



# Economic and Social Council

Distr.: General  
23 August 2013

Original: English

## Economic and Social Commission for Asia and the Pacific

Committee on Trade and Investment

### Third session

Bangkok, 20-22 November 2013

Item 5(a) of the provisional agenda\*

### Report on activities of the regional institutions:

Asian and Pacific Centre for Transfer of Technology

## Report on activities of the Asian and Pacific Centre for Transfer of Technology

### Note by the secretariat

#### Summary

The work of the secretariat in trade and investment is closely linked to and supported by the work of two regional institutions, namely the Asian and Pacific Centre for Transfer of Technology (APCTT) and the Centre for Sustainable Agricultural Mechanization. The present document contains a review of the activities of APCTT during the period 2011-2013 and highlights of future areas of work developed in response to requests from the member countries of the region that actively contribute to the Centre's vision. Currently, the activities of APCTT are directed towards building capacity for technology transfer of small and medium-sized enterprises, strengthening national innovation systems, developing institutional cooperation mechanisms for promoting renewable energy technologies, increasing capacity for managing research and development activities of research institutions in new and emerging areas of technology, such as nanotechnology, and enhancing technology intelligence through the provision of technology information services.

## Contents

	<i>Page</i>
I. Introduction.....	2
II. Activities in 2011-2013.....	2
A. Technology transfer through regional and subregional networking .....	4
B. Technology capacity-building and promotion and management of innovation .....	6
C. Technology transfer services.....	12
D. Technology information services.....	13
III. Future focus areas and programmes.....	16
A. Science, technology and innovation.....	16
B. Technology transfer .....	17
C. Technology intelligence.....	18
IV. Matters calling for the attention of the Committee .....	18

\* E/ESCAP/CTI(3)/L.1.

## I. Introduction

1. In the outcome of the United Nations Conference on Sustainable Development, which was held in Rio de Janeiro, Brazil, from 20 to 22 June 2012, the importance of technology transfer to developing countries was emphasized once again and heads of State and Government and high-level representatives recalled the provisions on technology transfer, finance, access to information and intellectual property rights as agreed in the Plan of Implementation of the World Summit on Sustainable Development (Johannesburg Plan of Implementation).<sup>1, 2</sup> In this context, the role of the Asian and Pacific Centre for Transfer of Technology (APCTT) has become relevant more than ever before, with the Centre positioned to play a catalytic function in assisting member countries in strengthening their national technology innovation systems and in addressing the challenges and opportunities posed by new and emerging technologies. This is especially true for countries with special needs, such as least developed countries, landlocked developing countries and small island developing States, as well as countries with economies in transition.

2. In the context of climate change, APCTT has an important role to play in promoting the transfer and utilization of renewable energy technologies and other technologies for both mitigation and adaptation. With more than 30 years of experience and expertise in developing and disseminating methodologies and practices for technology transfer and technology capacity-building, information networking and skill development, the Centre is making a concerted effort to assist the countries of the region in creating an environment that can support innovation and efficient technology transfer, with an emphasis on small and medium-sized enterprises (SMEs).

3. APCTT has continued to assist countries by focusing on the promotion of national innovation systems, technology transfer support services for SMEs, the promotion of critical emerging technologies, such as renewable energy technologies, biotechnology and nanotechnology, as well as the provision of information, networking and the sharing of experiences related to the management of technology. Under these thrust areas, the Centre has undertaken a range of programmes of immediate relevance to the region during 2011-2013.

## II. Activities in 2011-2013

4. During the present biennium, APCTT organized more than 25 capacity-building activities in 18 member countries of the region, namely Afghanistan, Bangladesh, Cambodia, China, India, Fiji, the Lao People's Democratic Republic, Indonesia, Kazakhstan, Malaysia, Myanmar, Nepal, Pakistan, the Philippines, the Republic of Korea, Sri Lanka, Thailand and Viet Nam. The Centre's activities had been jointly organized in cooperation with about 40 partner institutions, including government ministries, national institutions and international agencies.

5. APCTT has continued to facilitate and promote networking among institutions in specific industrial sectors, namely biotechnology, nanotechnology, traditional medicine and renewable energy, in member countries for the purpose of cooperation in research and development (R&D),

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<sup>1</sup> *Report of the World Summit on Sustainable Development, Johannesburg, South Africa, 26 August-4 September 2002* (United Nations publication, Sales No. E.03.II.A.1 and corrigendum), chap. I, resolution 2, annex.

<sup>2</sup> General Assembly resolution 66/288, annex.

the development of human resources and joint ventures, and other forms of technological cooperation, such as technology-based business partnerships among the participating institutions. The Centre had also focused on institutional capacity-building in member countries to assist their SMEs in identifying, acquiring and adopting technologies and in promoting information technology-enabled mechanisms to facilitate technology transfer and related intermediary services.

6. During the reporting period, APCTT organized eight capacity-building activities under its ongoing project to strengthen national innovation systems in Indonesia, Myanmar, Nepal, the Philippines and Viet Nam. In cooperation with the Science and Technology Policy Institute of the Republic of Korea, the Centre launched an initiative to develop guidelines on national science, technology and innovation (STI) strategies and initiatives for least developed countries. In that regard, a preliminary STI diagnosis of Nepal had been carried out. The key findings of the analysis were presented at a one-day workshop held in conjunction with the meeting of the Technical Committee in Manila. APCTT entered into a letter of agreement with partner institutions in Indonesia and Nepal to design, develop and manage their respective online national innovation system resource centres.

7. APCTT has implemented the India portion of a project funded by the United Nations Development Account that has been jointly undertaken by the Economic Commission for Europe, the United Nations Conference on Trade and Development and ESCAP to attract foreign direct investment in advanced fossil fuel technologies for electricity generation in the following countries: Afghanistan; China; India; Kazakhstan; Kyrgyzstan; Mongolia; Tajikistan; Ukraine; and Uzbekistan.

8. An online network and a training manual, funded through Section 23 of the programme budget, under a project on networking of R&D institutions in the Asia-Pacific region was developed with an aim to strengthen capacity in R&D management and innovation in new and emerging areas of technology, such as nanotechnology.

9. As a part of its endeavour towards enhancing technological intelligence in the region, APCTT continued to publish two periodicals, the *Asia-Pacific Tech Monitor* and the *Value Added Technology Information Services Update*, for disseminating a range of information on the latest technological innovations, technology policies, innovation management, technology transfer, conferences and workshops, and other events. During the reporting period, APCTT gave high priority to its normative and analytical work with a regional perspective that could serve as a basis for its regional technology cooperation activities.

10. APCTT made explicit efforts to focus on least developed countries, landlocked developing countries and Pacific island countries in the activities carried out under various projects. Participants from Afghanistan, Bangladesh, Bhutan, Cambodia, Fiji, the Lao People's Democratic Republic, Mongolia, Myanmar and Nepal took part in those activities.

11. APCTT actively participated in various programmes of ESCAP, in particular the Asia-Pacific Business Forum, which was held in Kuala Lumpur, on 15 and 16 October 2012. The Centre also participated in activities in India that were supported by the United Nations Development Assistance Framework, the United Nations Disaster Management Team and other United Nations entities.

## **A. Technology transfer through regional and subregional networking**

### **1. Renewable Energy Cooperation-Network for the Asia-Pacific**

12. APCTT initiated a project in July 2010 entitled “Establishing an Institutional Cooperation Mechanism to Promote Renewable Energy” with funding support of \$250,000 from the Ministry of New and Renewable Energy, India. During the past two years, the Centre implemented several activities under this programme at the regional level with the active involvement of 15 member countries, which led to the establishment of the institutional cooperation mechanism, the Renewable Energy Cooperation-Network for the Asia-Pacific (RECAP).

13. During the reporting period, APCTT co-organized with the Ministry of Science and Technology, China, the Consultative Forum for Research Managers on Promoting R&D Collaboration in the Development of Renewable Energy Micro-systems for Rural Applications. The Forum, which was held in Guangzhou, China, on 30 November and 1 December 2011, focused on exploring ways for enhancing R&D cooperation among institutions and researchers involved in the development of renewable energy micro-systems for rural applications in countries of the Asia-Pacific region. Research managers from 11 countries in the region, namely Bangladesh, China, Fiji, India, Mongolia, Nepal, Pakistan, the Republic of Korea, Sri Lanka, Thailand and Viet Nam participated in the Forum. They shared their views and suggestions on how R&D on renewable energy could be facilitated by APCTT through its RECAP network. One of the key recommendations that emerged from the discussions was to establish a “technology bank” of tested and proven renewable energy technologies (RETs) initially in the areas of solar, biomass, wind and mini-hydro power. It is envisaged that such a technology bank could serve as a repository of information on RETs that are readily available for transfer and deployment. Another suggestion made at the event was for APCTT to develop the Renewable Energy Technology Bank as an online technology database freely available for public access through its RECAP website.

14. A summary of outputs from the Renewable Energy Cooperation programme of work are listed below:

(a) A regional cooperation mechanism entitled, “Renewable Energy Cooperation-Network for the Asia-Pacific” was established by APCTT with the active involvement of the following countries in Asia and the Pacific: Bangladesh; China; Fiji; India; Indonesia; Iran (Islamic Republic of); Malaysia; Mongolia; Nepal; Pakistan; Philippines; Republic of Korea; Sri Lanka; Thailand; and Viet Nam;

(b) The Renewable Energy Technology Bank (RET-Bank) was established to serve as an online repository of information on tested and proven renewable energy technologies in the following renewable energy sectors: solar; biomass; wind; and hydro power. As of October 2013, the RET-Bank had about 60 renewable energy technologies with pro-poor applications ready for commercial transfer;

(c) APCCT created a directory of organizations involved in the promotion of renewable energy in member countries of the RECAP network that included comprehensive information on various business firms, intermediaries, research institutions, government agencies and regional and international organizations involved in the renewable energy sector in the target countries;

(d) A repository for information on infrastructure for facilitating regional cooperation on the RECAP website and the RECAP On-line Solution Centre were developed (<http://recap.apctt.org>) and made available for the use of member countries to exchange information, provide best practices, share technical expertise and conduct business networking in the area of renewable energy;

(e) Capacity-building programmes and regional consultations for research managers, policymakers, business firms and intermediaries in member countries of the RECAP network were organized by APCTT for enhancing skills, business networking and knowledge-sharing with the objective to foster regional cooperation in the development, transfer and adoption of renewable energy technologies;

(f) APCTT agreed to enter into partnerships with key renewable energy institutions in nine member countries of the RECAP network, namely China, Fiji, India, Indonesia, Nepal, Pakistan, the Philippines, Sri Lanka and Viet Nam, for regular information sharing on renewable energy events and preparation of country scenarios related to renewable energy adoption and utilization. In India, the Centre's partner was the Centre for Wind Energy Technology (C-WET) of the Ministry of New and Renewable Energy;

(g) APCTT completed a desk study on policies for promoting renewable energy technology development, transfer and adoption in the Asia-Pacific region. A report on the study is available from <http://recap.apctt.org/Publications.php>;

(h) The Centre organized three business-to-business meetings, in Colombo, Nanjing, China and Kuala Lumpur, for promoting technology transfer and business cooperation in the renewable energy sector among member countries.

## 2. SATNET Asia

15. During this reporting period, APCTT began working on a project entitled "Network for Knowledge Transfer on Sustainable Agricultural Technologies and Improved Market Linkages in South and Southeast Asia (SATNET Asia)" in partnership with the Centre for Alleviation of Poverty through Sustainable Agriculture (CAPSA), a regional institution of ESCAP based in Bogor, Indonesia. This European Union-funded project, which has a total budget of EUR 2.56 million (\$3.46 million), focuses on the dissemination of technologies and helping poor farmers gain market access in the following South and South-East Asian countries: Afghanistan; Bangladesh; Bhutan; Cambodia; India; Indonesia; the Lao People's Democratic Republic; Myanmar; Nepal; and Pakistan. The overall objective of the project is to contribute to improved food security and nutrition among the poorest and most vulnerable people in South and South-East Asia by increasing and accelerating the rate of adoption of sustainable and productivity-enhancing agricultural technologies and improving regional trade for food products. APCTT is responsible for the implementation of the South Asia component of the project with a total budget of EUR 343,389 (\$463,922) earmarked for implementing various activities in collaboration with participating member countries in the subregion. The Centre organized a regional workshop on climate resilient smallholder agricultural farming systems in South Asia in partnership with the United Nations Disaster Management Team in New Delhi from 24 to 27 June 2013 and is now planning 18 in-country training programmes in six target countries in South Asia, namely Afghanistan, Bangladesh, Bhutan, India, Nepal and Pakistan, and two subregional training workshops on sustainable agriculture and trade facilitation.

### 3. Asia-Pacific Traditional Medicine and Herbal Technology Network

16. APCTT organized a consultative forum on establishing a subhealth intervention technology consortium in the Asia-Pacific Region in Changsha, China, on 24 and 25 September 2012 in partnership with the Ministry of Science and Technology (MOST), China and Hunan Agricultural University, Changsha, China, with funding support from MOST. Several research institutions involved in traditional medicine-related research in 11 countries, namely China, India, Indonesia, Mongolia, Nepal, Pakistan, the Philippines, the Republic of Korea, Sri Lanka, Thailand and Viet Nam participated in the event. Discussions held during the forum led to the following conclusions and suggestions:

(a) The participants agreed on the need to develop a new website as a knowledge platform for the benefit of the Asia-Pacific Traditional Medicine and Herbal Technology Network (APTMNET) member countries. This website, to be named the Asia-Pacific Consortium for Subhealth Intervention Technology (APCSIT), will contain country specific pages for each member country of the network and information already available in the form of APTMNET country portals will be incorporated in the new website whenever possible. Hunan Agricultural University (HAU) will design and host the website based on the agreed architecture after receiving inputs from member countries. The Centre will extend assistance to HAU in designing the website;

(b) The Centre's suggestion of exploring the possibility of providing shared access to electronic journals and literature related to traditional medicine available with the respective partner institutions was welcomed by all member countries;

(c) The member countries also agreed with the proposal of HAU that collaborative research be conducted on a topic of mutual interest in the broad area of traditional medicine;

(d) The member countries requested APCTT to organize a training programme on technology commercialization and transfer for senior research managers involved in traditional medicine research in the participating member countries and a policymakers forum for enhancing the awareness of best practices related to the promotion of traditional medicine under the framework of APCSIT during 2013. HAU expressed its keen interest to host both the above-mentioned programmes in Changsha, China, and informed APCTT that it would be able to mobilize resources for organizing them;

(e) The participating countries welcomed the proposal of contributing research and technical articles in journals published by the partner organizations. APCTT made a proposal during the Forum that in 2013, it would consider publishing a special issue of its *Asia-Pacific Tech Monitor* that would focus entirely on traditional medicine and subhealth intervention technologies from the participating member countries.

## B. Technology capacity-building and promotion and management of innovation

### 1. National innovation systems

17. Assisting members and associate members of ESCAP by strengthening their capacity to develop and manage national innovation systems (NIS) is one of the primary mandates of APCTT, as stated in its

statute.<sup>3</sup> In accordance with this mandate, the Centre has been promoting and strengthening NIS in countries of the Asia-Pacific region since 2005. The Centre, with funds received from the Department of Scientific and Industrial Research (DSIR) of the Ministry of Science and Technology, India, is implementing the second phase of the project entitled “Promotion of National Innovation Systems in the Asia-Pacific Region” (2010-2013), which was launched in July 2010 following the successful implementation of the first phase. The project aims to assist the participating countries in strengthening specific key components of NIS identified by each country and organize capacity-building activities for policymakers, industries, universities/academia and research and development institutions (NIS key actors) to formulate, implement and manage strategic policies and programmes for developing effective working linkages/partnerships with other relevant key actors to transform technology innovation into products or services. A key feature of the second phase is the involvement of several countries with special needs, namely Afghanistan, Bangladesh, Bhutan, Cambodia, the Lao People’s Democratic Republic, Myanmar and Nepal.

18. During the period 2011-2013, at the request of member countries, APCTT organized the following capacity-building activities with cooperation and support from national institutions:

(a) Workshop on technology business incubator management, Jakarta, 21-23 November 2011: At the request of the Centre for Innovation, Indonesian Institute of Sciences (LIPI), a workshop was conducted in cooperation with the National Development Planning Agency and the Association of Indonesian Business Incubators. Support had also been extended to LIPI by the Islamic Development Bank. International participants from Bangladesh, Malaysia, Maldives and Pakistan joined the programme with support extended by IDB;

(b) Study visit to Myanmar from 20 to 22 December 2011: The Centre explored potential areas of cooperation with relevant government ministries in implementing project activities and learned about the salient features of the country’s NIS;

(c) Study visit to Nepal from 17 to 19 April 2012: APCTT along with the Science and Technology Policy Institute (STEPI) of the Republic of Korea visited Nepal to determine the current strengths and challenges of the country’s NIS and identify specific components of the systems that require interventions from the Government in order to strengthen their governance and performance;

(d) Workshop on Incubatee Selection and Mentoring Strategy for “Technology Business Incubator (TBIs) Management”, Jakarta, 9-10 July 2012: APCTT, in cooperation with the Centre for Innovation, LIPI and the Association of Indonesian Business Incubators, conducted a two-day workshop and provided training on the NIS On-line Resource Centre in Indonesia on the following day. LIPI had expressed an interest to develop such a resource centre in cooperation with and support from the Centre. In this regard, a letter of agreement that defined the technical assistance and financial support from the Centre and the role and responsibilities of the partner institution in Indonesia was finalized;

(e) Workshop on national financing of technology innovation, Hanoi, 30-31 October 2012: The Centre in cooperation with the State Agency for Technology Innovation (SATI) of the Ministry of Science and Technology, Viet Nam organized this workshop. At the event, experts from

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<sup>3</sup> Commission resolution 64/1 of 18 May 2006, para. 4.

China, India, Malaysia and the Republic of Korea held in-depth discussions with the senior officials of SATI and shared institutional experiences and their views with the participants;

(f) Asia-Pacific NIS Online Resource Centre (<http://nis.apctt.org>): This web-based resource centre, developed by APCTT, provides access to and disseminates information on various project activities. It also makes available presentations given by national and international experts at NIS forums and various regional and national workshops, seminars and forums and their conclusions and recommendations. The Asia-Pacific resource centre also contains knowledge resources related to the concepts, design, and the development of a national information system and is currently being updated with the outputs of the activities organized in 2012-2013 under the second phase of the NIS project. As specified in letter of agreements between ESCAP and partner institutions in Indonesia and Nepal, these two countries have embarked on developing their own NIS Resource Centre. Indonesia has launched its web-based Indonesia NIS resource centre, while a partner institution in Nepal has developed and is testing a pilot version of the Nepal NIS Resource Centre. These resource centres will be linked to the APCTT Asia-Pacific NIS Resource Centre, resulting in seamless connectivity among the users of the three resource centres.

## 2. Science Technology and innovation diagnosis and strategy development

19. *Workshop on Linkages and Partnerships among Enterprises, R&D Institutions, Academia/Universities to Foster Innovation and Transfer of Technology, Kathmandu, 17-18 July 2012.* The Government of Nepal had identified the strengthening of linkages and partnerships among NIS key actors as the key component of its NIS. APCTT and STEPI jointly organized the workshop in cooperation with the Research Centre for Applied Science and Technology (RECAST), Tribhuvan University, Nepal with support from the Ministry of Science and Environment. During the workshop, which was attended by government policymakers, staff members of R&D institutions and industries, members of academia and industries and experts from APCTT, STEPI and Nepal presented their views on various aspects and issues on industry-R&D institutions-academia linkages and partnerships. Preliminary findings of an APCTT-STEPI joint study were also presented at the workshop.

20. *Training on NIS Online Resource Centre, Kathmandu, 19 July 2012.* In order to assist Nepal to design and develop a NIS on-line resource centre, a training programme was organized in cooperation with RECAST. The APCTT-developed Asia-Pacific National Innovation On-line Resource Centre set up in India was used to demonstrate its salient design elements and content aspects. Discussions were held on how to assemble and provide access to the latest information on policy measures, support mechanisms and technology intermediaries, promoting innovation in Nepal and assisting target users in their efforts to transform innovation into commercial products or services. RECAST has developed and pilot tested the web-based Nepal NIS Resource Centre.

21. *Consultative Workshop on Innovation System Diagnosis and Strategy Development – Best Practices, Manila, 28 November 2012.* This workshop, held in conjunction with the Technical Committee meeting, was organized in cooperation with STEPI, the Technology Application and Promotion Institute (TAPI) of the Department of Science and Technology, the Philippines and Filipinnovation, a programme that is spearheaded by the Department of Science and Technology.



22. *ART 2013 programme – STI Strategy Development in Practice.* APCTT participated in the Asia-Pacific Economic Cooperation (APEC) Research and Technology (ART) programme, which was organized by STEPI in cooperation with the Indonesian Institute of Sciences in Jakarta from 28 January 2012 to 1 February 2013. The programme aimed to deliberate on STI policy approaches based on comparisons of development experiences in newly industrialized countries, such as the Republic of Korea. During the programme, 18 countries shared their STI policy approaches, while APCTT related its experiences in assisting member countries in the area of NIS under its five-year strategic plan.

23. As part of efforts to continue to assist least developed countries in the area of STI diagnosis and strategy development, APCTT and STEPI carried out a joint field study in the Lao People's Democratic Republic from 5 to 8 March 2013 organized by the Department of Technology and Innovation, Ministry of Science and Technology. The study team engaged in in-depth discussions with various ministries, academia and industries to learn about the country's socioeconomic setting with an objective to identify STI structural bottlenecks that may require interventions from the Government. The preliminary findings of this field visit coupled with feedback received through a questionnaire and desk research will be presented at a national workshop, which was scheduled to be held in October 2013. Based on the findings, STI strategies were to be drawn up at the workshop for the consideration of the Government of the Lao People's Democratic Republic.

### **3. Advanced fossil fuel technologies**

24. A United Nations-funded project to enhance the capabilities of selected economies in transition and emerging market economies to attract foreign direct investment in advanced fossil fuel technologies for electricity generation was implemented by the Economic Commission for Europe (ECE) in cooperation with ESCAP and the United Nations Conference on Trade and Development (UNCTAD). The following countries participated in the project: Afghanistan; China; India; Kazakhstan; Kyrgyzstan; Mongolia; Tajikistan; Ukraine; and Uzbekistan. ESCAP assigned APCTT with handling the implementation of the India portion of the project. To assist in carrying out this function, two senior consultants engaged by APCTT completed a base line study on advances in fossil fuel technologies, foreign direct investment policies and investment opportunities related to the deployment of advanced fossil fuel technologies for power generation in India. The Centre, in cooperation with ECE, UNCTAD and the Ministry of Power and the Government of India, organized a workshop on advances in fossil fuel technologies and investments for power generation in New Delhi on 6 and 7 June 2012 to present the findings of the study and deliberate on specific issues. It consulted with ECE and worked with about 25 experts, who presented their views and deliberated on the following: promotion and advances in the development of advanced fossil fuel technologies in India; national approaches, including investment policies and opportunities and challenges in deployment of advanced fossil fuel technologies; investment and financing for deployment of advanced fossil fuel-based power generation technologies in India; and development of the power sector, taking into account advanced fossil fuel technologies. Proceedings of the workshop are available on the APCTT web page.

25. APCTT participated in a meeting entitled "Towards a Greener Energy Future: International Investment in Advanced Fossil Fuel Technologies", in Xiamen, China on 8 September 2012. This conference, organized by UNCTAD in cooperation with the Ministry of Commerce, China, was held in conjunction with the sixteenth China International Fair for Investment and

Trade, aimed to foster awareness of issues pertaining to attracting foreign investment and enhancing technology transfer in advanced fossil fuel technologies for electricity generation in China.

26. The Centre also co-organized with ECE, UNCTAD, the World Energy Council, the Global Sustainable Electricity Partnership and the International Project Finance Association, an international conference on attracting foreign investment in advanced fossil fuel technologies in Almaty, Kazakhstan, on 14 and 15 November 2012. The conference set out to mitigate the adverse effects of climate change through the deployment of advanced fossil fuel technologies made possible by national and cross-border investments in and among the project target countries, namely Afghanistan, China, India, Kazakhstan, Kyrgyzstan, Mongolia, Tajikistan, Ukraine and Uzbekistan. APCTT invited ten experts to attend the conference to explore partnership opportunities and network with their counterparts in the participating countries. The experts represented power generation corporations, central regulatory authorities and investors from India.

#### **4. Enabling environment, including the innovation eco-system for sustainable energy options**

27. Over the years, the potential of sustainable energy options, such as energy efficiency, renewable energy or alternative housing materials, in helping to address poverty reduction and achieve sustainable development when linked to strategies to increase affordability and access has become evident. A number of case studies have indicated that these options generate income and contribute to social development, as well as sustainability.

28. In order to replicate the best practices from such cases studies, critical success criteria (“enabling environment”) need to be identified, such as the business model, availability of local supplies of raw materials and equipment, market structure and dynamics, availability of finance, regulatory framework, technological viability and the socioeconomic setting of target beneficiaries. With a goal to assist policymakers in strengthening their national enabling environment and innovation ecosystem to promote and develop sustainable energy options that would bring about improvement in the economic livelihood within the context of sustainable development, ESCAP is implementing a project funded by the Development Account of the United Nations. This project, is targeted to assist mainly countries with special needs and developing countries by making sustainable energy options and alternative housing materials more affordable through, among others, South-South cooperation in the Asia-Pacific region.

29. APCTT is partnering with ESCAP to develop an assessment framework on an enabling environment, including an innovation ecosystem, to assess opportunities for deploying sustainable energy options in three pilot countries and to select suitable options using relevant adoption criteria in the pilot countries based on geographical locations and socioeconomic settings. An expert group meeting, which was held in Bangkok and concurrently in Suva through video conferencing on 19 and 20 February 2013, reviewed the conceptual model in developing the assessment framework and successful delivery models (policy, business and technology) and their replicability to promote sustainable energy options in selected countries, preferably in the least developed and Pacific island countries.

30. The assessment framework will include current national and provincial policies, programmes, delivery and support mechanisms (technical, financial and technology transfer). As key players in the innovation eco-system, industries, R&D institutions and academia are set to

play a major role in the development, adoption and transfer of technology, especially in rendering sustainable energy options that are accessible and affordable. Case studies will be used to illustrate the role of an enabling environment and the innovation eco-system. This framework will be used by the pilot countries to carry out an assessment of their own national enabling environment and develop a national strategy paper on sustainable energy options with the assistance of an international expert.

## **5. Research and development management in the area of nanotechnology**

31. APCTT initiated a United Nations-funded project to develop a regional network for research and development institutions in the Asia-Pacific region with the aim to strengthen their capacity in new and emerging areas of technology. During the reporting period, APCTT organized several key activities under this project:

(a) The Expert Group Meeting on Networking of R&D Institutions in the Asia-Pacific to Strengthen Capacity of R&D Management and Innovation in the field of Nanotechnology, Bangkok, 7-8 December 2011: The meeting sought guidance and suggestions from experts on enhancing regional cooperation in promoting the development and commercialization of nanotechnology-based value-added products in the Asia-Pacific region;

(b) The publication of a manual on critical issues related to nanotechnology research and development management from an Asia-Pacific perspective to be used as a resource material for capacity-building activities carried out by researchers/research managers in the participating member countries;

(c) Two study visits to two institutions: Sri Lanka Institute of Nanotechnology and Industrial Technology Institute, Colombo, 14-15 June 2012; and Industrial Technology Research Institute and De La Salle University, Manila, 25-26 July 2012;

(d) National Workshop on Strengthening R&D Management Capacity of Researchers and Research Managers in the Area of Nanotechnology, Jakarta, 26-27 June 2013: The workshop was organized in cooperation with and hosted by the Indonesian Institute of Sciences;

(e) Ongoing project to develop a website to serve as a regional information network on nanotechnology that functions as a one-stop shop for relevant information.

32. The research and development management capacity-building programme in the area of nanotechnology has resulted in several outputs as noted below. Thus far, 113 professionals, representing a wide range of national organizations, institutions and SMEs of member countries, have participated in the programme:

(a) An expert group meeting, which brought together 13 senior researchers engaged in the area of nanotechnology representing leading R&D institutions from eight member countries in the region, namely China, India, Indonesia, the Islamic Republic of Iran, Pakistan, the Philippines, Sri Lanka and Thailand. Key recommendations of the expert group meeting included: to create a dedicated website which would function as a regional information network on nanotechnology developments in selected countries; to compile a database of nanotechnologies that research and development institutes are willing to offer for commercialization; to develop a database of research and development institutions engaged in the development of nanotechnology-

based value-added products; to organize capacity-building programmes for researchers that focus on critical issues related to nanotechnology research and development management, such as nanosafety compliance, standardization and certification of nanoproducts; to adopt good intellectual property (IP) practices and leverage the IP generated for commercial benefit; and to commercialize research results in the area of nanotechnology. Other outputs of the meeting were the following: country reports from participating member countries; and a study report entitled “Innovative development of nanotechnology-based value-added products for enhancing competitiveness: overview and strategic implications for firms and R&D institutions in the Asia-Pacific region” in which an overview was given of the status and scope of development, application and commercialization of value-added nanomaterials in the Asia-Pacific region;

(b) The *Manual on Critical Issues in Nanotechnology R&D Management: An Asia-Pacific Perspective*, which is comprised of four substantive chapters based on critical aspects of research and development management that were identified at expert group meeting in 2011: (i) nanosafety, standardization and certification; (ii) protection and valuation of nanotechnology IP; (iii) the commercialization of nanotechnology research and development results; and (iv) case studies on the development and commercialization of nanotechnology-based value-added products from the Asia-Pacific region. The manual includes 26 case studies on various aspects of nanotechnology development and commercialization from 11 Asia-Pacific countries, namely China, India, Indonesia, Japan, the Islamic Republic of Iran, Malaysia, Pakistan, the Philippines, the Republic of Korea, Sri Lanka and Thailand, and six case studies from developed countries outside the region such as Denmark, Spain, the Netherlands and the United States of America;

(c) The National Workshop on Strengthening R&D Management Capacity of Researchers and Research Managers in the Area of Nanotechnology, Jakarta, 26-27 June 2013: Five international resource persons from India, Malaysia and the Republic of Korea as well as staff from APCTT, academics and government officials shared their knowledge and experiences with the participants at the workshop, which was attended by about 60 participants representing various ministries, departments, research and development institutes, universities, national technology and innovation promotion agencies and SMEs in Indonesia. Participants of the workshop deliberated on the following topics: research and development management capacity-building in the area of nanotechnology, taking into account regional and national perspectives; environmental, health and safety implications and risk governance of nanotechnology; protection and valuation of intellectual property rights in nanotechnology; testing, standardization and certification of nanoproducts; and the commercialization of research results by research and development institutes in the field of nanotechnology. The agenda also included a panel discussion and recommendations on the critical aspects of R&D management in nanotechnology.

### C. Technology transfer services

33. APCTT provides buyers and sellers of technologies with a technology trade platform and offers technology exchange and transfer services to promote technology cooperation and trade among organizations and enterprises in the Asia-Pacific region. It receives offers of, and requests for, technology from SMEs, research institutions, universities, business firms and business intermediaries. The Centre, through its network of technology transfer intermediaries and technology transfer portal (<http://technology4sme.net>) fielded more than 500 technology transfer facilitation requests from SMEs

and entrepreneurs across Asia and the Pacific during the period August 2011 to August 2013.

## **1. Business-to-business meetings on technology transfer**

34. APCTT, in collaboration with the Centre for Sustainable Agricultural Mechanization (CSAM), SIRIM Berhad, the Malaysian Agricultural Research and Development Institute and the South-South Global Assets and Technology Exchange, organized a business-to-business (B2B) meeting on technology transfer in Kuala Lumpur on 16 October 2012. The meeting set out to provide an enabling platform for business firms from ESCAP member countries to explore possibilities for technology-based business cooperation at the subregional and regional levels. The key focus areas of the meeting were energy, agriculture, medical systems, electronics, food processing and biotechnology. Representatives of business firms, chambers of commerce, government organizations involved in business promotion, as well as research organizations interested in commercializing their technologies from Brunei Darussalam, China, India, Indonesia, the Lao People's Democratic Republic, Malaysia, Myanmar and Thailand participated in the meeting by giving presentations on their specific interests and the nature and extent of cooperation sought by them. Following the presentations, a series of one-to-one meetings were held between interested technology seekers and technology providers.

## **2. Strengthening technology transfer capacity of member countries**

35. Considering the large number of SMEs in the region, APCTT has embarked on a programme to develop trained personnel who can help SMEs plan and implement technology transfer projects in a holistic manner. One approach for attaining a critical mass of such experts in member countries is to develop trainers who can, in turn, develop others so that, through a multiplier effect, several trained personnel would become available to assist SMEs in planning and implementing technology transfer projects. As part of this initiative, APCTT has developed a training manual on planning and implementing technology transfer projects which can be useful in the effort to train trainers to be master trainers. The master trainers can then conduct further SME training programmes in their respective countries. The Centre, in partnership with the Technology Application and Promotion Institute (TAPI) and the Department of Science and Technology (DOST) of the Philippines, organized a Training of Trainers Programme on "Planning and Implementing Technology Transfer Projects" in Manila from 7 to 9 November 2011. More than 40 technology transfer professionals and intermediaries in the Philippines, who were selected by TAPI and DOST received training on various aspects of planning and implementing technology transfer projects. The positive response to the pilot programme has prompted APCTT to organize similar ones in India and Thailand during this reporting period in partnership with relevant agencies in those countries.

36. As part of the Asia-Pacific Business Forum 2012, APCTT, with support from the Ministry of Science, Technology and Innovation and SIRIM Berhad, organized in Kuala Lumpur on 15 October 2012 a workshop for SMEs on the valuation of IP. Several business firms from the member countries of the Association of Southeast Asian Nations participated in the workshop.

## **D. Technology information services**

37. The dissemination of technological information is a key function of APCTT. Over the past three decades, the Centre has provided technology

information services to national policymakers, SMEs and technology transfer intermediaries. In this endeavour, APCTT has continued to publish online periodicals, namely the *Asia-Pacific Tech Monitor* and the *Value Added Technology Information Service (VATIS) Update* series on biotechnology, food processing, non-conventional energy, ozone layer protection and waste management. Activities undertaken during the reporting period are summarized below:

(a) As recommended by the Centre's Governing Council and Technical Committee meetings held in 2010, the *Asia-Pacific Tech Monitor* and *VATIS Updates* (except Ozone Layer Protection), beginning in January 2012, are published quarterly instead of bimonthly;

(b) Beginning in 2012, an editorial advisory board for the *Asia-Pacific Tech Monitor*, which is comprised of ten eminent international experts from China, Germany, India, Indonesia, Japan, Malaysia, the Republic of Korea, Sri Lanka and Thailand, was granted authority to give advice and guidance as and when required;

(c) APCTT published nine issues of *Asia-Pacific Tech Monitor* and 45 issues of *VATIS Updates*, all of which were made available and disseminated free of cost on [www.techmonitor.net](http://www.techmonitor.net);

(d) About 1,500 printed copies of each issue of *VATIS Update on Ozone Layer Protection* were also disseminated to SMEs, policymakers, intermediary agencies and related stakeholders in India;

(e) To achieve the goal of strengthening the technological capabilities of SMEs in the region by disseminating technological information in a cost-effective way, APCTT continued to provide free access to its websites and e-publications;

(f) APCTT introduced a number of useful information/knowledge products on themes that are of contemporary relevance to SMEs.

38. Listed below are some of the outputs from the Centre's technology information services during the reporting period:

(a) The *Asia-Pacific Tech Monitor* featured 44 special articles which were contributed by 68 authors/experts from 15 countries, namely Afghanistan, China, France, Germany, India, Indonesia, Japan, Malaysia, the Philippines, the Republic of Korea, Sri Lanka, Thailand, the Netherlands, the United States and Viet Nam. The articles were predominately from experts from countries in the Asia-Pacific region;

(b) The *Asia-Pacific Tech Monitor* issues contained articles that focused on nine special themes, namely institutional networking for enhancing innovation; enhancing SME competitiveness through technology monitoring, acquisition and adoption; environmentally sustainable low-carbon technologies; enhancing economic integration in the Asia-Pacific region through strengthening national innovation systems – challenges and strategies; adoption and utilization of renewable energy technologies and business models for SMEs; accessing the biotechnology global value chain – partnering opportunities for SMEs of the Asia-Pacific region; promoting nanotechnology applications – the role of research and development institutes to enhance competitiveness of SMEs; promoting technology-based resilience to natural disasters – opportunities for Asia and the Pacific; and diagnosis of national innovation systems and development strategies to strengthen its key components;

(c) The special feature articles presented data and analyses with regard to critical issues under various special themes and included several case studies and best practices from the region as well as from elsewhere;

(d) The *Asia-Pacific Tech Monitor* provided useful information on some 130 technological innovations from around the world in several new and emerging areas, such as biotechnology, disaster management, renewable energy, nanotechnology, low-carbon technologies and advanced materials technology. An almost equal number of technology market-related news items from the Asia-Pacific countries were also collected and written about in the periodical;

(e) About 90 short articles providing useful how-to guides, best practices and tips for SMEs were compiled and disseminated through the “Business Coach” section of *Asia-Pacific Tech Monitor*. The articles were featured under various topics relevant for SMEs, such as start-up venture creation, venture financing, managing innovation, technology transfer and green productivity. The aim of “Business Coach” is to promote techno-entrepreneurship and assist firms as they transition through the various stages of transforming innovations into products and services;

(f) Through the relevant yellow page sections of *Asia-Pacific Tech Monitor*, APCTT disseminated about 75 technology offers and 47 technology requests from 12 countries, namely Bangladesh, the Czech Republic, France, Hungary, India, the Islamic Republic of Iran, Mexico, Pakistan, the Philippines, the Russian Federation, Sri Lanka and the United Kingdom of Great Britain and Northern Ireland. Those offers and requests were specifically selected and retrieved from the APCTT database, which is available from [www.technology4sme.net](http://www.technology4sme.net) and listed in *Asia-Pacific Tech Monitor* to reach the target audience;

(g) The *VATIS Updates* disseminated technological information on more than 2,700 technology innovations and events from about 35 countries that originated from more than 500 information sources (mainly web-based) around the world. Besides web-based sources, the information on latest technological innovations with potential commercial applications and important technological events were also identified and retrieved from other sources, including the print media, and direct communication through electronic mail. The key features of the *VATIS Update* series are the packaging of information in a capsule form and the facilitation of direct access to information sources, wherever possible;

(h) APCTT partnered with prominent institutions to jointly publish three of the *VATIS Update* periodicals. *Ozone Layer Protection* was published with support from the Ozone Cell of the Ministry of Environment and Forests of the Government of India. *Waste Management* and *Biotechnology* were co-published with Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH – Advisory Services in Environmental Management and the Biotech Consortium India Limited (BCIL), respectively;

(i) As recommended by the Governing Council of APCTT in 2007, effective from the September-October 2008 issues, both *Asia-Pacific Tech Monitor* and *VATIS Update* series have become completely web-based and can be accessed and downloaded for free from [www.techmonitor.net](http://www.techmonitor.net). As a follow-up, APCTT is making a list of e-subscribers for targeted dissemination of its web-based periodicals. The list currently comprises about 410 e-subscribers who have requested that specific periodicals to be sent to them by email as and when they are released on the website;

(j) APCTT launched an innovative knowledge product as a CD-ROM entitled “Technology transfer in the Asia-Pacific: Challenges and opportunities”. The interactive and user-friendly CD presents, in a systematic and organized format, more than 100 articles related to technology transfer that were published in *Asia-Pacific Tech Monitor* during the period 1984-2010. The articles were organized under various themes, such as (i) conceptual issues tied to technology transfer, (ii) IP issues in technology transfer, (iii) technology assessment and valuation, (iv) infrastructure for supporting technology transfer, (v) promoting international technology transfer and (vi) country experiences;

(k) APCTT has developed the *Renewable Energy Business Directory* for the benefit of business firms, technology transfer intermediaries and entrepreneurs interested in technology transfer and/or business partnerships in the renewable energy sector.

### III. Future focus areas and programmes

39. Moving forward, APCTT has identified three key themes under which its activities are being grouped. They are the following:

- (a) Science, technology and innovation;
- (b) Technology transfer;
- (c) Technology intelligence.

#### A. Science, technology and innovation

40. In its five-year strategic plan (2013-2017). APCTT identified strengthening of NIS and grass-roots innovation as a key strategic intervention and proposed the following initiatives:

- (a) Technology-based business incubation:
  - (i) Assist member countries in the development and management of technology-based incubation for commercialization of R&D outputs;
  - (ii) Assist member countries in the development of technology-based rural entrepreneurship incubators;
  - (iii) Compile comprehensive information on national policies in the Asia-Pacific region for promoting and facilitating the development of technology-based rural entrepreneurship incubators and map existing incubators in selected countries;
  - (iv) Facilitate application of modern science and technology for value addition to traditional technologies.
- (b) Capacity development in innovation management and systems of innovation:
  - (i) Develop and validate resource materials and training modules on innovation management for R&D institutes, academia and SMEs;
  - (ii) Conduct capacity-building programmes in member countries to develop skills of policymakers and senior managers to strengthen systems of innovation at the national, subnational and sectoral levels;
  - (iii) Promote linkages and partnerships among universities, R&D institutes and industries.



(c) Technology adoption for inclusive development:

- (i) Partner with national agencies and technology-oriented non-governmental organizations to accelerate technology adoption by vulnerable groups;
- (ii) Collaborate with the relevant divisions and subregional offices of ESCAP in promoting the application of ICT-based delivery mechanisms for social protection in priority areas, such as education and health;
- (iii) Promote the development of institutional mechanisms in member countries for scouting, documenting, protecting and commercializing grass-roots innovations.

(d) R&D management in the area of nanotechnology: Under the programme of work, APCTT plans to carry out the following activities post-August 2013:

- (i) Organize two national capacity-building workshops for strengthening R&D management capacity of researchers and research managers in the area of nanotechnology in the member countries. One of them has been finalized. It will be held in Tehran on 18 and 19 December 2013 in collaboration with the Iranian Research Organization for Science and Technology (IROST);
- (ii) Set up a regional research and development management networking website in the area of nanotechnology consisting of relevant databases of nanotechnologies and research and development institutions;
- (iii) Make the publication *Manual on Critical Issues in Nanotechnology R&D Management: An Asia-Pacific Perspective* freely available on the nanotechnology website for the benefit of national stakeholders;
- (iv) Upload relevant documents and project outputs on the website for wider dissemination in the Asia-Pacific region.

## B. Technology transfer

41. APCTT is seeking avenues of funding support for phase two of the Renewable Energy Cooperation project, which will focus on strengthening the capacity of member countries to develop renewable energy resource assessments and to identify and assess renewable energy technologies that could meet their local requirements.

42. The Centre is also considering the possibility of revitalizing the Asia-Pacific Traditional Medicine and Herbal Technology Network with a proposal to establish the Asia-Pacific consortium for subhealth intervention Technology with support from the Ministry of Science and Technology of China and in partnership with Hunan Agricultural University, Changsha, China.

43. APCTT will continue to plan and deliver training of trainers programmes on technology transfer at the national level upon request from member countries.

44. APCTT will continue to work towards strengthening the capacity of six target countries in South Asia through its SATNET Asia programme of work in the areas of sustainable agriculture and agricultural trade facilitation.

45. APCTT will work with individual member countries to determine which specific areas they may require assistance, especially with regard to bridging the knowledge gap in new and emerging technologies.

### **C. Technology intelligence**

46. The APCTT work programme on “Strengthening technology intelligence” has evolved from the earlier “technology information services” programme. Through this new programme, APCTT will strive to go beyond mere dissemination of technology information to the provision of technology intelligence to help member States and their enterprises to overcome the challenges arising out of today’s dynamic business and technological setting. In this regard, APCTT will focus on interventions that aim at providing technology intelligence to enable member States to keep abreast of global technological developments and use them strategically. Towards this endeavour, APCTT plans to continue to carry out several activities as listed below:

(a) Publish and upgrade the periodical *Asia-Pacific Tech Monitor* for the benefit of member country stakeholders;

(b) Publish *Value Added Technology Information Service (VATIS) Updates* in five specific areas namely: biotechnology; waste management; non-conventional energy; food processing; and ozone layer protection;

(c) In collaboration with member States, translate the above-mentioned periodicals into local languages to expand their reach;

(d) Develop specialist publications and knowledge products on various technological themes of current interest based on the archived information from past issues of *Asia-Pacific Tech Monitor* and disseminate them to planners, policymakers, researchers, and managers of technology.

## **IV. Matters calling for the attention of the Committee**

47. APCTT invites the Committee to consider the following suggestions and recommendations:

(a) Enhancement of institutional support:

(i) In view of its increasing operational costs, the Centre encourages the member States to augment their contributions in line with the recommended guidelines of \$30,000 for developing countries and \$7,000 for least developed countries;

(ii) APCTT is keen to explore new sources to augment its current institutional support, including contributions from the corporate sector. This could be in the form of a corpus fund. Suitable guidelines for this could be developed in consultation with ESCAP.

(b) Assignment of national experts:

For enhanced programme delivery, it is important that the Centre strengthen its human resources. The Centre seeks active cooperation from member countries to implement suggested options, such as the secondment of experts from member countries on a non-reimbursable loan basis and the placement of experts from the corporate sector on a pro bono basis.