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### Transferring technology for inclusive and sustainable trade and investment

## Technology transfer for inclusive and sustainable trade and investment

### Note by the secretariat

#### *Summary*

The essential role of technology in economic development and of trade and investment as principal modalities to transfer technology is widely recognized. At the same time, technology is needed to enable enterprises, including those in the agricultural sector, to trade, invest and improve competitiveness through innovation.

However, not all countries have the capacity to either develop their own or access technologies that suit their level of development. Many countries also face obstacles because of stringent intellectual property rights provisions. However, with the expansion of value chains, the growth of foreign direct investment and the dismantling of trade barriers, new opportunities for technology development and transfer have emerged, while some countries in the region have become technology suppliers.

To convert challenges into opportunities, institutions at the national and regional levels are needed to support technology development and transfer. In Asia and the Pacific, APCTT and UNAPCAEM are ESCAP regional institutions that focus on facilitating the transfer and development of technology.

The Committee may wish to provide guidance on the technology transfer-related activities of these two institutions as they relate to capturing trade and investment opportunities.

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### **I. Current situation and developments in the region**

1. Interest in enhancing competitiveness through the effective use of technology has intensified globally during the last few years, mainly due to the globalization of business and agricultural enterprises, liberalization of many developing economies and greater emphasis on the protection of intellectual property after the formation of the World Trade Organization. Indeed, the transfer of manufacturing and agricultural technology has become an important part of the international business strategy of firms.

2. More than three decades ago, the renowned economist Edwin Mansfield pointed out the following:

“One of the fundamental processes that influence the economic performance of nations and firms is technology transfer. Economists have long recognized that the transfer of technology is at the heart of the process of economic growth, and that the progress of both developed and developing

countries depends on the extent and efficiency of such transfer. In recent years, economists have also come to realize (or rediscover) the important effects of international technology transfer on the size and patterns of world trade.”<sup>1</sup>

Considerable emphasis is also placed on the importance of ensuring that technology transfer initiatives explicitly incorporate environmental aspects in the planning and implementation processes.

3. It must be noted that economic growth may not need to come at the expense of environmental protection. These should not be viewed as opposing objectives, but rather as a symbiotic relationship necessary for the sustainability of both. Achieving this relationship requires a change in mindset and the ability to access innovative technologies that can serve to increase manufacturing and agricultural productivity using natural resources in a more sustainable manner.

4. To convert challenges into opportunities, institutions at the national and regional levels are needed to support technology development and transfer. At the regional level, the Asian and Pacific Centre for Transfer of Technology (APCTT) and the United Nations Asian and Pacific Centre for Agricultural Engineering and Machinery (UNAPCAEM) are ESCAP institutions that focus on facilitating the transfer and development of technology. Recently, their combined efforts have focused on four priority areas: (a) food security; (b) managing the effects of climate change on agriculture; (c) strengthening the development of small and medium-sized enterprises (SMEs); and (d) promoting the transfer and utilization of renewable energy technologies.

#### **A. Food security**

5. Food prices in the Asia-Pacific region, especially of wheat, corn and other staples, including cooking oil, are now as high as those recorded in 2008. High food prices in 2010 kept 19.4 million people in poverty in the region, who would otherwise be out of poverty.<sup>2</sup> Scenario estimates for 2011 suggest that high food and oil prices may slow down poverty reduction even further, affecting from 10 million to 42 million additional people, and postponing the achievement of Millennium Development Goal 1 on eradicating extreme poverty and hunger by half a decade in many countries.<sup>3</sup>

6. Against the above backdrop is the fact that maintaining food security will also need to keep pace with global population increases, in which demand for agricultural goods is expected to rise by 70 per cent. In an era of heightened environmental awareness, the existing situation calls for greater focus on more environmentally sustainable agricultural practices, such as utilizing appropriate technologies and agricultural machinery, bearing in

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<sup>1</sup> E. Mansfield, “East-West technological transfer issues and problems, international technology transfer: Forms, resource requirements, and policies”, *American Economic Review*, 65(2) (1975), pp. 372-376.

<sup>2</sup> ESCAP, “Rising food prices and inflation in the Asia-Pacific region: causes, impact and policy response”, ESCAP MPDD Policy Briefs, No. 7, March 2011. Available from: [http://www.unescap.org/pdd/publications/me\\_brief/mpdd-pb-7.pdf](http://www.unescap.org/pdd/publications/me_brief/mpdd-pb-7.pdf).

<sup>3</sup> Ibid.

mind that more than 60 per cent of the Asia-Pacific region's poor depend on the agricultural sector for their main livelihood.

7. Further progress in reducing poverty throughout Asia and the Pacific will rely, to a great extent, on the ability of countries in the region to achieve sustainable economic growth in the agricultural sector, a key contributor to their economies, and consequently on realizing environmentally sustainable land management.

## **B. Managing climate change and agriculture**

8. The agricultural sector has a direct impact on climate change through greenhouse emissions and land use effects. In addition to being a significant user of land and consumer of fossil fuel, the agricultural sector contributes directly to greenhouse gas emissions through such practices as rice production, the raising of livestock and the transport of agricultural goods from rural to urban areas. According to the Intergovernmental Panel on Climate Change, the three main causes of the increase in greenhouse gases observed over the past 250 years have been greater reliance on fossil fuels, land use and agriculture.

9. Adding to the above challenges for the region from the accelerating effects of human-induced climate change is the fact that the agricultural sector is still largely embedded in unsustainable agricultural production practices brought on by the first "Green Revolution". The Green Revolution has helped the region achieve significant yield increases, contributing greatly to the improvement of food security and the reduction of poverty. However, the intensive farming practices of the Green Revolution have placed high demands on water, added to overgrazing and led to excessive use of nutrients and chemical inputs to control weeds, pests and diseases that result in problems of pollution, eutrophication,<sup>4</sup> land degradation and desertification.

10. Intensive monocultural practices have led to severe soil degradation due to erosion and salt deposition as well as to declines in both soil macronutrients and micronutrients. This, in turn, has pushed farmers to apply larger doses of chemical fertilizers, resulting in an eight-fold increase in their consumption in the last 50 years.<sup>5</sup>

11. The Green Revolution has also ushered in the rapid adoption of farm mechanization technologies. Asia is becoming an increasingly key global player in the manufacturing and distribution of agricultural machinery. According to the Food and Agriculture Organization of the United Nations, 30.48 per cent of the tractors sold worldwide in 2004 were produced in

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<sup>4</sup> As indicated on the United States Geological Survey website, <http://toxics.usgs.gov/definitions/eutrophication.html>, H.W. Art defines eutrophication as: "The process by which a body of water acquires a high concentration of nutrients, especially phosphates and nitrates. These typically promote excessive growth of algae. As the algae die and decompose, high levels of organic matter and the decomposing organisms deplete the water of available oxygen, causing the death of other organisms, such as fish. Eutrophication is a natural, slow-aging process for a water body, but human activity greatly speeds up the process."

<sup>5</sup> Bhaskar Goswami, "Agriculture in Punjab: Scars of the Green Revolution", *India Together*, February 2011. Available from: <http://www.indiatogether.org/2011/feb/agr-punjab.htm>.

Asia, with India topping the list.<sup>6</sup> This development is expected to accrue even more growth potential in the future.

### C. Strengthening the development of small and medium-sized enterprises

12. In recent decades, SMEs have begun to utilize technology transfer as a strategic means of meeting challenges posed by the globalization of business.<sup>7</sup> Due to size and skill resource constraints, SMEs cannot carry out internal research and development to generate their own technologies but still they need a flow of new technology to be able to compete. This need has created a new niche market for technology transfer.<sup>8</sup> The importance of technology transfer, from an economic and competitiveness perspective, has also stimulated university-industry technology transfer.

13. However, planning and managing a technology transfer project, especially an international one, is not easy. While large organizations may be able to gain access to the resources needed to overcome these problems, this is usually not the case with SMEs.

14. A comprehensive list of problems faced by SMEs in managing technology transfer was provided in a paper prepared by Nimesh Chandra.<sup>9</sup> Many of these problems persist and with rapidly changing technological and business trends, new problems have emerged. Governments, international agencies and non-governmental organizations have all attempted to alleviate these problems by introducing various supportive measures. Yet, many of these measures make the tacit assumption that technology transfer is a relatively predictable process whereby buyers of technology (transferees) acquire, assimilate and then improve the purchased technology, often with assistance from government policies.<sup>10</sup> This approach tends to oversimplify the magnitude of the problem faced by SMEs in planning and implementing technology transfer projects. Based on the work of the Global Climate Network, barriers to the development and transfer of technologies can exist at two levels.<sup>11</sup> First, a barrier can exist “in practice”, resulting from a lack of skills to plan and implement technology transfer projects and weaknesses in policies to direct technology

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<sup>6</sup> Food and Agriculture Organization of the United Nations, Corporate Database for Substantive Statistical Data (2004). Available from: <http://faostat.fao.org/site/291/default.aspx>.

<sup>7</sup> S. Mayer and W. Blaas, “Technology transfer: an opportunity for small open economies”, *Journal of Technology Transfer*, 27(3) (2002), pp. 275-289.

<sup>8</sup> M.T. Morrissey and S. Almonacid, “Rethinking technology transfer”, *Journal of Food Engineering*, vol. 67, issue 1-2, 2005, pp. 135-145.

<sup>9</sup> APCTT, “Small and medium enterprises in the national systems of innovation: exploring the barriers to technology transfer”, (2009). Available from [http://www.business-asia.net/Pdf\\_Pages/Guidebook%20on%20Technology%20Transfer%20Mechanisms/SME%20in%20National%20Systems%20of%20Innovation.pdf](http://www.business-asia.net/Pdf_Pages/Guidebook%20on%20Technology%20Transfer%20Mechanisms/SME%20in%20National%20Systems%20of%20Innovation.pdf).

<sup>10</sup> M.A. Cusumano and D. Elenkov, “Linking international technology transfer with strategy and management: a literature commentary”, *Research Policy*, 23 (1994), pp. 195-215.

<sup>11</sup> Global Climate Network, *Breaking Through on Technology: Overcoming the Barriers to the Development and Wide Deployment of Low-carbon Technology* (London, 2009). Available from: <http://www.globalclimatenetwork.info/publicationsandreports/publication.asp?id=680>.

flows. Second, one can occur “in principle”, whereby, historically, technology transfer and trade have been linked in controversial debates split along developed-developing country lines.

15. In the “practice layer”, problems arise due to SMEs lacking the capacity to make a business case for an envisaged technology transfer project to search for available technologies, to choose from among the potential technologies, to negotiate the terms of transfer, to implement the technology transfer project, to use the transferred technology effectively and to improve operations through innovation. In the “principle layer”, specific barriers that have attracted attention are those related to intellectual property and finance. Intellectual property is a principal component of innovation but it is also accepted that it can serve as a barrier to technology transfer.<sup>12</sup> It is argued that as long as the majority of new patents, for instance in low-carbon technologies, are registered in developed countries, intellectual property will be a barrier to technology transfer. Coupled with this, the lack of access to finance is also a major barrier to the development and transfer of technologies to SMEs.

16. Operators of rural SMEs tend to be some of the poorest people working in the agricultural sector. Of note, rural women, in particular, face many obstacles in gaining entry to the small-scale business sector as they often lack access to information about entrepreneurship development programmes, technologies for productivity, natural resource management strategies for sustainability and improving their quality of life. This marked gender gap has been a prominent barrier to the socio-economic development and poverty reduction efforts in the Asia-Pacific region.

17. These challenges and barriers are aggravated by the fact that many countries in the region do not have effective national systems for innovation that develop public policies, implement initiatives and support structures that foster critical technologies needed by SMEs, especially from a “green growth” perspective.<sup>13</sup> The policy mix needs to explicitly prioritize preferred technologies, establish standards and provide targeted financial and fiscal incentives.

#### **D. Promoting the transfer and utilization of renewable energy technologies**

18. Since 1980, the global consumption of primary energy has doubled, with much of the increase coming from Asia and the Pacific due to, among other things, rapid economic growth, vast investments in infrastructure development and the growing population in the region.<sup>14</sup> Compared with other parts of the world, the region also produces and consumes energy inefficiently.<sup>15</sup> Thus, the region has to find ways to reduce energy intensity and lessen the impact of its energy use on the environment and on the climate. This means that countries have to start using low-carbon energy

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<sup>12</sup> ESCAP, *Financing an Inclusive and Green Future: A Supportive Financial System and Green Growth for Achieving the Millennium Development Goals in Asia and the Pacific* (United Nations publication, Sales No. E.10.II.F.4) (2010).

<sup>13</sup> Ibid.

<sup>14</sup> ESCAP, *Energy Security and Sustainable Development in Asia and the Pacific* (United Nations publication, Sales No. E.08.II.F.13) (2008). Available from: [www.unescap.org/publications/detail.asp?id=1286](http://www.unescap.org/publications/detail.asp?id=1286).

<sup>15</sup> Ibid.

resources, in which an attractive option would be to adopt and utilize renewable energy technologies (RETs). The use of these technologies would also help mitigate climate change.

19. Even though renewable energy resources, with the exception of hydropower, are abundant in the region, they make up less than 2 per cent of the commercial energy mix.<sup>16</sup> This is because potential adopters of RETs perceive it to be too risky. One approach to stimulating greater use of RETs would be to encourage public-private partnerships that enable the private sector to share its expertise and resources in promoting the transfer and utilization of such technologies.

## II. Opportunities – including South-South cooperation

20. Several interventions are needed in parallel to help economies in Asia and the Pacific overcome the challenges and barriers faced in enhancing the role of technology in economic development and trade and investment. Some of the more important interventions are listed below along with possible opportunities for South-South cooperation:

(a) *Building technology transfer capacity.* It is imperative to create a critical mass of skills in developing nations and countries with special needs to help firms, especially SMEs, plan and implement technology transfer projects with a business focus. Development of such capacity can help enhance opportunities to use public-private partnerships as a means of accelerating the flow of priority technologies needed by a country. Sharing the experiences of countries such as China, India, and the Republic of Korea in strengthening their SME technology transfer capacity can be of use to other countries;

(b) *Avoiding the “valley of death”.* In many instances, innovations that are generated as a result of research and development lie dormant without being commercialized. This phenomenon is popularly referred to as the “valley of death”. Efforts are needed at the national level to enhance national research and development support and promote international collaboration for bringing in, assimilating, adapting, commercializing and improving technologies in priority areas, such as “climate-smart” technologies, to avoid the “valley of death.” In recent years, some countries in the Asia-Pacific region, such as China and the Republic of Korea, have made vast strides in successfully commercializing innovations, and their expertise could be shared with other countries;

(c) *Strengthening policy regimes for accelerating the flow of technologies in priority areas.* While many countries tend to have generic policy statements supporting the inducement, adoption and utilization of technologies in priority areas, greater specificity is often needed with respect to policy instruments and related institutional frameworks. Lack of specificity often results in sub-critical efforts by firms. For instance, in the field of “climate-smart” technologies, policies need to be specific with respect to promoting a desired energy mix, emissions reduction, energy efficiency and conservation in the manufacturing, construction and transportation sectors. In this field, technologically advanced countries, such as China and India, have introduced advanced programmes to promote the adoption and utilization of renewable energy in the areas of solar, wind,

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<sup>16</sup> Ibid.

micro-hydropower and biomass (including biogas technology and clean husbandry practices), while smaller countries, such as Bangladesh and Nepal, have successfully introduced programmes for rural applications. Sri Lanka and Thailand have successfully implemented public-private partnership initiatives to promote the application of nanotechnology to produce value added industrial products;

(d) *Enhancing the use of intellectual property.* The level of intellectual property-related difficulties may not be the same with all technologies. Countries may wish to identify technologies in priority areas, in which there are little or no intellectual property barriers. These can be publicized widely. In the case of technologies in which intellectual property barriers are high, thereby hindering their effective deployment and diffusion, measures such as guarantees for strong intellectual property enforcement and joint collaboration for developing locally appropriate versions could be explored. South-South cooperation through the sharing of best practices in intellectual property management could be very useful;

(e) *Establishing subregional “innovation hubs”.* Subregional “innovation hubs” based on the “open innovation” principle could be set up, for instance, in the regions covered by the Association of Southeast Asian Nations or the South Asian Association for Regional Cooperation, to develop and apply technologies in areas, such as renewable energy, biotechnology and nanotechnology, that have significant implications, especially for developing countries. This could reduce the cost of deploying intellectual property;

(f) *Increasing access to finance.* Lack of access to finance has significant international and national political implications. In this regard, there can be no “one size fits all” approach, especially in developing countries, where there are constraints on public expenditure and a majority of the population is sensitive to price increases. Thus, while Governments address this issue in international forums, suitably designed economy-wide and market transformation incentives are needed at the national level to attract finance. Very often, an existing technology gets “locked in” within its operational setting because of system and network externalities. The incentives must help overcome this obstacle, which can prevent firms from switching to newer technologies that could enhance national competitiveness while being climate friendly. This is an area where South-South cooperation could prove to be invaluable;

(g) *Calls for a second Green Revolution.* As the region aims for more balanced economic growth, there are calls for a second, more knowledge-intensive and truly green agricultural revolution that combines advances in science and agricultural engineering with the region’s unique traditional knowledge to make agriculture, rural communities and management of land more environmentally sustainable. This movement would, consequently, contribute to the development of more resilient rural livelihoods. In the last few years, many countries in Asia and the Pacific have instituted “green” agricultural programmes that are becoming good agricultural practices for possible replication. China, India, Indonesia, Malaysia and Thailand, among others, have instituted comprehensive adaptation programmes to address climate change and its deleterious effects on the agricultural sector. The experiences of these countries in these endeavours could be shared with other countries throughout the region. Areas covered in these programmes include: crop improvement;

diversification and research; drought proofing; organic agriculture; enhanced public education and awareness; and eco-labelling;

(h) *Sustainable land management.* A multitude of projects have been conducted and hundreds of millions of dollars have been spent on issues related to land degradation and desertification. The missing ingredients in these endeavours has been the integration of the many innovations and education at all levels regarding the need to manage the land according to the biological capacity of the landscape and not the short-term needs of rural communities. China and Mongolia, which have significant areas of grasslands and rangelands, have instituted policies and programmes aimed at addressing cyclical sand and dust storm events. Much more could be done in this area through more intensive and integrated approaches at reducing land degradation and desertification with good practices being replicated;

(i) *Managing increased agricultural mechanization.* The rising global population and subsequent increase in demand for food and fibre come at a time when the total labour force involved in agricultural activities is declining annually. Consequently, farmers throughout the region are beginning to substitute traditional agricultural practices with more mechanized production techniques, creating the need for region-wide safety standards and guidelines on the production and operation of agricultural machines. Trade can play a part in this by increasing the types of agricultural machinery available to farmers, improving the quality of the machinery as a result of greater competition in the market and stimulating innovation as manufacturers look to garner a larger market share. Tools, such as test codes and schemes for agricultural machinery that can promote synergy in the Asia-Pacific region in the application of uniform or mutually recognized testing procedures, must be crafted to benefit the end user, not the supplier. The model of the European Network for Testing of Agricultural Machines is being looked at for possible replication in the Asian and Pacific region;

(j) *Empowering women.* At its 2010 annual ministerial review, the Economic and Social Council placed the spotlight on the gender equality-related Millennium Development Goals and called for ways to help develop comprehensive strategies that empower women, encourage women's full enjoyment of human rights and the eradication of poverty as these are essential to economic and social development.<sup>17</sup> Such comprehensive strategies comprise the promotion of more gender-equitable rural employment opportunities and agro-entrepreneurship and enhanced access to environmentally sustainable agricultural technologies. More gender-equitable entrepreneurship development programmes linked to agriculturally based SMEs is seen to be one of the practical strategies for alleviating poverty and generating income and employment opportunities for the rural poor. This would encourage rural women's access to resources such as assets, capital, technology, and agriculture and rural development services, thus improving food security and livelihoods.

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<sup>17</sup> See *Official Records of the General Assembly, Sixty-fifth Session, Supplement No. 3 (A/65/3/Rev.1)*, chap. III, sect. F.

### **III. APCTT and UNAPCAEM – responding to the pulse of the region**

21. The mandates of APCTT and UNAPCAEM are aimed at strengthening the technology transfer capacity of member countries in the Asia-Pacific region with a view to promoting sustainable and inclusive development. A brief overview of the ongoing and expected activities of the two centres is presented below.

#### **A. Managing climate change and ensuring environmentally sustainable agriculture**

22. In the area of climate change, UNAPCAEM is focusing on strengthening institutional capacity for policy development and implementation that addresses poverty reduction through an integrated approach of combating desertification and land degradation by utilizing innovative agro-technologies, establishing functional and mutually beneficial public-private partnerships and sharing good agricultural management practices in the Asia-Pacific region. The Centre aims to increase the capacity of policymakers dealing with agricultural issues in selected countries in the region to make informed policy decisions that address food insecurity, land degradation and desertification issues and to formulate proper policies that encourage sustainable land management, environmentally sustainable agriculture practices and afforestation (rejuvenating degraded grasslands).

23. UNAPCAEM is also looking at building capacity in biogas technology and clean husbandry in the Asia-Pacific region through an integrated approach involving technical assistance, training, agro-technology innovation and knowledge-sharing. Possible channels under consideration for building capacity are technical assistance on renewable energy and enhancing human resources development through training workshops and the expansion of e-knowledge platforms.

#### **B. Establishing an Asian and Pacific network for testing agricultural machinery**

24. UNAPCAEM is currently promoting South-South cooperation and technology transfer through the development of an agricultural machinery and farm implements testing network that is economically, environmentally and socially (pro-poor) sustainable. It plans to undertake data collection on the status of the agricultural machinery and farm implements testing stations across the region and conduct a needs assessment of member countries with existing authorized testing centres. In addition, the Centre is organizing an expert group meeting of professionals on agricultural machinery testing from member countries to be held during the last week of July 2011 in Bangkok. During the meeting, a task force will be set up to formulate a concrete action plan leading to the formal establishment of an Asian and Pacific network for testing agricultural machinery and farm implements. The main goals of the network would be to increase farmers' access to quality and affordable agricultural machinery and farm implements at the ground-level by facilitating the smooth trade flow of such equipment through the promotion of uniform testing standards in the region. Members of the UNAPCAEM Governing Council have expressed strong support for the network.

### **C. Fostering gender-equitable entrepreneurship**

25. UNAPCAEM is also planning to promote more gender-equitable entrepreneurship through environmentally sustainable agriculture initiatives in the Greater Tumen Subregion. Key policymakers and decision makers that work for Governments and development stakeholders will be called upon to identify ways to advance the prospects for more gender-equitable agro-entrepreneurship in the region through environmentally sustainable agriculture initiatives aimed at alleviating poverty, generating income and providing meaningful employment opportunities.

### **D. Promotion of national innovation systems**

26. It is well recognized that a country needs a strong national innovation system in order to implement technology-based initiatives that address key development issues. Based on this, APCTT, with funding from the Department of Scientific and Industrial Research of the Government of India, is implementing a programme aimed at building capacity at the national level to enable policymakers to understand the importance, key components and implementation strategy and management practices of a national information system and its organic-linkages with subnational and sectoral innovation systems. Specific attention is being paid to such areas as best management practices of technology incubation centres; networking of research and development institutions for technology development and transfer of technology; management of intellectual property rights and technology-led women's entrepreneurship development. This work programme will also focus on the needs of countries with special needs.

### **E. Establishing an institutional cooperation mechanism to promote renewable energy**

27. Under its programme of work on promoting RETs in the Asia-Pacific region, APCTT has, with funding from the Ministry of New and Renewable Energy of the Government of India, commenced activities to establish a regional cooperative mechanism that will perform four major functions, namely: web-based dissemination of information on RETs; sharing best practices with respect to policy initiatives for promoting the transfer and utilization of RETs; developing capacity at the SME and rural level to plan and implement RET transfer projects; and promoting research and development collaboration for developing and adapting RETs.

### **F. Building technology transfer capacity in SMEs**

28. APCTT is developing a comprehensive training manual on planning and implementing technology transfer projects to help SMEs strengthen their capacity to manage technology transfer projects. The aim of the project is to create a critical mass of skills in this area in member countries by training trainers from technology transfer intermediaries and related institutions. These master trainers can then conduct further SME training programmes and, if needed, translate the manual into the local language to enable wider dissemination. The manual will also be placed on the APCTT website to enable wider dissemination and translation into local languages if needed. The training of trainer programmes can be conducted in member countries, upon request, with the member country bearing the local costs and APCTT providing the training expertise. The Centre also plans to publish a guidebook book on effective management of technology transfer,

in particular with regard to clean and renewable energy technologies, for enhancing the competitiveness of SMEs, including its gender dimensions, and is currently working on the preparation of a proposal for fostering the commercialization of grass-roots innovation with a view to promoting “social entrepreneurship”.

**G. Assisting SMEs in applying new and emerging technologies, including environmentally sound technologies**

29. APCTT continues to provide proactive services to buyers and sellers of technology through its Technology4sme and Business-Asia websites. It also disseminates the latest information on technological developments through its publications – *Asia-Pacific Tech Monitor* and the *Value-Added Technology Information Services (VATIS) Updates*.

**H. Strengthening innovation in research and development institutes**

30. At the request of member countries, APCTT is working on a proposal to create a regional web-based research and development resource facility in the area of nanotechnology, which would contain information on leading research and development institutions, a database of prominent researchers in member countries and details of research projects in which collaboration is being sought. This collaboration mechanism would also be used to conduct training programmes in association with knowledge partners and leading research and development institutions in the region to introduce best practices in critical areas, such as research and development proposal preparation, research and development project selection, research and development project monitoring, enhancing creativity of research and development human resources, research and development management information systems, intellectual property protection, commercialization of research results, and planning and implementing joint international research projects. The training programmes are to be designed taking into consideration the stage of technological development of participating member countries.

**I. Expanding cooperation in promoting traditional medicine**

31. APCTT has already set up the Asia-Pacific Traditional Medicine and Herbal Technology network for the dissemination of information to promote industrial/technical cooperation on traditional medicine in the Asian and Pacific region. A total of 14 countries in the region have joined the network but, due to resource and skill constraints, several of them have not been able to establish focal points to agree upon levels with respect to network architecture, website design, structure of the database, technical standards and the role and responsibilities of project coordinators. The Centre plans to develop a follow-up programme of work to assist these weaker members and also bring countries with special needs into the network.

**IV. Issues for consideration by the Committee**

32. The Committee may wish to deliberate on the issues and challenges associated with technology transfer identified above as they relate to capturing trade and investment opportunities, including priority actions and policy measures identified by the secretariat for further consideration at the national, regional and global levels, and the appropriateness of the work of

the two centres in addressing these challenges. In considering the issues presented above, the Committee may wish to refer to the most recent reports of the respective Governing Councils of the two centres.<sup>18</sup>

33. In particular, the Committee may wish to provide recommendations related to the following technology transfer initiatives:

(a) Increasing the flow of efficient and safe agricultural machinery in the region through, among other things, the proposed establishment of a network for testing agricultural machinery;

(b) Enabling member countries to continuously upgrade the technology transfer capacity of SMEs and technology intermediaries by enhancing technology transfer advisory and support services;

(c) Assisting member countries in refining their national innovation systems, promoting sustainable and inclusive development, and fostering social entrepreneurship through innovation not only in organized sectors but also at the grass-roots level;

(d) Promoting the development of networks among research and development institutes in the Asian and Pacific region to enhance collaboration, the sharing of experiences and the benchmarking of effective research and development management practices.

34. The Committee may also wish to propose options for human and financial resources mobilization that would assist APCTT and UNAPCAEM in achieving a higher degree of technical and financial self-sufficiency. This could include encouraging ESCAP members and associate members to provide the centres with support in terms of increased financial contributions and expertise, in particular with regard to the areas identified above. The Committee may also wish to discuss the potential establishment of a threshold for minimum contributions from member countries with a view to ensuring the viability of the two centres in the long term. In doing so, it may wish to take into consideration the recommendation by the Governing Council of APCTT to establish a minimum threshold of \$30,000 per year for developing countries and \$7,000 per year for least developed countries.<sup>19</sup>

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<sup>18</sup> For APCTT, see E/ESCAP/67/5, annex III. For UNAPCAEM, see E/ESCAP/67/6, annex III.

<sup>19</sup> See E/ESCAP/67/5, annex III, para. 4(a)(i).