Contribution of ESCAP to the Secretary-General's 2012 AMR Report

SCIENCE, TECHNOLOGY AND INNOVATION (STI) CAPACITY BUILDING FOR PROMOTING SUSTAINABLE DEVELOPMENT AND ACHIEVING THE MILLENNIUM DEVELOPMENT GOALS

Innovation is a process wherein individuals and groups apply their creative, adaptive capacities and their individual, social, organizational and institutional knowledge for the generation and application of new scientific and technical knowledge or combine existing knowledge to address a specific issue or develop a specific product or service. Since science, technology and innovation (STI) are complementary and interdependent concepts, they must be considered in concert. Though STI holds great potential for contributing to sustainable development, it is important to examine closely the ways in which social institutions, processes, and values shape the priorities of research and development (R&D), and the conditions under which its potential benefits can be reaped[1].A country's development must include a foundation of universal primary education and access to quality secondary education. But meeting the Millennium Development Goals (MDGs), competing in a global economy, and providing high-wage jobs will entail STI capacity building as well. In turn, capacity building requires targeting investments in education and training, improving R&D, supporting industrial innovation, promoting lifelong learning, and fostering policies for an enabling environment to create and apply knowledge, and private sector development.[2]

STI is viewed as a key component of sustainable growth and development of a country. The capacity of countries to address its developmental challenges, become part of a global technology value chain, and compete in the global market depends more and more on their ability to innovate and apply the relevant technology to industries and productive sectors. Countries' investments in STI and the integration of STI into education, economic and industrial policies can increase their productivity, enhance global market competitiveness and create employment. There is a common view that STI policies and programmes are largely market-driven and dominated by R&D agendas that often do not address the hardships faced by billions of impoverished people around the world. This necessitates the need for evolving appropriate STI policies which could effectively address the critical issues related to sustainable and inclusive development.

Even with the rapid pace of technological developments, society is facing numerous problems in critical areas of human development. These areas have been the focus of the millennium development goals (MDGs) and the sustainable development agenda outlined by Rio+20. STI can directly contribute to sustainable development through its enormous positive potential in contributing to agriculture, health, education, energy and many other important sectors, thereby boosting economic growth and human development in countries. STI also holds great potential to be the key driving forces for countries to achieve the MDGs. For instance, by

[1] Harnessing science, technology and innovation for sustainable development – A report from the ICSU-ISTS-TWAS Consortium ad hoc Advisory Group (Source: http://sustsci.harvard.edu/ists/docs/consortium_ahag_rpt_0503.pdf)

[2]Science, Technology and Innovation Capacity Building for Sustainable Growth and Poverty Reduction, World Bank, 2008.

boosting productivity in the agriculture sector, it is possible to achieve food security and eradicate hunger (MDG1). Therefore, STI could be used as an enabling mechanism to address these problems through providing technological solutions, thus helping countries towards achieving the desired goals. STI policies are vital for strengthening R&D, innovation and technology capabilities, developing state-of-the-art technological solutions, and for creating a critical knowledge base that is essential for acquiring, adapting, deploying and disseminating these technologies to support sustainable development and poverty reduction in developing countries, including least developed countries. There are various mechanisms through which national STI policies could address critical developmental issues and challenges. These are briefly outlined in the following sections:

1. Problem-driven research for development and innovation: . An effective way of integration of STI with sustainable development goals is to follow a "research for development approach" in which the research must be geared towards providing practical options, solutions, and operational means of attaining sustainability goals[3]. In this regard, national STI policies could promote problem-driven R&D and related programmes of activities, including capacity building activities.. This way, R&D would be linked to to actions that facilitate sustainable development.[4] Specific problems identified under different MDG areas could be addressed by appropriate STI interventions through encouraging the development of relevant technological solutions. In this regard, an STI policy strategy could aim at (a) encouraging R&D institutes to recognize and find solutions to specific problems in different areas of MDGs and sustainable development and, (b) mobilizing and allocating resources for related R&D and implementing research results to deliver benefits to the people and communities at large. For instance, the Open Source Drug Discovery (OSDD) initiative of the Council of Scientific and Industrial Research, Government of India encourages a creative and open innovation-based collaborative approach among various stakeholders in the country to work together towards achieving affordable health care. The OSDD initiative has the potential to contribute to multiple MDGs, especially MDG-4 - reducing child mortality rates, MDG-5 - improving maternal health, and MDG-6 - combating HIV/AIDS, malaria, and other diseases. This is a pertinent example of how an innovative STI approach could contribute towards achieving the MDGs at the national level.

2. Participatory processes for defining research priorities: STI could play a vital role in prioritizing R&D areas and topics that are related to MDGs and sustainable development. Instead of the conventional top-down approach, a bottom-up strategy could be adopted whereby national development goals and market needs could define R&D priorities, promote development of technological solutions and deploy and diffuse appropriate technologies. Identification and prioritizing of research projects could be carried out most effectively through participatory processes involving relevant stakeholders, including government agencies, research institutions and centres of excellence, project implementing agencies, venture capital and other financial institutions, the private sector, NGOs and civil society groups, development partners, end-users and consumers.

[3] Source: **http://sustsci.harvard.edu/ists/docs/consortium_ahag_rpt_0503.pdf**

[4] ICSU, ISTS, and TWAS (2005). Harnessing science, technology and innovation for sustainable development, the International Council for Science, Paris, France

3. Networks, partnerships, collaborations and interlinkages: Most projects aiming to achieve inclusive and sustainable development involve multiple stakeholders and hence it is critical to build and strengthen modalities for institutional collaboration and partnerships to effectively deliver the desired services to end-users. Linkages between stakeholders would help to: (a) foster learning in various critical aspects of technology implementation through inter-organizational and inter-firm flows of knowledge and skills; and (b) integrate technologies across all sectors of the economy. Hence there is a need to establish linkages among stakeholders in the form of networks, partnerships and collaborations through appropriate STI policy interventions.

4. STI infrastructure and capacity-building: A prerequisite to achieve STI-based sustainable development is to have critical STI infrastructure and institutional capacity for diffusing the benefits of technology to people most in need in developing countries. It is necessary for governments to build capacity of stakeholders to facilitate the commercialization of R&D outputs, technology transfer, technology deployment and adaptation. The success of technology innovation also depends on the ability of key actors of innovation systems to forge effective linkages and partnerships in transforming an idea into a commercial product or service. Therefore, the absence of sufficient capacities of relevant stakeholders could undermine national efforts to promote greater use of technologies in support of MDGs and sustainable development. For instance, in the case of the Republic of Korea, innovative STI policy approaches which addressed the country's weaknesses and leveraged its strengths made it possible for education and industrialization to be well coordinated and play a mutually supportive role in sustaining and accelerating national development. Education was tailored towards technological learning to achieve industrialization, while industrialization enhanced the rate of return on investment in education, promoting further demand for education.

5. Intellectual property regime: An efficient national intellectual property environment is necessary, not only for the protection and promotion of traditional and indigenously developed technologies, but also to promote the transfer and acquisition of foreign technologies. In addition, increased use of flexibilities at national levels provided by the global IPR regime (such as the WTO Agreement on Trade-Related Aspects of Intellectual Rights Protection or TRIPS) could provide an impetus to the promotion of national level technology development in respective countries. Favourable national IPR policies are known to contribute to MDGs related to health, environmental sustainability, food security and global partnership for development. For example, STI policies should aim at providing a favourable IPR environment to make needed medicines available and accessible in developing countries − especially anti-retroviral drugs to combat HIV/AIDS − at lower prices, enhancing international funding and using TRIPS flexibilities to leverage access to medicines. These developments have important repercussions for the achievement of MDG-8 and, more broadly, they also support MDG-6, which aims to achieve universal access to treatment of HIV/AIDS.[5]

6. Green economy through low-carbon enterprise development: The current challenges posed by the climate change provide opportunities for many developing and least developed countries to deploy STI for fostering low-carbon economic development thus contributing to environmental sustainability (MDG-7) and climate change mitigation (Rio+20 agenda). Their STI policies could promote green economy through technological capacity building in terms of

[5]http://www.wto.org/english/thewto_e/coher_e/mdg_e/medicine_e.htm

development, transfer, adaptation, deployment and use of low-carbon technologies by enterprises. Such policies are part and parcel of wider efforts to climate change mitigation and promote sustainable development. For instance, the green growth strategy promoted by ESCAP is a holistic approach for promoting environmentally sustainable economic progress in countries in the Asia Pacific region. This approach demands that institutions, policies, processes, and values, including those geared towards the promotion of development and transfer of technologies, must work in tandem to ensure that the development efforts in countries in the region directly contribute to environmental sustainability.

7. Energy access: Energy access and affordability have been critical issues for the large populations living in rural and inaccessible areas. The Rio+20 Outcome Document underscores energy as a priority area of sustainable development and proposes to build on the "Sustainable Energy for All" initiative launched by the Secretary-General of the United Nations. In view of this, STI could be viewed as an instrument to mitigate the obstacles and thereby increasing the accessibility and affordability of energy from sustainable energy options, including renewable sources for poor people living in rural and remote areas. Greater access to sustainable energy for domestic use can have a significant impact on livelihoods in rural areas of developing countries and least developed countries. Cleaner use of traditional fuels and renewable energy can significantly improve health, education, empowerment of women, etc.[6] Sustainable energy options - when linked to income generating activities - have demonstrated great potential to address poverty reduction, job creation and sustainable development thus contributing to various MDGs.

8. Grassroots technological innovation: Every community, region or country possesses indigenous knowledge and innovations developed and acquired through traditional practices over long periods of time. It is a common view that these grassroots technological innovations and practices are in close harmony with inclusive and sustainable development and, hence, could be actively promoted through appropriate STI policy measures. In this context, the mainstreaming of indigenous knowledge and grassroots technological innovation into modern STI systems would contribute towards achieving the MDGs and sustainable development. These efforts would not only validate and diffuse grassroots innovations through the application of modern science and technology, but could also provide equitable and affordable solutions to target beneficiaries. The National Innovation Foundation-India (NIF) has taken a lead role in strengthening grassroots technological innovations and traditional knowledge in the country. This policy initiative is meant to help India become a creative and knowledge-based society by expanding the policy and institutional space for grassroots technological innovators.[7]

9. STI delivery models: There are many examples of STI-driven technological interventions implemented through different types of innovative models for the delivery of MDGs and benefits of sustainable development. They are: public-private-partnerships, social enterprises, independent green power producers, donor-driven models, market-driven models, and government subsidized or grants-driven models or a combination of two or more of these

[6]UNCTAD (2010). Renewable energy technologies for rural development, UNCTAD current studies on science, technology and innovation, No. 1, New York (USA) and Geneva (Switzerland)
[7] http://www.nif.org.in

models. In view of the need to achieve the MDGs and address sustainable development challenges, these innovative models bring together the resources and strengths of collaborating partners for mutual benefit. STI policies could contribute towards achieving the MDGs and sustainable development through mapping, replicating and scaling-up of successful product and service delivery models in relevant areas.

In Asia and the Pacific, ESCAP regional institute, the Asian and Pacific Centre for Transfer of Technology (APCTT), has promoted the development of policy frameworks and built institutional capacity for the development of STI policies and transfer of technology in the Asia-Pacific countries for 35 years. In particular, it has assisted member countries in strengthening their national innovation systems (NIS) for creating a technology innovation ecosystem, building technology transfer capacity of SMEs, developing institutional cooperation mechanisms for promoting renewable energy technologies, increasing R&D management capacity of research institutions in the area of new and emerging areas of technology such as nanotechnology and renewable energy technology, and enhancing technology intelligence through the provision of technology information services.