

**Economic and Social Commission for Asia and the Pacific****Seventy-fourth session**

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Item 5 of the provisional agenda**

**Regional economic cooperation and integration in Asia
and the Pacific****Integrated and seamless connectivity for sustainable
development in Asia and the Pacific: progress and the
way forward****Note by the secretariat***Summary*

At its seventy-third session, the Economic and Social Commission for Asia and the Pacific adopted resolution 73/3 on advancing integrated and seamless connectivity for sustainable development in Asia and the Pacific. The present document contains a review of the state of regional connectivity in the areas of trade, transport, information and communications technology and energy, as well as an outline of a way forward towards integrated and seamless regional connectivity for sustainable development.

The Commission may wish to consider the present document and provide guidance for the future work of the secretariat.

I. Introduction

1. At its seventy-third session, the Economic and Social Commission for Asia and the Pacific (ESCAP) adopted resolution 73/3 on advancing integrated and seamless connectivity for sustainable development in Asia and the Pacific. Integrated and seamless connectivity is expected to enable goods, services, people and information to move efficiently across borders without facing unnecessary barriers.

2. Promoting seamless connectivity requires an integrated and comprehensive approach towards liberalization of trade and investment in goods and services, trade facilitation and the development of sustainable transport, information and communications technology (ICT) and energy infrastructure networks. It requires regional and national policies to be coordinated, infrastructure gaps to be filled, technical standards to be harmonized, operational procedures to be synchronized, ICT to be developed and deployed, and cross-border transport rules and regulations to be aligned.

* Reissued for technical reasons on 18 April 2018.

** ESCAP/74/L.1/Rev.1.

3. In adopting resolution 73/3, the Commission recognized the crucial and substantive role of connectivity in achieving the Sustainable Development Goals in Asia and the Pacific and called on the secretariat to continue to promote integrated and seamless connectivity for sustainable development in the areas of transport, trade, energy and ICT in the region. The Commission also requested the secretariat to report on the progress made, challenges remaining and the way forward for regional connectivity every three years, starting in 2018.

4. Accordingly, the present document reviews the state of regional connectivity in each of the four above-mentioned areas and outlines a way forward towards integrated and seamless regional connectivity for sustainable development.

II. Trade connectivity in the Asia-Pacific region

A. Progress

5. While regional trade connectivity in the Asia-Pacific region has improved overall during the past two decades, intraregional trade costs remain excessively high in many subregions and countries, particularly in countries with special needs. Comprehensive trade costs among major East and North-East Asian economies (China, Japan and the Republic of Korea) now stand at 62 per cent in tariff-equivalent terms, approaching those prevailing among the three largest European Union economies (42 per cent) (see table).

6. In contrast, in some cases, trade costs in other subregions remain more than three times higher than trade costs among European Union members. Trade costs within and between subregions show that it is much more costly for major East and North-East Asian economies and South-East Asian economies to trade with North and Central Asia, South and South-West Asia, and the Pacific island developing economies than to trade between themselves or with far-away developed economies.

7. High intraregional trade costs preclude the participation of North and Central Asia, South and South-West Asia, and the small Pacific island countries in regional trade and production networks. While intraregional trade in the ESCAP region has grown significantly over the past two decades, it is still concentrated on only a few economies. Trade between economies in East and North-East Asia and South-East Asia accounts for more than 72 per cent of such intraregional trade. The trend in intraregional investment is similar.

8. While trade connectivity is affected by geographical and cultural factors, ESCAP research suggests that approximately 80 per cent of international trade costs in the region can be reduced through an integrated mix of policy reforms spanning trade, transport and ICT in particular.¹ Trade policy measures, such as tariffs, non-tariff measures, trade facilitation and paperless trade measures, as well as regulatory restrictions in trade-related services are important components of this mix and key determinants of trade connectivity.

¹ See E/ESCAP/CTI(5)/2 and E/ESCAP/CTI(5)/2/Corr.1.

Table
Intra- and extraregional comprehensive trade costs in the Asia-Pacific region
 (Percentage)

	<i>ASEAN-4</i>	<i>East and North-East Asia-3</i>	<i>North and Central Asia-4</i>	<i>Pacific island developing economies</i>	<i>SAARC-4</i>	<i>Australia and New Zealand</i>	<i>European Union-3</i>
ASEAN-4	81 (2.6)						
East and North-East Asia-3	82 (-2.0)	62 (-3.4)					
North and Central Asia-4	369 (2.1)	182 (-9.1)	116 (-5.6)				
Pacific island developing economies	198 (-8.7)	193 (-3.9)	448 (35.1)	158 (-5.7)			
SAARC-4	155 (0.2)	143 (-5.1)	336 (7.5)	357 (-4.7)	141 (5.2)		
Australia and New Zealand	108 (-1.3)	97 (-6.7)	361 (-4.9)	92 (-7.7)	155 (-8.5)	53 (-2.3)	
European Union-3	116 (-3.0)	93 (-5.1)	159 (-6.4)	215 (-7.2)	128 (-1.8)	116 (-3.3)	42 (-8.1)
United States of America	96 (7.5)	72 (-0.8)	185 (-3.4)	176 (-5.2)	130 (4.1)	104 (0.8)	74 (0.2)

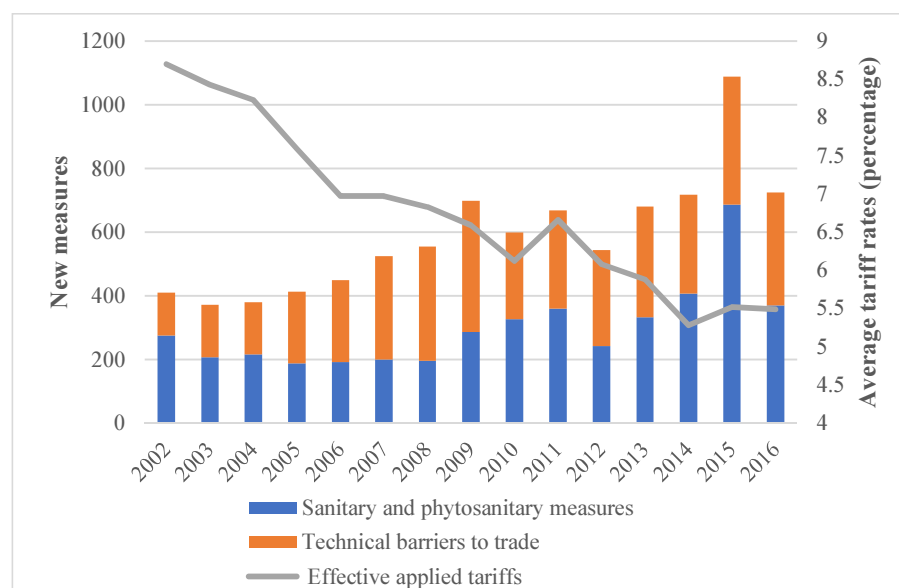
Source: ESCAP calculations based on ESCAP-World Bank Trade Cost Database. Available from <http://artnet.unescap.org/databases.html#first> (accessed 30 June 2017).

Note: Trade costs shown are average trade costs during the period 2010–2015 and may be interpreted as tariff equivalents. Changes in average trade costs between 2004–2009 and 2010–2015 are in parentheses.

Abbreviations: ASEAN-4: Indonesia, Malaysia, the Philippines and Thailand; East and North-East Asia-3: China, Japan and the Republic of Korea; European Union-3: Germany, France and the United Kingdom; North and Central Asia-4: Georgia, Kazakhstan, Kyrgyzstan and the Russian Federation; Pacific island developing economies: Fiji and Papua New Guinea; SAARC-4: Bangladesh, India, Pakistan and Sri Lanka (referring to the South Asian Association for Regional Cooperation).

9. The region has made a notable progress in reducing tariff barriers to trade. Average applied tariff rates in Asia-Pacific countries have decreased substantially (figure I). Tariff reductions have been achieved through a combination of unilateral liberalization, preferential trade agreements and liberalization within the World Trade Organization (WTO) framework. The tariffs, however, vary substantially across sectors, with average applied tariff rates for sensitive products, such as agricultural products, remaining higher than for manufactured products.

Figure I
Effectively applied tariffs and newly initiated sanitary and phytosanitary measures and technical barriers to trade imposed by the Asia-Pacific economies, 2002–2016



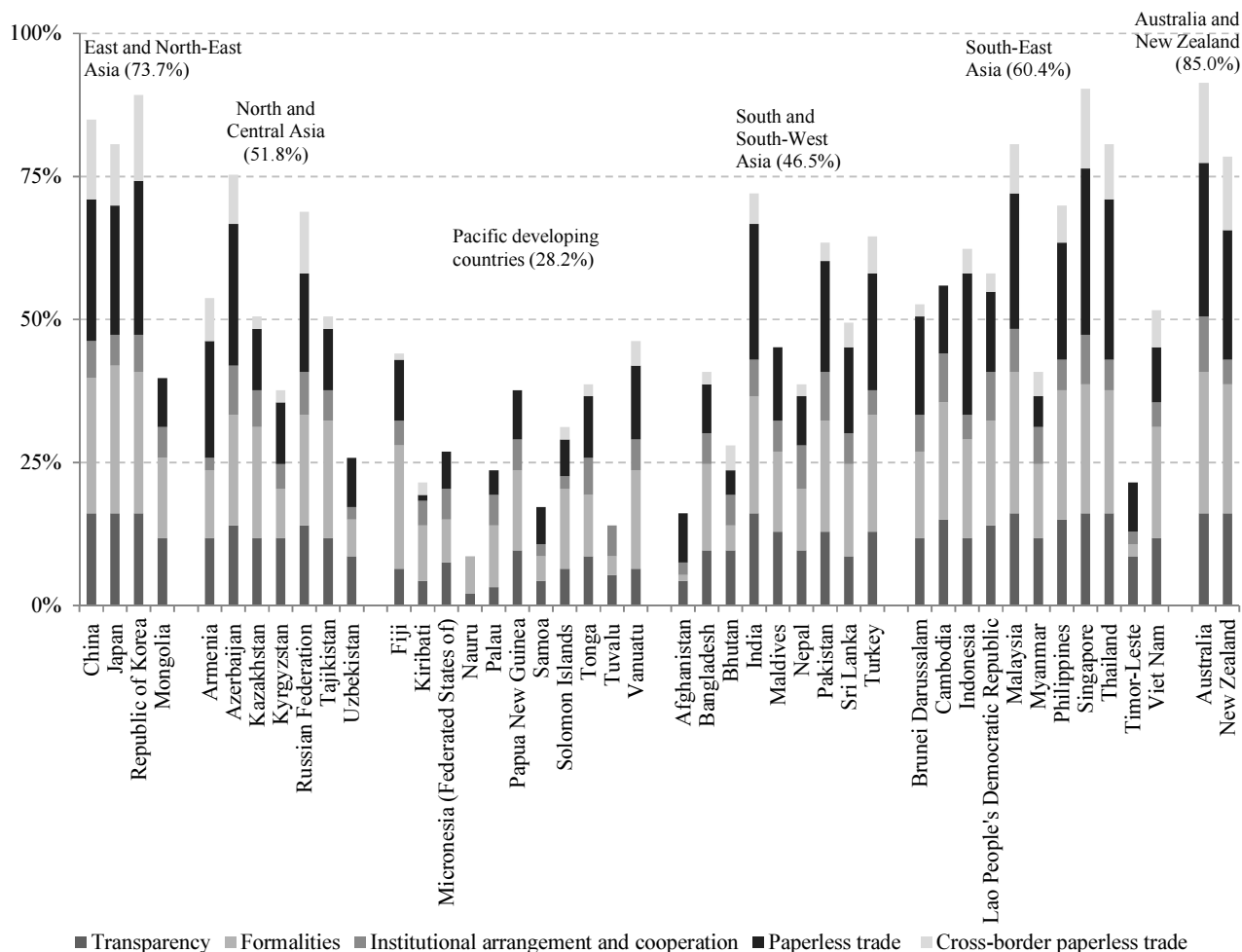
Source: ESCAP calculations based on data from World Bank, World Integrated Trade Solution database, available from <http://wits.worldbank.org/> (accessed 31 July 2017); and WTO, Integrated Trade Intelligence Portal (I-TIP) database (accessed 8 February 2018).

10. While tariffs have decreased, non-tariff measures have risen. Non-tariff measures cover a wide variety of regulations that may affect prices, quantity and characteristics of traded goods. Technical non-tariff measures, such as product labelling standards, and sanitary and phytosanitary measures, which cover regulations on plant and animal health, have become the most common form of non-tariff measures. There was a substantial increase in the number of new non-tariff measures initiated by the economies of the Asia-Pacific region in the period from 2002 to 2016 (figure I). Rising non-tariff measures may partly explain why, despite the decline in tariffs and decrease in shipping and transportation costs over time, estimated trade costs incurred by the Asia-Pacific economies remain high, as noted earlier.

11. Trade facilitation, or the simplification and harmonization of customs and trade procedures, is instrumental to reducing trade costs and achieving seamless connectivity in the region. Average implementation rates of trade facilitation and paperless trade measures in Asia and the Pacific increased from 46.5 per cent in 2015 to 50.4 per cent in 2017. Implementation varies significantly across countries and subregions, and across types of trade facilitation measures (figure II). For example, implementation of cross-border paperless trade measures, aimed at enabling the seamless flow of information

between all stakeholders along an international supply chain, remain at the pilot stage in many countries.

Figure II
Overall implementation of trade facilitation measures in 44 Asia-Pacific countries, 2017



Source: United Nations, “Trade facilitation and paperless trade implementation in Asia and the Pacific: regional report 2017”. Available from www.unescap.org/resources/trade-facilitation-and-paperless-trade-implementation-asia-and-pacific-regional-report.

12. Trade in services also affects regional connectivity, as trade costs very much depend on the availability of affordable and efficient trade-related services, such as transport and delivery services. These services are critical to make trade more inclusive as, for example, small and medium-sized enterprises are often fully dependent on third-party logistics providers. However, trade in services remains very restricted in the Asia-Pacific region and rail transport, air transport and courier services are, on average, among the top five most restricted trade services.² Importantly, the different levels of restrictiveness

² *Services and Global Value Chains: the Asia-Pacific Reality* (United Nations publication, Sales No. E.18.II.F.11).

across countries and sectors reflect different regulatory requirements, which can increase the cost of trade across borders.

13. Governments in the Asia-Pacific region have tended to proactively use trade agreements to promote trade linkages with countries within and outside the region. The region is a major contributor to the worldwide build-up of agreements. Of the 274 physical preferential trade agreements in force globally, 170 (66 per cent) involve Asia-Pacific economies. More than 80 of those preferential trade agreements are intraregional in nature and now cover more than 72 per cent of intraregional trade.

B. Challenges

14. Because tariffs now contribute less than 10 per cent of overall trade costs, enhancement in trade connectivity will have to come from reducing other costs. Designing and enforcing non-tariff measures that will not unduly affect regional trade connectivity remains a key challenge. Non-tariff measures are typically less transparent and harder to monitor than tariffs. They can make trade less inclusive because the compliance capacity of small and medium-sized enterprises tends to be more limited than that of large firms. At the same time, non-tariff measures have a potential role in sustainable development; for example, they can be used to ensure that traded goods meet social and environmental standards consistent with the Sustainable Development Goals.

15. Simplifying and digitizing trade procedures to make import, export and transit processes more transparent and inclusive is another major challenge, as it requires overcoming structural problems in developing economies of the region, including limited human resource capacity and the lack of cooperation at the national level among and between government agencies and the private sector. Seamless trade connectivity also implies that Governments need to think beyond the national level when developing single window systems and other paperless trade systems and find ways to enable the electronic exchange of data and documents with relevant stakeholders in trade partner countries.

16. Although the importance of services for improved connectivity has been increasingly recognized, liberalization of trade in related services can be expected to remain particularly challenging. Opening the services market has important impacts on domestic regulatory sovereignty and the responsibility for regulating different services such as financial services, transportation services or ICT services, lies with different government agencies. In addition, the lack of services statistics in developing economies means that it is difficult to estimate trade frictions induced by services policy, not to mention the social and environmental impact of services trade liberalization.

17. Finally, the proliferation of bilateral and regional trade agreements within the region also creates challenges for seamless regional connectivity. Different rules of origin between trade agreements increase the complexity of the trade and investment environment. For example, even among the ASEAN+1 agreements, there are 22 different types of rules of origin, and only 30 per cent of the tariff lines share a common set of rules. The high costs of complying with rules of origin may exceed the savings associated with the tariff preference provided under an agreement, particularly for small and medium-sized enterprises in developing countries of the region.

C. Way forward

18. Given the importance of non-tariff measures both as emerging trade barriers and tools for sustainable development, regional good practices on non-

tariff measures should be developed building upon existing international standards and agreements. A first step would be to collect data on existing non-tariff measures and to compare and evaluate their impacts based on a common methodology.

19. Cooperation on digital trade facilitation offers a great opportunity to reduce trade costs and increase trade volume for the region. Through paperless trade and seamless electronic exchange of trade data and documents, the Framework Agreement on Facilitation of Cross-border Paperless Trade in Asia and the Pacific will not only complement the WTO Agreement on Trade Facilitation but also provide a unique platform for ESCAP member States to realize their potential.

20. The removal and streamlining of burdensome regulations should also be actively pursued. Improving regulatory transparency is often the first and easiest step towards reducing regulatory costs. The removal of regulations that prevent more efficient competitive behaviour would be an important step to reduce the costs and enhance the efficiency of infrastructure services.

21. The complex web of agreements should be consolidated, or at least the approaches to rules of origin should be harmonized. ESCAP member States could work together on developing a simple, single set of rules that are transparent and easy to comply with. However, building a consensus for a single approach is a challenge for the negotiators.

III. Transport connectivity in the Asia-Pacific region

A. Progress

22. There have been consistent efforts by ESCAP member States to achieve seamless transport connectivity over the past several years. Regarding transport infrastructure, recent initiatives in developing the road and railway networks are being implemented with an increasing awareness of their continuation through the territories of neighbouring countries. The World Bank's Logistics Performance Index suggests that the transport and logistics performance of the ESCAP region has improved by nearly 7 per cent on average between 2007 and 2016. The performance of landlocked developing countries has been even better, with a 17 per cent improvement on the Logistics Performance Index during that period.

23. Under the terms of the Intergovernmental Agreement on the Asian Highway Network and the Intergovernmental Agreement on the Trans-Asian Railway Network, formalized networks have been adopted as two coordinated plans for the development of highway routes and railway lines of international importance within Asia and between Asia and neighbouring regions to facilitate regional economic integration. The Asian Highway network now comprises 143,000 km of highways in 32 countries and member countries have made substantial efforts to improve the quality of road infrastructure, resulting in an increase of the number of roads meeting higher level of standards. For example, primary class roads now cover 11.8 per cent of the network (up from 9 per cent in 2008), and Class I road share in 2017 was 21 per cent (compared to 17.9 per cent in 2008). The Trans-Asian Railway network in its current configuration includes 118,000 km of existing or planned railway tracks in 27 countries. Out of this total, 12,400 km (10.5 per cent) of the network are missing. The development of the networks has been incorporated into national plans or strategies in many countries.

24. The Working Group on the Asian Highway and the Working Group on the Trans-Asian Railway Network have been established as legislative platforms for policymakers of the region to discuss issues and coordinate policies supporting the development of the respective networks, including to identify new solutions for aligning the future development of transport networks with the implementation of the Sustainable Development Goals. A recent example of the progress in this direction is annex II bis to the Intergovernmental Agreement on the Asian Highway Network which provides guidance to member States on design standards for road infrastructure safety along the Asian Highway network and thus helps reduce fatality and injury rates from road traffic accidents.

25. Initiatives to develop transport infrastructure need to be supported by trade and transport facilitation measures. In this regard, the secretariat has been supporting member countries to develop and implement new transport facilitation agreements. In support of road transport, notable initiatives include the signing of the Intergovernmental Agreement on International Road Transport along the Asian Highway Network by China, Mongolia and the Russian Federation in December 2016 that aims to open large parts of the Asian Highway network to international road transport. Prior to that, in June 2015, countries in South Asia, namely, Bangladesh, Bhutan, India and Nepal signed the Motor Vehicles Agreement for seamless movement of vehicles among these countries and they are now taking steps to ratify and begin implementing the agreement.

26. The Intergovernmental Agreement of the Shanghai Cooperation Organization Member States on the Facilitation of International Road Transport, was signed in September 2014 and entered into force in January 2017. The Joint Committee of the Agreement, which is a body to coordinate its implementation, was established in May 2017. This Agreement will significantly promote regional and subregional connectivity and integration among China, the Russian Federation and Central Asian countries. Implementation of numerous transport facilitation agreements among South-East Asian countries is also ongoing and expected to open more border crossings for international transport.

27. For international railway transport, a significant development in past few years has been the rapid growth in the volume of railway transport between Asia and Europe. The number of regular routes increased from two in 2012 to nearly 39 in 2016. Approximately 2,000 freight trains had crossed between the two continents as of 2016. As per the data from Global Times,³ the number of freight trains between China and Europe increased from 17 in 2011 to 1,702 in 2016 – a hundred-fold increase in six years. Apart from the trans-Siberian route, other routes through Central Asia are becoming competitive due to the movement of industrial production to western parts of China. To exploit the transit potential between Asia and Europe, most countries in Central Asia and their neighbours are making efforts to improve their railway transport, and numerous projects are underway to provide railway transport connectivity between Asia and Europe through Central Asia and the southern Caucasus.

28. The development of dry ports in the region is critical for encouraging a modal shift from road to railways. To support the member countries in these efforts, the secretariat supported the Intergovernmental Agreement on Dry Ports, which entered into force in April 2016. Together with the existing Intergovernmental Agreements on the Asian Highway and the Trans-Asian

³ www.globaltimes.cn/content/1046043.shtml.

Railway Networks, it will provide renewed impetus to the coordinated development of dry ports of international importance. ESCAP member countries have designated a total of 240 dry ports to fall under the agreement, including 153 existing dry ports and 87 potential ones.

B. Challenges

29. Despite the steady progress made during the past two decades, the region still has a long way to go in realizing seamless regional road and rail transport connectivity along the Asian Highway and Trans-Asian Railway routes.

30. As regards the Asian Highway network, a significant number of roads do not yet meet the minimum desirable standards. In addition, in too many instances, different standards apply to a single Asian Highway route on either side of a common border between neighbouring countries. This hampers the development of international cross-border road movements as road operators perceive poor infrastructure as posing a risk of injury to drivers and damage to vehicles.

31. There are still many missing links in the Trans-Asian Railway as well. The lack of rail intercountry connectivity is particularly acute in South-East Asia, including its links to other subregions, which accounts for 42 per cent of the missing sections in the Trans-Asian Railway network.

32. The region's fragmented approach, particularly for operational transport connectivity, has contributed to slow progress and suboptimal results in terms of transport efficiency. Meanwhile, the demand for transport in the region has grown rapidly due to high economic growth in many countries during the past two decades, a trend that is likely to continue. This has occurred while the adverse impact of climate change, and the role of road transport in aggravating it, have become matters of concern at both the national and international level.

33. The logistics sector in many ESCAP member countries faces challenges associated with poor performance and high costs. Low levels of human resource capacity within the sector is one of the main hindrances to developing efficient and effective logistics systems in the region. Logistics service providers in some countries lack access to quality training programmes. In addition, standards for training programmes differ widely within and across countries.

34. The implementation of the 2030 Agenda for Sustainable Development could be both an opportunity for and a challenge to the transport sector. Indeed, while the transport sector has been a key driver of economic development and is a provider of employment, it remains a leading contributor to greenhouse gas emissions and a major consumer of fossil fuels. This challenge is even more formidable for a region that enjoys a high birth rate and an expanding middle class with growing affluence and purchasing power that fuel an increased demand for consumer goods, in particular private vehicles.

C. Way forward

35. The Ministerial Conference on Transport, held in Moscow in December 2016, reiterated the importance of integrated intermodal transport systems for achieving sustainable transport connectivity in the region. It adopted the Regional Action Programme for Sustainable Transport Connectivity in Asia and the Pacific, phase I (2017–2021), which was endorsed by the Commission

in May 2017 through resolution 73/4. Among the immediate objectives of the Regional Action Programme are enhancing regional connectivity through the continued development and upgrading of the transport infrastructure networks, and the establishment and operationalization of integrated intermodal transport systems by using existing capacities and infrastructure more effectively.

36. To make railways attractive to shippers on a regular basis, it is critically important to increase the reliability and predictability of freight train services. To this end, railway border crossing procedures need to be streamlined to reduce delays. International railway transport can be further facilitated in the region by developing common minimum technical standards for cross-border railway operations in critical areas.

37. To make transport networks more efficient, it is imperative that the modal interchange among road, railway, seaport and airport systems is seamless. This requires interconnections among different modal infrastructure as well as information exchange. Such facilities may include intermodal terminals or dry ports for freight transport and transfer points or stations, multimodal transport hubs and Mobility as a Service facilities for passenger transport. Streamlined rules and regulations for dry ports will contribute substantially to increasing the efficiency of transport and transit corridors in fostering regional cooperation and pave the way for sustainable development among countries.

38. Planning and developing facilitation agreements on efficient transport and transit corridors can obviate some of these challenges. The connection between transport and transit corridors and sustainable development has been emphasized in General Assembly resolution 69/213 of 19 December 2014. As most of the international freight traffic flows on well-known routes, it may be possible to bring together all stakeholders to agree on facilitated procedures to implement along the selected transport and transit corridors. For efficient operationalization of integrated intermodal transport, the transport logistics services in the region need further improvement, for example, by enhancing the capacity of logistics service providers and establishing logistics information systems that would enhance logistics efficiency and reduce related costs.

39. As requested by the member States, the secretariat is also assessing the benefit of the introduction of new technologies such as intelligent transport systems for the region. These systems include transport operation and management and planning systems, with a combination of modern technologies based on the new capabilities offered by ICT. The deployment of intelligent transport systems enables improved traffic management, more fluid traffic flows and higher levels of safety and security, which lead to cleaner, safer and more efficient transport systems operating in an innovative manner. However, policy challenges may be amplified due to the speed of change. Therefore it is crucial to consider intelligent transport systems early in the planning process for seamless transport connectivity to capture its potential contributions to the Sustainable Development Goals, such as reduced energy consumption and environmental pollution generated by road traffic, as well as greater road safety and security.

IV. Information and communications technology connectivity in the Asia-Pacific region

A. Progress

40. The Asia-Pacific region as a whole has a strong growth trajectory in access to fixed and mobile broadband. Compared with other regions, in 2016, the majority of the world's total fixed-broadband subscriptions were found in the Asia-Pacific region (56.6 per cent),⁴ followed by Europe (20.3 per cent) and North America (13.0 per cent). Fixed-broadband subscriptions per 100 inhabitants in ESCAP member States (11.6), was still far lower than North America (32.9) and Europe (31.1), but slightly lower than the global average (12.5) and slightly higher than Latin America and the Caribbean (11.2).

41. When analysed by subregion, the average fixed-broadband subscriptions per 100 inhabitants in 2016 was highest in East and North-East Asia (24). When growth of fixed-broadband subscriptions was compared over time by subregion, North and Central Asia experienced the strongest growth (a five-fold increase between 2007 and 2016), driven by strong growth in Azerbaijan, Georgia, Kazakhstan and the Russian Federation. Other subregions that experienced strong growth include South and South-West Asia (four-fold) and South-East Asia (three-fold).

42. However, in 18 member States,⁵ less than 2 per cent of the population on average had fixed-broadband subscriptions in 2016. This number had not changed since 2015, thus the gap between rapidly growing countries and the rest has widened. Most of the 18 countries are countries with special needs (least developed countries, landlocked developing countries and small island developing States), requiring urgent attention to increase access to fixed broadband.

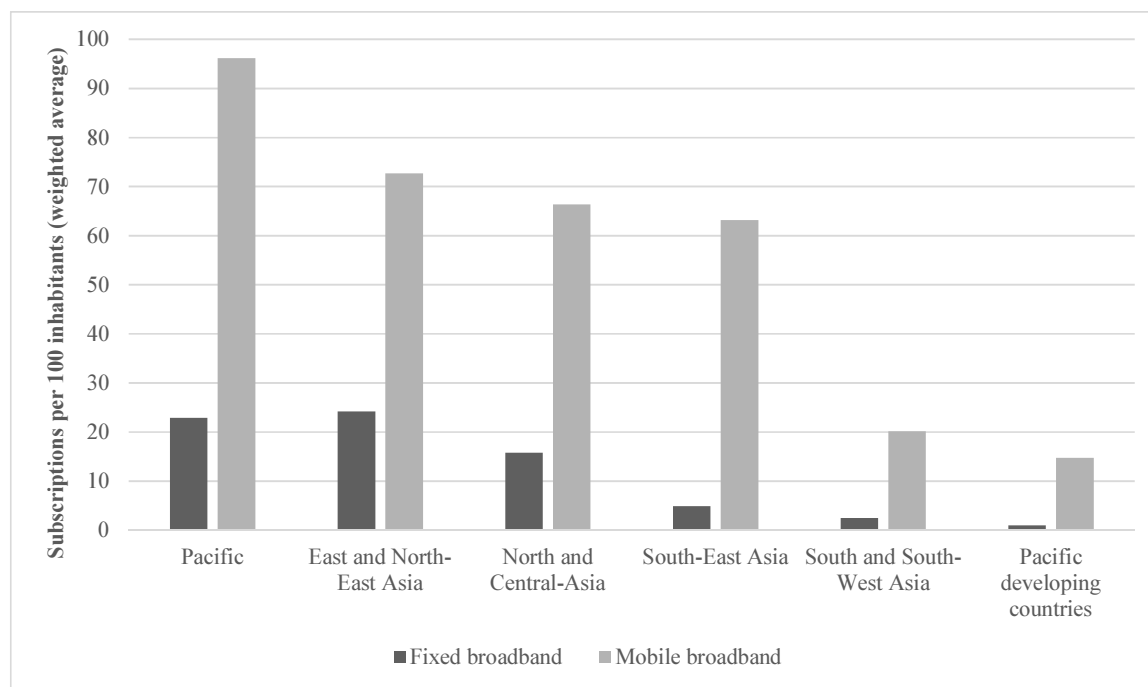
43. Mobile-broadband subscriptions are now much more common and widespread than fixed-broadband connections (figure III). Almost half of the 4.4 billion people in ESCAP member States had mobile-broadband subscriptions in 2016. Compared with other regions, mobile-broadband subscriptions per 100 inhabitants in the Asia-Pacific region (49) was behind North America (115), Europe (77) and the world average (52).

44. When analysed by subregion, the average mobile-broadband subscriptions per 100 inhabitants in 2016 was highest in the Pacific (driven by Australia and New Zealand), followed by East and North-East Asia (driven by Japan and the Republic of Korea). South and South-West Asia and developing countries in the Pacific (excluding Australia and New Zealand) had the lowest average mobile-broadband subscriptions per 100 inhabitants, although there have been significant increases in both subregions since 2010.

⁴ An increase of 6 percentage points from 2015.

⁵ For full country listing, see ESCAP, "Artificial Intelligence and Broadband Divide: State of ICT Connectivity in Asia and the Pacific – 2017" (Bangkok, 2017). Available from www.unescap.org/sites/default/files/publication_StateofICT2017.pdf.

Figure III
Broadband subscriptions per 100 inhabitants by subregion, 2016



Source: Produced by ESCAP based on data from International Telecommunication Union (ITU), World Telecommunication/ICT Indicators database 2017 (21st Edition/December 2017). Available from www.itu.int/en/ITU-D/Statistics/Pages/publications/wtid.aspx (accessed 17 February 2018).

Note: Pacific developing countries excluded Australia and New Zealand.

B. Challenges

45. Extending broadband connectivity to remote and rural areas has been a persistent challenge in the region. Remote and rural areas are often not connected because private operators do not consider them to be commercially viable. Private sector investments in ICT infrastructure tend to target urban areas which are more densely populated, and hence more profitable. The universal access and service fund⁶ is one of the traditional financing mechanisms used to connect sparsely populated rural areas, where there was neither the population density nor the capital for telecommunication operators to justify private sector infrastructure investments. However, an ESCAP study found that in most cases, the funds had not achieved their intended purpose of

⁶ Such funds are established by Governments, and a percentage of the gross or net annual revenue of telecommunication operators is levied to fund ICT infrastructure projects. Some countries charge an overall annual regulatory fee. Other funding sources include contributions from international finance institutions, such as the World Bank, as well as licensing fees. In some cases, contributions are made directly from the Government’s budget. For more details, see ESCAP, “The impact of universal service funds on fixed-broadband deployment and internet adoption in Asia and the Pacific”, Asia-Pacific Information Superhighway Working Paper Series (Bangkok, 2017). Available from www.unescap.org/sites/default/files/Universal%20Access%20and%20Service%20Funds.pdf.

enhancing broadband connectivity in rural and remote communities.⁷ This could be due to weaknesses in the structure and design of the funds which poses challenges for the timely implementation of projects. The study also included success stories.

46. Disaster risk is one of the main challenges in expanding broadband connectivity in Asia and the Pacific. For example, some areas of Central Asia are prone to multiple natural hazards, and therefore building resilience in ICT infrastructure is considered a development imperative. During the period 2000–2015, 210 disasters caused 10,639 deaths and affected more than 16 million people in the Special Programme for the Economies of Central Asia subregion. Floods were the most frequent disaster, followed by earthquakes and landslides, which may impact ICT networks and facilities. Between 2000 and 2016, the Pacific subregion experienced 225 natural disasters⁸ that caused 1,752 fatalities, affected 4.7 million people and resulted in nearly \$50 billion (in 2005 United States dollars) in damages.⁹ The ICT infrastructure was continually affected by natural disasters, which disrupted the ability of providers to serve current and new customers. The total damage caused by Cyclone Winston to the communication sector in Fiji was estimated to be approximately \$24 million.¹⁰

47. The lack of access to resilient and affordable electricity has been found to deter broadband adoption in Pacific island countries or areas. A positive and statistically significant relationship was found between access to electricity (measured by electricity consumption) and fixed-broadband adoption.⁷ The policy implication for the development of broadband connectivity is that other supporting infrastructure, in particular the power grid, must have the power generating capacity to meet the increasing demand of an expanding broadband network.

48. The lack of conducive ICT policies for investment deters broadband adoption in ESCAP member countries. Based on available data from 16 ESCAP economies that have introduced competition policies on international gateways, an ESCAP study¹¹ found that economies with the highest broadband connectivity were those that introduced competition on international gateways (figure IV). Similar outcomes were identified with regard to the introduction of competition to mobile phone services in Pacific island countries or areas.⁷

⁷ ESCAP, “The impact of universal service funds on fixed-broadband deployment and internet adoption in Asia and the Pacific”, Asia-Pacific Information Superhighway Working Paper Series (Bangkok, 2017). Available from www.unescap.org/resources/impact-universal-service-funds-fixed-broadband-deployment-and-internet-adoption-asia-and.

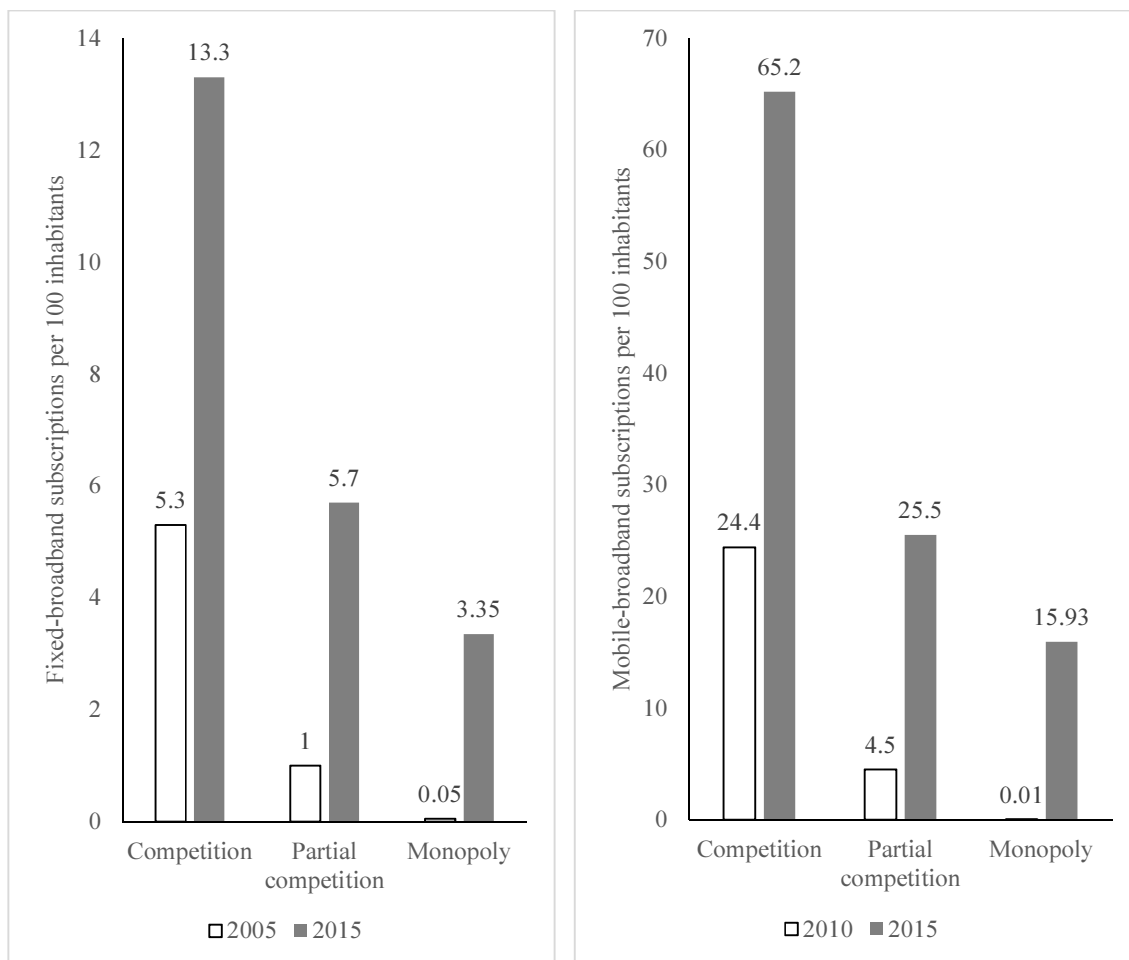
⁸ Disaster categories included were drought, earthquake, extreme temperature, flood, landslide, mass movement (dry), storm, volcanic activity and wildfire.

⁹ Centre for Research on the Epidemiology of Disasters, EM-DAT: The International Disaster Database. Available from <http://emdat.be> (accessed 14 March 2017).

¹⁰ Including loss of income due to interruption of service.

¹¹ ESCAP, “Effect of open international gateways on the broadband connectivity market”, IDD Working Papers (Bangkok, 2017). Available from www.unescap.org/resources/effect-open-international-gateways-broadband-connectivity-market.

Figure IV
Competition policy, international gateways and broadband access in selected economies



Source: ESCAP calculations based on World Bank, *The Little Data Book on Information and Communication Technology 2017* (Washington, D.C., 2017). Available from <http://documents.worldbank.org/curated/en/606191484194306157/The-little-data-book-on-information-and-communication-technology-2017>.

Notes: Countries were selected based on two conditions: (1) only countries with available data in each year were included; and (2) in order to increase observations, all countries that retained similar market policy (competition, partial competition or monopoly) in each year were included. Due to limited data, different years were used for fixed-broadband subscriptions (2005 and 2015) and mobile-broadband subscriptions (2010 and 2015). Country coverage: 34 Asia-Pacific economies (including 16 economies that have introduced competition or partial competition).

C. Way forward

49. Investing in supply-side infrastructure is critical, but on its own it is insufficient to promote resilient and affordable broadband connectivity in the region. ESCAP has thus prioritized the implementation of the Asia-Pacific Information Superhighway initiative which seeks to extend broadband infrastructure connectivity seamlessly across the Asia-Pacific region.

50. In addition, effective financing mechanisms for ICT infrastructure are critical to encourage broadband investments in areas which may not be commercially viable at present. Subsequent in-depth analyses on the performance of universal access and service funds and other modalities of cross-border ICT financing may help support policy discussions and regional dialogue in the future.

51. E-resilience best practices and policies also need to be examined and exchanged among ESCAP member States to promote the development of resilient ICT infrastructure for disaster risk reduction. Disaster risk informed investments also support the implementation of the Sendai Framework for Disaster Risk Reduction 2015–2030 and the achievement of resilience-related Sustainable Development Goals.

52. Finally, closer policy collaboration between ICT and energy sectors should be explored to promote affordable and reliable electricity sources for ICT connectivity. Building on examples of cross-border co-deployment of fibre-optic cables along passive infrastructures such as pipelines, power grids, highways and railway lines in Asia and the Pacific and further afield, ways of scaling up such initiatives should be explored. Furthermore, cooperation should be strengthened with various socioeconomic sectors for business development, employment creation, environmental management, health, education and e-government applications to create synergies between ICT infrastructure and sectoral applications such as smart grids, intelligent transport systems and e-commerce, including paperless trade and e-banking services.

V. Energy connectivity

A. Progress

53. The Asia-Pacific region already consumes almost half of the world's energy and demand continues to grow, especially demand for electricity. The electricity sector has the potential to be a cornerstone in facilitating the transition of member States to the sustainable development path through efficient use of energy resources, optimization of regional investment and increase of renewable energy uptake. Developing regional connectivity in the electricity sector can enhance the ability of the region to meet its energy demand, while promoting the integration of the three dimensions of sustainable development in energy sector planning. The existing and planned bilateral cross-border electricity connectivity projects and agreements provide a good foundation for more comprehensive subregional integration of electricity markets.

54. Currently, most of the cross-border electricity power trade and connectivity is done on a bilateral basis. The volume of intraregional trade in energy and electricity remains low in comparison to electricity demands. With a view to harness the region's significant potential for complementarities in energy resource endowment, including abundant renewable energy sources, there are some subregional initiatives to promote multilateral power trade.

55. Several countries in the Asia-Pacific region have made significant progress in harmonizing regulatory frameworks to enable cross-border power trade through bilateral agreements. Further efforts to liberalize and internationalize energy markets are required to reap the clear overall benefits of multilateral power trade, and many countries must do more to attract foreign and private investment in cross-border infrastructure.

56. Countries of South-East Asia have increasingly engaged in cross-border energy and electricity trade in the past few years. Countries involved in the two most comprehensive integrated network initiatives, the Greater Mekong Subregion Power Market and the Association of Southeast Asian Nations (ASEAN) Power Grid, have been particularly active, with three projects planned for the period 2016–2020. Following the establishment of the ASEAN Economic Community in 2015, the ASEAN Economic Community Blueprint 2025 identified the energy sector as a focal area for regional cooperation. In September 2017, the Lao People’s Democratic Republic, Malaysia and Thailand signed a memorandum of understanding under which Malaysia will import 100 MW of hydropower from the Lao People’s Democratic Republic by 2018. This memorandum of understanding is a pilot project in developing a power market for the ASEAN region within the framework of the ASEAN Power Grid.

57. Within South and South-West Asia, the South Asian Association for Regional Cooperation (SAARC) Framework Agreement for Energy Cooperation, a vision to develop the SAARC energy ring and market for electricity, has been agreed upon. However, currently only a limited bilateral power transmission infrastructure exists: India is the only country that has cross-border interconnections with Bangladesh, Bhutan and Nepal. The South Asia Regional Initiative for Energy Integration has been supporting studies on harmonizing regulatory framework, standards and codes for transmission lines and market development.

58. In East and North-East Asia, energy institutes and power utility companies have been conducting a number of pre-feasibility studies regarding the creation of the Asia Super Grid, a multinational power grid interconnection. Yet, progress on this ambitious regional integration project and the Gobitec initiative to export renewable energy from Mongolia to the rest of the subregion has so far remained slow. The development of regional markets is challenged by massive investment requirements and the need for coordinated planning and harmonized policy development.

59. In North and Central Asia, energy sharing and transport networks among countries have been historically well-established but over the past few years the region has experienced a sharp decline in intraregional electricity trade. The Central Asia Regional Economic Cooperation Programme is the major subregional platform for economic cooperation and integration. One of the most promising projects in the subregion, the Central Asia South Asia Electricity Transmission and Trade Project (CASA-1000), aims to transfer electricity from Kyrgyzstan and Tajikistan, both of which have abundant hydropower resources and surplus electricity production during the summer, to Afghanistan and Pakistan, both of which suffer chronic shortages.

60. Policies to balance energy security and energy mix will have significant impacts on investments in infrastructure. These policies are of prime importance to political decision-makers, who face additional challenges in defining a comprehensive model. Decision-makers in some countries may be concerned that national energy security would be compromised through regional energy trade. In this context, the progress of subregional initiatives to promote multilateral power trade has been generally slow because of challenges in developing consensus in defining a comprehensive model of integration.

B. Challenges

61. Despite the collaborative efforts made during the past two decades, the region still faces significant challenges in realizing its full energy connectivity potential. Political challenges are a major impediment to accelerating progress, including a lack of trust and political will; difficulties on how to balance energy security and energy dependency; conflicting national interests among member States; and a lack of a regional multilateral institutional mechanism to facilitate cooperation among countries.

62. Cross-border power markets are not sufficiently well developed. Many national impediments to the promotion of power trade remain, including legislative restrictions on electricity trading across national boundaries. Technical and legal challenges that still need to be addressed include, among others, different technical standards for transmission grids; differences in legal and regulatory frameworks; a lack of independent dispute resolution mechanisms; the need to harmonize rules and regulations among member States; the absence of non-discriminatory open access in transmission infrastructure for multinational connectivity; and limited institutional and human capacity to address the challenges.

63. The challenges are compounded by and result in a lack of investment and financial support for cross-border electricity projects and the need to attract foreign direct investment and financing from international banks to boost the development of the power sector. The lack of financing is particularly problematic given the capital-intensive nature of cross border interconnection infrastructures.

64. To maximize investment and co-benefits, it is important to also consider the possibility of developing infrastructure that supports multipurpose use such as providing electric power and ICT cables for the Internet and communications through the transmission system. Including such solutions through regional discussions and policy planning and coordination will result in more efficient and higher quality of infrastructure. This will add a further dimension in building resiliency through co-deployment of infrastructure.

C. Way forward

65. To address common challenges among the various subregions, there is a need to develop a common regional framework based on the experiences of the region that would facilitate the development of bilateral connections as well as multilateral cross-border electricity trade and connectivity. Developing such a regional framework will require studies to identify and propose effective measures that can be agreed on to address the challenges identified above.

66. The regional road map for implementing the 2030 Agenda for Sustainable Development in Asia and the Pacific could include medium- and long-term development strategies and mechanisms which could help to more rapidly adapt energy systems to overcome modern and emerging challenges by streamlining contracts, increasing the availability of financing, reducing risk and accelerating the development of norms and mutual trust among member States. An important initial step would be to agree on an inclusive process to be followed to reach a regional consensus on a framework.

VI. Towards integrated and seamless regional connectivity for sustainable development

67. The sectoral reports on progress, challenges and ways forward for regional connectivity presented above reveal strong interlinkages between trade, transport, ICT and energy connectivity. Reaping the sustainable development benefits of regional connectivity requires an integrated approach to effectively eliminate bottlenecks to the flow of goods, services and people across the region.

68. First, hard and soft infrastructure bottlenecks need to be addressed in parallel. As already noted, reducing intraregional trade costs requires not only the removal of soft trade policy and procedural barriers, but coordinated investment in cross-border transport, ICT and energy infrastructure. Preliminary studies conducted by the secretariat on enhancing regional connectivity in the context of the Belt and Road Initiative reveal that the investments and policy reforms to be prioritized vary depending on the group of countries or the corridor considered. However, they consistently show that the benefits of soft infrastructure improvements are directly related to improvements in hard infrastructure. For example, trade gains from implementing trade facilitation and paperless trade measures are much higher when decent roads and physical border facilities are also available and vice versa.

69. Second, co-development of physical networks of transport, energy and ICT should be carefully considered. Such an approach could reduce costs and accelerate the planning and implementation of infrastructure projects, which if pursued individually would likely involve more time and cost overall for construction, negotiations, acquisition of rights of way and other administrative procedures and issues, including impact on road safety. Co-deployment may also help achieve economies of scale and enhance the financial attractiveness of a project. However, to be successful, cross-sectoral and cross-border infrastructure development initiatives require significant improvements in inter-agency cooperation and collaboration between the public and private sectors at the local, provincial, national and regional levels, for planning, construction and maintenance of the physical networks.

70. In this regard, some countries have already begun to co-deploy optical-fibre cables along transport infrastructure networks and there are proposals to embed this into the existing regional agreements on the Asian Highway network and the Trans-Asian Railway network. In the deliberations at its 5th meeting, the Working Group on the Trans-Asian Railway Network recognized that the deployment of optical-fibre cables along transport infrastructure networks had the potential to strengthen ICT connectivity in the region. However, the Working Group took the view that actions in that regard necessitated the involvement of a range of stakeholders in both the public and private sectors, and that more extensive consultations were required at the national level prior to such amendment being considered by the Working Group. The Working Group also voiced the opinion that, given the importance of ICT deployment in the region and considering the technical and legal complexities attached to such co-deployment, related matters could be approached in a more comprehensive manner through a dedicated intergovernmental agreement with full arrangements of rights and obligations. The Working Group encouraged the secretariat to undertake a study on such

an agreement in close collaboration with all public and private stakeholders in all member States.¹²

71. For its part, the Working Group on the Asian Highway requested the secretariat to conduct a further study on co-deployment and, drawing on that study, the Working Group would consider the matter again within one year. It also requested that the secretariat organize a joint meeting of the Working Group on the Asian Highway, the Working Group on the Trans-Asian Railway Network and the Asia-Pacific Information Superhighway Steering Group.¹³

72. Third, efforts to improve regional connectivity should be based on common standards and principles to ensure that bilateral or subregional connectivity solutions can readily integrate with each other at the regional level. This is a main purpose of many of the existing agreements negotiated by ESCAP, including the Framework Agreement on Facilitation of Cross-border Paperless Trade in Asia and the Pacific, which recommends using international standards when available. Common methodologies may also be developed to conduct assessments of connectivity projects according to the economic, social and environmental dimensions of sustainable development.

73. Going forward, achieving integrated and seamless connectivity will necessarily involve addressing the plethora of overlapping and often mutually inconsistent bilateral and plurilateral regulatory arrangements in such areas as trade preferences, investment protection and transport norms, among others. As noted in the recent ESCAP report on enhancing regional economic cooperation and integration in Asia and the Pacific, ESCAP can play an overarching role in helping the region capitalize on these opportunities by leveraging its inclusive intergovernmental platform, its normative work and its multisectoral technical expertise in support of integrated and seamless regional connectivity.¹⁴ ESCAP already has existing subprogrammes and intergovernmental committees on transport, ICT, energy and trade. It is also working with subregional cooperation organizations, including ASEAN, the Economic Cooperation Organization, the Pacific Islands Forum and SAARC, and is providing technical cooperation for the Belt and Road Initiative.

74. ESCAP will continue to bring together member States, subregional organizations and other institutions to forge regional arrangements, conduct research to better understand the costs and benefits of regional connectivity, and develop cross-sectoral synergies, taking into account global initiatives and frameworks for actions related to sustainable development.

¹² E/ESCAP/TARN/WG(5)/6, paras. 7 and 8.

¹³ E/ESCAP/AHWG(7)/5, para. 8.

¹⁴ *Enhancing Regional Economic Cooperation and Integration in Asia and the Pacific* (ST/ESCAP/2781). Available from www.unescap.org/sites/default/files/Asia-Pacific%20RECI%20Report.pdf.