Framework Programme (FP7, 2007-13) as well as the new policy context and the Horizon 2020 Framework Programme (2014-20).

- The basic operating principles of the EU Framework Programme (FP) for Research include: scientific excellence, support to other EU policies, transnational cooperation, public call, peer review, competitive selection and cost-sharing, and ownership of results (including IPR) by participants.
- Openness to international participation is a key feature of the FP, while being the EU’s instrument of its own innovation policies.
- FP incorporates funding for developing country participants. In sustainable development-related fields, FP7 incorporated EU contributions to Global Earth Observation System, including dissemination of environmental information in LDCs, capacity building in Central Europe and Africa, and agriculture and forestry management in Africa, etc.
- The Horizon 2020 Programme is likely to emphasise joint actions to address global challenges, complementarities to MDGs, Rio+20 and post-2015 objectives, public-private funding, coupling research to innovation and simplified access, with projects prioritising scientific excellence, industrial leadership and relevance for societal challenges.

In his two-part presentation, **Dr. Altay Altmörs** (First Secretary, Permanent Representation of Turkey to the UN) started off by reviewing the state of international commitments for technology facilitation and his perspectives for a way forward in this regard. He then gave an overview of Turkey’s national efforts in this area, including efforts on international cooperation. His main points included:

- The importance of technology transfer to developing countries being complemented by domestic technological efforts.
- The need to improve the flexibility of IPR protection in order to accelerate the dissemination of technologies, in particular for LDCs.
- The establishment of a Technology Bank and Science, Technology and Innovation Facility for LDCs, as a concrete example following up on a technology commitment, in this case emanating from the Istanbul Programme of Action on LDCs (2011). Turkey’s readiness to host this initiative and provide financial as well as human resource support.
- The need for the Open Working Group on Sustainable Development Goals to take account of technology issues in the Rio+20 follow up.

Dr. Altınörs also elaborated on Turkey's effort in the past decade to boost the role of science-based innovation in its domestic context, which saw a six-fold rise in innovation expenditures and a major expansion of innovation outcome indicators (e.g., publications, patents), and underlined that Turkey has benefited a lot from cooperation with the EU in this field.

In his second presentation in this Workshop cycle, **Dr. Morgan Bazilian** (Deputy Director, Joint Institute for Strategic Energy Analysis (JISEA), National Renewable Energy Laboratory – United States) presented the activity of the Clean Energy Solutions Centre (CESC), which is an outcome of the Clean Energy Ministerial initiated at the UNFCCC Conference of Parties in Copenhagen in December 2009 by the U.S. Secretary of Energy Steven Chu.

- CESC is a knowledge-sharing and capacity-building activity, incorporating an “ask an expert” service for quick-response technical assistance on strategies, regulations, standards, financial incentives, and deployment programs, provided by a global network of energy experts, and is provided free of charge.
- CESC also links up with other key players such as the REPAN (Renewable Energy Policy Advice Network) partnership and IRENA (International Renewable Energy Agency) which strives to be a one-stop shop for renewable energy policy advice.
- CESC provides regular webinars, selected categorized literature, analysis tools and models as well as data (e.g., DSIRE, which is a US renewable energy and energy efficiency database, and IREEED, which is the same for India).
- It publishes a *Quarterly Policy and Market Briefing* on renewable energy, together with **Bloomberg New Energy Finance**, and provides it free of charge.

GENERAL DISCUSSION

The richness of national and international technology facilitation examples given in the presentations and the abundance of associated acronyms during the workshops led to an enduring leitmotif on the possible “**fragmentation**” of international efforts in this field. However, there was no specific discussion of instances of wasteful duplication or identification of significant gaps and unaddressed needs within this picture of fragmentation.

There was also a noticeable shift in the prevailing opinion in relation to one issue. While the message “technology is there” had been heard frequently in Workshops 1 and 2, the tenor of the discussion in Workshop 4 moved towards the opposite view that **many of the clean and environmentally sound technologies needed by developing countries “aren’t there”** and thus in this there is a need for publicly-driven big-push effort similar to the example of the Green Revolution in the 1970s. A number of questions have been raised by more than one participant:

- Should certain groups of countries (LDCs, SIDS) be prioritised in technology facilitation? (*Ireland, Trinidad and Tobago*) A (**Dr. Bazilian**): SIDS face special challenges as companies are less interested in small markets. But, SIDS innovate more flexibly.
- Could a technology facilitation mechanism under UN auspices be the solution to the problem of “fragmentation” of international efforts (*India, Trinidad and Tobago*)? A (**Dr. Bazilian**): CTCN is working to address the issue of fragmentation. UNFCCC has done a mapping of energy/climate change technology space. There is merit in thinking about a “focal point” to overcome fragmentation. Emerging important bilateral and plurilateral “North-South” and “South-South” initiatives (US-China, China-India, etc.) could be used as levers.
- (to Mr. Levy) How is IPR arising from EU FP activities shared – is any IP owned by the EU? (*Fiji, United States*) A: EU encourages project participants to come to an agreement

on IP sharing. The EU is not party to the consortium agreements underpinning the projects but provides a template for them. The EU expects participants to make available the IP necessary for successful completion of FP projects, and has a backstop reserve to step in to ensure that, but there have been no instances where that had to be evoked.

Ireland: Is absorptive capacity an issue in technology facilitation for developing countries? **A (Dr. Bazilian):** It is a key issue.

India: While a multitude of innovative technology initiatives exist on the ground, they mostly represent a “patchwork” of “stopgap” solutions – not the long term solution we want. And, there is a need for transformational change in the area of sustainable development.

Major Groups (ETC Group): A technology facilitation mechanism in New York needs to be in a position to (a) respond/report to governments on a regular basis; (b) benefit from national experiences and bridge them; (c) work with governments and the UN agencies to harmonise work within the UN System, and (d) advise governments on questions of control of technology and navigation of the IP systems.

United States:

- (to Dr. Mallet) What is the appropriate public policy on technology vis-à-vis the SMEs?
- (to Dr. Altınörs) Would a Technology Bank place emphasis on developing countries’ generating technology or accessing technology developed elsewhere and will it assist countries in addressing IP issues?

Dr. Mallet: It is important to facilitate access to frontier technologies in a systematic way and a facilitation mechanism could serve as a focal point in this regard and help develop a common vision. But this must be “lean”, not bureaucratic.

Mr. Levy: There are a number of existing mechanisms for technology facilitation and a lot is happening on the ground. We need to see what needs to be done to make these efforts comprehensive, systematic and understand what sort of forum is needed to bring experiences together and make them available to all those seeking knowledge. Perhaps the UN System is the place to start. Regarding the selection of topics and projects, the FP holds extensive consultations with the entire stakeholder community and a great deal occurs under PPPs in support of specific research agendas, in line with broad EU objectives. But the agenda is ultimately defined by the stakeholders.

Dr. Altınörs: Countries’ needs are differentiated by level of development. The Technology bank project launched by the Istanbul Conference is proceeding with a gap and capacity analysis which is due to be completed soon and the Bank is expected to be set up as a UN entity with a budget, hosted and supported by Turkey. It will help identify LDCs’ needs for technology and knowledge and increase their capacity. While some LDCs do have some technology capacity, they are not sufficiently well equipped to commercialise technologies.

Egypt: Need to understand whether “fragmentation” translates into limited impact. There is a need for a forum/space to bring together different actors, end the “silo” approach to technology and go beyond one-off discussions. How should these tracks be brought together – a question also for the High-level Political Forum process?

Mr. Abdel Latif (ICTSD): A technology facilitation mechanism could address coordination issues, get the UN agencies to work in an articulated manner and avoid the adverse effect from the present multiple sources of advice at the country level on renewable energy issues for example. Could this be facilitated by a country-level vehicle as in the example of the UN country reports that are done on development activities?

Moderator Ambassador Acharya:

- Need to understand how to move from a fragmented to an integrated, systemic approach for technology for sustainable development.

- Need to understand the entire “ecosystem” of technology, not only transfer, but also adaptation, innovation, application.
- Particular challenge for LDCs, SIDS, where the impact of global challenges is disproportionate and an extra effort is needed.
- Need to focus on facilitation, including on IPR issues, within a multi-stakeholder approach, and aim at transformational change in the long-term.

Session 4.2

Strengthening clean and environmentally sound technology development, transfer and dissemination: Options for a facilitation mechanism

Moderated by **Mr. Nikhil Seth** (Director, Division for Sustainable Development, Department of Economic and Social Affairs - DESA), the focus of the discussion at the closing panel of the final Workshop in this cycle was on the way forward. The Moderator recalled the Issues Note (see web) that was circulated and he grouped the key issues under several headings:

- Complexity of technologies.
- Complexity of the needs of countries, differentiated by level of development, regions, etc.
- Difficulty of bringing about large-scale transformation.
- The sheer number of initiatives out there.
- Putting the IPR issues in their proper context – neither exaggerating nor neglecting them.
- The wealth of multilateral and bilateral experiences in cooperation.

Mr. Seth invited participants to consider the following questions:

- *Given the myriad of ways in which the UN and other bodies address technology issues, what more can be done?*
- *What is the preferred way forward – a new body or better coordination of existing bodies?*
- *How to ensure good governance of the institutional structure for technology facilitation?*
- *How to overcome the skills gap?*
- *How to avoid distortions in trade and investment areas while doing the above?*

H.E. Ambassador Dr. A.K. Abdul Momen (Permanent Representative of Bangladesh to the United Nations) presented the issues and options as he saw them from the perspective of policy making in an LDC.

- Rio+20 outcome document places a strong emphasis on science and technology for the achievement of sustainable development.
- LDCs are particularly disadvantaged in this area, as, given their low technology base and other shortcomings (finance etc.), technological “leapfrogging” is not an available option.
- The Technology Bank proposal by Turkey is welcomed by LDCs as a tangible target emanating from the Istanbul Action Plan that could help address the current fragmented nature of capacity building efforts.

- Transition periods in the TRIPS agreements due to expire in July 2013 need to be extended. The flexibility that the LDCs are enjoying should continue for individual countries until they graduate out of the LDC category.
- LDCs need not only technology, but also a strong science base, top quality HR development, finance and technical partnerships.
- “South-South” cooperation could be crucial for supporting LDCs in their technology needs and emerging countries should come forward with their expertise to help the LDCs.
- A facilitation mechanism for LDCs is necessary for the development, transfer and dissemination of clean technologies and to help LDCs move up in the development ladder. It will have to be adjusted to the needs of individual LDCs.

H.E. Ambassador Erik Laursen (Deputy Permanent Representative of Denmark to the United Nations) presented Denmark’s efforts to make its own economy more sustainable and contribute to global initiatives.

- Denmark has seen economic growth with stable emission since the 1980s, a falling (by 28%) of the energy intensity of GDP (which rose by 40%) since 1990, and aims to derive all energy supply from renewables by 2050, the success of which partly depends on global factors.
- Denmark has a high level of green taxes, which may not be popular but have proven effective and have stimulated technological innovations. Pricing mechanisms to increase efficiency, such as water and energy, have motivated consumers to choose more effective products and to use less. System inefficiencies have been reduced.
- Denmark provides support to global sustainable development, with ODA outflows around \$2.6B (0.8% of GDP) prioritising Green Growth, human resource development, social stability and democracy. Among others, this supports:
 - A sustainable energy fund for Africa (now with US participation) through AfDB, catalysing private investment.
 - A DANIDA partnership programme with Bangladesh, promoting business to business cooperation with substantial technology transfer.
 - 3GF – global green growth forum bringing together private and public sectors, supported by several countries and private sector investors.
 - Climate Technology Centre to be established in Copenhagen and supported by UNEP and UNIDO, as a result of COP15 [see presentation by Dr. Bazilian in Workshop 3 above.]
- More PPPs and multi-stakeholder collaborative arrangements are becoming a reality for delivering technology transfer at scale and Denmark seeks to be a hub for innovation in a number of key clean and environmentally sound technologies.
- Denmark is also host to a number of clean technology related investments from emerging economies such as China and India.

H.E. Ambassador Manjeev Puri (Deputy Permanent Representative, Permanent Mission of India to the United Nations) spoke to the core subject of the Session with remarks stressing the need to undertake a large scale international initiative to break the energy-climate link.

- Debates on clean technology suffer from a lack of interest among the bigger players.

- There is a dearth of “transformative” technologies that can break the energy-climate link and a lack of political will to push for them. Transformative technologies are the ones that diffuse widely and affect the lives of all – such as cellular telephones or the internet.
- There is a need to replicate, in the area of clean and environmentally sound technologies, the type of transformation that was brought about with the CGIAR model [see presentation by Dr. Srinivas in Workshop 3 above] which brought together research with large-scale funding, with much of the technology development led by the leading developed countries, and the World Bank (where the CGIAR was anchored) was involved.
- “South-South” and triangular cooperation do offer opportunities to buy more per ODA dollar, but there are few success cases of the latter. One example is the India-Brazil-South Africa fund for water desalination in Cape Verde administered by the UNDP, but emerging donors have had difficulties in the bidding process. In other instances “South-South” cooperation is galloping: China is the largest funder in Africa. India is also supporting Africa and Asia (e.g., Bhutan, Afghanistan).
- India strongly supports the Secretary-General’s 2012 report on “Options for a facilitation mechanism...” (A/67/348) as well as the establishment of a technology facilitation mechanism anchored in the UN.
- This should include looking at issues in IPR and balancing the need to reward innovation with the needs of the global commons and the poor.

Mr. Yuri Yaroshevich (Head of Department, Ministry of Foreign Affairs, Republic of Belarus) provided the perspective of middle-income economies in relation to the question of technology facilitation for sustainable development.

- The challenge is to ensure all states have access to relevant technologies. But key environmentally sound technologies are concentrated in a few states.
- The bulk of the world population lives in middle income economies. And, at the end of the day, we are all consumers of energy.
- In the UNFCCC process, a number of countries have been excluded from the transfer of technology in the second commitment period of the Kyoto and the Doha agreements which were adopted with insufficient transparency.
- As underlined by the Secretary-General’s 2012 report (A/67/348), there is a need for an effective coordination mechanism for technology facilitation, incorporating a substantive research component, adequate funding (with a global voluntary fund with contributions by states and other stakeholders) and a systemic approach.
- The needs of the middle income countries should not be underestimated.

Dr. Louise Kantrow (Permanent Representative of the International Chamber of Commerce (ICC) to the United Nations) gave the perspective of the private sector on the subject of technology facilitation mechanism and called attention to the ICC’s *Green Economy Roadmap* (2012) and *Intellectual Property Roadmap* (11th Edition, 2012).

- The private sector will be key for the development of new technologies and is prepared to continue to engage with governments on this subject. It is important to understand how a technology facilitation mechanism can be beneficial for the private sector.
- With the expected rise in population and energy needs, it will be important to establish partnerships to work towards resource-efficient technologies.

- Business needs a comprehensive, balanced and stable investment framework and smart regulations.
- There is a need to study options for a large scale deployment of technologies and develop a menu of policy options for countries at different stages of development.
- There is a need to understand better the role of IPRs which are not only an incentive for companies to innovate but also valuable assets for generating revenue through licensing.
- Governments should continue to play a role in basic scientific research.

GENERAL DISCUSSION

Trinidad and Tobago speaking on behalf of CARICOM (*see [statement](#)*):

- Support for the Secretary-General's report of 2012 (A/67/348) and for a technology facilitation mechanism, which could assist SIDS as a pilot case (as in www.sidsdock.org). The small size of SIDS may offer a potential for rapid diffusion of technologies.
- A facilitation mechanism should address the fragmentation of efforts in environmental technology development and transfer and enable the coordination of technical assistance.
- A facilitation mechanism should target specific gaps and avoid duplicating ongoing work.

China (Endorsing the statement delivered in Workshop 3 by the Group of 77 and China):

- How should science and technology considerations be incorporated into the post-2015 development agenda?
- What could be done to overcome fragmentation in international technology facilitation efforts? China believes that a UN body should coordinate science and technology work.
- "South-South" cooperation is key; China engages in a considerable amount of it, and appreciates the attention placed on its experience in this area.

India:

- Presentations indicate that there are still challenging bottlenecks in the area of technology, particularly in the LDCs which cannot be expected to leapfrog.
- As illustrated by Mr. Laursen, even developed countries partly depend on global factors for their clean technology policies. Thus, a global mechanism for technology facilitation anchored in the UN would be valuable in terms of overcoming bottlenecks and combining funding and research.
- How could advanced economies benefit from a facilitation mechanism?

Tunisia (*see [statement](#)*)

- Strong support for a technology facilitation mechanism, including global and regional components, national contact points and an intergovernmental forum.
- The facilitation mechanism should incorporate a global network or partnership with funding to strengthen R&D and demonstration, a global network of technology incubators, a global clean technology venture fund and sharing arrangements for IPRs.

Peru (to Denmark): What remedies is Denmark putting in place to overcome the difficulties in achieving the 100% renewable energy supply? **A:** A facilitation mechanism would be very important. Denmark cannot be certain that by 2050 it will be able to reach the energy goal if it is not connected to the international community in terms of investment.

Brazil: The three great challenges facing humanity (achieving sustainable development, eradicating poverty and tackling climate change) cannot be achieved without technology

where it is needed and when it is needed. A technology facilitation mechanism centred in the UN is a good idea; but is it enough to effectuate a paradigm change? There is a wide gap between the discourse and reality of technology transfer, and there is reason to be sceptical of voluntary mechanisms, given the “failure of the UNFCCC”.

United States:

- Does the lack of IP protection/enforcement represent a barrier for the private sector?
- What is seen by some as fragmentation represents diversity of approaches and mechanisms to public-private partnerships and does not constitute a problem. There is a need to learn from success stories therein.
- Concern regarding the global facilitation mechanism idea, as there is not one size fits all.
- Private sector generates more than 70% of clean energy technologies. Need to understand what incentives can make the private sector to commercialise them more widely.

Egypt:

- Recognises the complexity of technology facilitation and its role in sustainable development, and appreciate the learning process enabled by these Workshops.
- Importance of avoiding a dogmatic position and discussing in a pragmatic way.
- Recalls the mandate from Rio+20 which needs to be implemented.
- Asserts that the Workshops have shown the need for a facilitation mechanism.
- Reiterates the need to address technology issues in an integrated manner.
- The value of having some sort of platform or space for continuous dialogue – not necessarily a convention or legally binding instrument – which should consist of:
 - Capacity building - which could be done by UNESCO.
 - Tech needs assessment (UNIDO, UNEP, IRENA) with a systemic approach.
 - Finance element - possibly a voluntary fund for technology acquisition.
 - Transfer mechanism for publicly owned technology: possibility of replicating the system used for pharmaceuticals, on ground of urgency of the climate challenge.

Niger: Valuable Workshops. “Technologies exist.” Possibility of transfer exists. The need for their transfer exists. We must move forward with it.

Major Groups (ETC group):

- Would a technology facilitation mechanism constrain innovation or promote diffusion?
- (To ICC) Current mechanisms have narrowed the range of technologies available.
- (To India) How can CGIAR model be replicated while 6 companies control 2/3 of seed and conduct ¾ of private R&D on agriculture? 45% of agriculture research is on corn. A (***Amb. Puri***): This is because the US Government moved out of agricultural research.

Trinidad and Tobago: Rejects suggestion that fragmentation can be a sign of healthy diversity. Much more so than the Danish example, a typical SIDS country depends on international cooperation for every element of its technology policy. A global facilitation mechanism need not be prescriptive – the case for it has been made.

Ambassador Momen: A country like Bangladesh needs a big push to become a middle-income economy. A technology facilitation mechanism can facilitate this but is not enough. There is a need for political commitment.

Ambassador Laursen: Political commitment is the key to create win-win opportunities. Many multilateral initiatives are taking root such as the UNFCCC Climate Technology Centre in Copenhagen, UN setting up its partnerships facility, SG's Sustainable Energy for All Initiative, Global Compact, etc. There is a need to create one framework where all stakeholders can come together.

Ambassador Puri: Scepticism on mandatory approaches. The challenge is to get the biggest and the best to be willing to put in practice the relevant policies in their own countries.

Mr. Yaroshevich: Proposal to create a fund to purchase IP for critical technologies and make them available as common heritage of mankind.

Dr. Kantrow: The business community gets the point and believes that there are steps ahead in the discussions. The ICC is partnering with the UN. For instance, investment guidelines are being developed with UNCTAD. ICC advises countries in terms of creating conducive and enabling environments and national frameworks. A facilitation mechanism would create a space where stakeholders that normally do not sit together eventually get together and make a valuable contribution to the international community.

Reflections on Key Messages from Technology Workshops:

Views presented by **Prof. Ambuj D. Sagar** (Dean, Alumni Affairs & International Programs and Vipula and Mahesh Chaturvedi Professor of Policy Studies, Department of Humanities and Social Sciences, Indian Institute of Technology)

The Workshops contributed to a conversation involving three arenas:

1) A development and sustainability arena – with urgent imperatives in energy/climate, agriculture, health, etc.

2) A technology arena – which can play a key role in meeting these imperatives

Leveraging the potential of technology requires:

- Availability of suitable technologies at affordable cost – some may be globally new, some may be existing elsewhere but locally new through technology transfer
- Ability to absorb the technology; and
- Ability to deploy at scale.

Successful technology development/dissemination/deployment has various dimensions:

- Technical – development of new technologies, adaptation of new or existing technologies for local implementation
- Finance
- Markets
- Policy/regulatory.

These factors are dependent on technology and stage of technology cycle/maturity, involving a multiplicity of actors, which necessitates the coordination of actors and activities.

Different countries have different needs; different technologies may be suitable for them. Different gaps exist for different countries for any specific technology, especially given relatively weak capabilities. Thus different pathways exist for different countries.

Need both availability of technologies and implementation at scale. The former is mostly dependent on private actors to develop technologies (as noted by US and others). Not all sustainable development imperatives provide enough of a market signal. There exist an urgency dimension and a moral imperative (to promote human, economic, and social development) or planetary imperative dimension.

Regarding scale, existing capabilities to implement in developing countries are not enough and existing international effort seem to be focused mostly on diffusion, with some efforts on knowledge sharing and broader S&T education.

Existing activities include: a) Knowledge dissemination: information gathering; knowledge sharing; expert advice (illustrative example presented in this series of Workshops: Clean Energy Solutions Center); b) Capacity building – training of researchers (e.g., UNCTAD); c) Technical assistance (e.g., CTCN, UNEP); d) Market creation (e.g., COSA).

The potential goals of a facilitation mechanism include:

It must help countries understand which technologies might help achieve sustainable development goals and help them implement these technologies.

It must take stock of where things are and what is happening on the ground, understand best practices; but also see where things need to go, in what time frame and then assess what the gaps/needs are for different countries.

It must integrate the environmental, economic, and social dimensions of sustainable development.

If there is to be one, a technology facilitation mechanism could have the core function of enhancing the availability of technologies:

(1) Technologies that may not be developed by technology players on their own:

Some new technologies may need R&D support (funding, human and institutional resources) for development, for which international collaborative RD&D may help. There are many other pathways, as noted by many, including the delegate from Tunisia.

A mechanism could also leverage new approaches such as innovation prizes to provide incentives to various actors (firms, academia) to generate new technologies. DFID is soon to launch an Innovation Prizes for Environment and Development (IP4ED) program.

(2) Some technologies may become available through the market, where issues of cost, often related to IP, may need to be resolved. But in many cases, one needs clear policy signals that do not exist today. As in the climate arena where, for example in the US, the focus shifts back and forth between shale gas and clean technology innovation. And, there could be a somewhat differentiated approach to IP based on economic/development status of country.

(3) On absorption and deployment of technologies there is a need to strengthen local capabilities, including technical capabilities to ensure absorption/adoption of technology and practices. There is also a need to strengthen institutional capabilities, finance, and policies for market-creation (risk-mitigation for early adopters) and market-expansion activities (pricing mechanisms, feed-in tariffs), as well as governance and regulation and coordination across activities and actors.

Given the range of country circumstances and wide variation in the nature of technologies, one needs nuanced approach. Different countries will need different kinds of and different levels of support.

Therefore, there is a need for a system-level approach that addresses all elements – any one missing element can impede success. This may require some national actions, some international actions to develop local capability, and some international collaborative actions to develop technologies. The aim here is not one way transfer of technologies and knowledge but cooperative approaches (“South-South”, “North-South”, triangular).

3) A political decision making arena

What we emphasise amongst these options depends on political decision-making or political will: How ambitious we are in terms of the nature of transformation and the speed. Do we seek rapid and substantial shift or slow, incremental, business-as-usual transformation? Many of the current approaches fall more in the latter. Regarding the former, some participants have emphasised the generation of new ‘transformative’ technologies. This also involves accelerating local capability building, with big-ticket items, going beyond business-as-usual.

A technology facilitation mechanism will not be a magic bullet but can accelerate the transition to a sustainable future. And we need all the help we can get.

Closing Remarks

by the Vice President of the 67th Session of the United Nations General Assembly

Speaking in his capacity as Acting President of the General Assembly, **Ambassador Momen** observed that these Workshops have shown the value of a regular exchange of views among Member States, the UN system, and other stakeholders in a more interactive format on the subject of technology facilitation. He closed the proceedings by recalling that the discussions and recommendations arising from these Workshops, and from written submissions, are meant to underpin a report by the Secretary-General on the way forward in this area, to be presented at the 68th Session of the General Assembly starting as of this September.