



REPORT ON THE IMPLEMENTATION OF ARTICLE 66.2 OF THE TRIPS AGREEMENT

UNITED STATES

Addendum

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1 INTRODUCTION

1.1. The United States is committed to continually enhancing its activities relevant to Article 66.2 of the Agreement on Trade-Related Aspects of Intellectual Property (TRIPS Agreement), and reporting these activities, in keeping with the guidelines established in the TRIPS Council's Decision of 20 February 2003 (IP/C/28). Consistent with this decision, developed countries Members are to provide yearly reports of technology transfer to "least developed country" (LDCs) Members.

1.2. The intellectual property (IP), trade capacity, training, development assistance, financing, and infrastructure-related programmes described in this report are integral elements of the United States Government's efforts to help LDCs create the conditions essential to encourage the effective transfer of technology to LDC Members. No report can describe every activity of the US Government that directly or indirectly promotes and encourages technology transfer to LDCs, but this report attempts to describe the most significant activities and programmes.

1.3. The United States Government spends about US\$40¹ billion annually on research conducted by federally operated laboratories, as well as by federally funded research and development centres (FFRDCs). A significant portion of that research results in inventions or findings that contribute to the development of new technologies and processes. Commercialization of these outputs can yield economic and social benefits that increase returns on the taxpayer investment in federal research and development.

1.4. The myriad technology transfer-related programmes sponsored by US Government entities provide several insights to the US approach to technology transfer. First, the primary driver for technology transfer from the United States is the private sector, and many US programmes help LDCs create the necessary conditions for the private sector to have the confidence to invest in LDCs, export new technologies to LDCs, and develop new technologies in collaboration with LDCs. These conditions include, *inter alia*, rule of law, good governance, respect for intellectual property rights (IPRs), and government investments in education, health, and infrastructure. Second, there is no one best method of technology transfer. The United States involves many parts of its Government in the effort to transfer technology, transferring some technology directly with publications, workshops and technical assistance, and inviting partnerships with the private sector to further disseminate and develop technology. Third, along with programmes directly supported by the US Government, the US tax system, which allows taxpayers to make tax-exempt donations to non-profit organizations, contributes towards technology transfer in the form of foregone taxes. For example, non-profit organizations, such as the Gates Foundation and US universities, play an important role in facilitating technology transfer to LDCs. Finally, a major source of technology transfer from the United States to LDCs is our institutions of higher education where students from LDCs learn state-of-the-art skills and absorb an unders tanding of the important role that rule of law, good governance, IPR and limited government intervention in the economy play in creating the conditions necessary for entrepreneurship, innovation and the utilization of new technologies to address the needs of their home countries.

1.5. The United States continues to believe that the effective functioning of Article 66.2 of the TRIPS Agreement requires a robust dialogue between developed and LDC Members in order to target incentives in a way that is most responsive to the self-identified technology transfer interests and needs of LDC Members. The United States appreciates the efforts of the TRIPS Council Secretariat and Member states to organize discussions among the Member states regarding Article 66.2 implementation.

2 GENERAL TECHNOLOGY TRANSFER PROGRAMMES

2.1. Technology transfer can be most effective when the technology is requested by an individual or company that will be using the technology. The Federal Laboratory Consortium for Technology Transfer (FLC) plays a key role in providing information about technologies that are available for licensing (see <http://www.federallabs.org/flc/available-technologies/>). FLC is a nationwide network of federal laboratories that provides the forum to develop strategies and opportunities for linking laboratory mission technologies and expertise with the marketplace. The FLC was organized in

¹ See table 10: <http://www.nsf.gov/statistics/nsf13326/pdf/tab10.pdf>

1974 and formally chartered by the Federal Technology Transfer Act of 1986 to promote and strengthen technology transfer nationwide. Today, approximately 300 federal laboratories and centres and their parent departments and agencies are FLC members. The FLC promotes technical cooperation between the federal laboratories in the United States and large and small businesses, academia, state and local governments, and federal agencies. Furthermore, the FLC collaborates with local, state, regional and national organizations that promote technical cooperation, and works to improve the effectiveness of individual and organizational efforts in technology transfer through training, recognition, awards and evaluation. Moreover, the FLC encourages technology transfer and, through its member laboratories, seeks partners not only in the United States, but all around the world.

2.2. In October of 2011, the President issued a memorandum to all US federal agencies that conduct research and development, directing them to take measures to improve their technology transfer programmes leading to commercialization.² In response to this directive, each agency developed specific plans and goals that will be implemented and tracked from 2013–2017. These initiatives are intended to streamline technology transfer and accelerate the pace of technology transfer. In addition to direct action by agencies, new interagency metrics were developed to better describe and demonstrate performance in this area. A copy of each agency plan, interagency summaries, and the new metrics for technology transfer are available at: <http://www.nist.gov/tpo/publications/agency-responses-presidential-memo.cfm>.

3 INCENTIVES RELATED TO THE ENVIRONMENT

3.1 US role in forestry resource management

3.1. The US Forest Service (USFS) and the International Union of Forest Research Organizations (IUFRO) signed a partnership agreement on 8 May 2009 with the objective to enhance the contribution of forest science to international forest-related policy processes and implementation of sustainable forest resource management, particularly in economically disadvantaged countries. Two significant objectives of the agreement are related to technology transfer. The first is to strengthen national forest research systems in Africa, Asia and Latin America, particularly through capacity development, scientist assistance and institution-building. The second is to support IUFRO's global initiatives on mobilizing and disseminating forest-related information through modern Internet-based information and communication technologies.

3.1.1 Support to the forest science community in developing countries

3.2. The IUFRO has a long history in providing support to the forest science community in developing countries in Africa, Asia and Latin America. Over the past 25 years, IUFRO, with funding from the international donor community, has implemented various capacity-building activities through its Special Programme for Developing Countries (IUFRO-SPDC). These activities are intended to facilitate implementation of sound forest management policies and practices on the ground through the generation and dissemination of quality research results on forests and trees. Over the past seven years, IUFRO-SPDC's capacity-building activities have concentrated on assisting forest research institutions in partner developing countries to effectively contribute to shaping national and local forest policies and sustainable forest management systems.

3.3. The activities to be financed from the USFS allocation in 2012/2013 mainly focus on Africa, as IUFRO organized its first IUFRO-FORNESSA (Forestry Research Network of Sub-Saharan Africa) Regional Congress in Africa in 2012. To this end, an expanded scientist assistance programme was implemented in order to support around 80 forest researchers from African countries (i.e. national forest research organizations and forest universities) to participate in the Congress. The Congress brought together a total of 300 forest scientists from Africa and overseas to discuss pressing issues related to the conservation and management of African forests and trees such as forests and climate change, forest biodiversity conservation, and energy and food security. In conjunction with the Congress, the International Tropical Timber Organization (ITTO) and the African Forest Forum (AFF) held a "Forest Policy Day" aiming at bringing together forest researchers and policy-makers, thus further contributing to enhancing science-policy interactions in Africa.

² <http://www.whitehouse.gov/the-press-office/2011/10/28/presidential-memorandum-accelerating-technology-transfer-and-commerciali>.

3.4. With the acquisition of two major research networking and dissemination projects, one in Africa funded by the International Tropical Timber Organization (ITTO) and another one in Latin America financed by the European Commission, IUFRO-SPDC is expanding its support to regional partner networks. Although the main funding for these projects is provided by ITTO and the European Commission, IUFRO requires the provision of its own resources at a level of 30 per cent of total project costs, which will be covered by the USFS allocation.

3.5. The ITTO-REDDDES Project, "Strengthening the Capacity of ITTO Producer Countries in Generating and Disseminating Scientific Information on Reducing Deforestation and Forest Degradation and Enhancing Environmental Services from Forests in Africa", aims to generate scientific information on specific pilot areas in Cameroon, Ghana, Liberia and Nigeria, and disseminate this information to policymakers and forest practitioners at the national and regional level through science-policy interactions in close cooperation with the African Forest Forum (AFF). Project activities over a period of two years (2012-2013) include broad assessments of the pilot sites, stakeholder meetings, and dissemination of results through policy briefs and other information products.

3.6. The European Commission -EcoAdapt Project, "Ecosystem-Based Strategies and Innovations in Water Governance – Networks for Adaptation to Climate Change in Latin American Landscapes," is an undertaking (2012-2014) on capacity building for interdisciplinary action research on adaptation of forests to climate change with a focus on wise utilization of water resources. Partners in the project include Centro Agronómico Tropical de Investigación y Enseñanza (CATIE), Centre de Coopération Internationale en Recherche Agronomique pour le Développement CIRAD, Stockholm Environment Institute – Oxford, and 16 local organizations in Latin America (mainly Model Forests, universities, etc.). IUFRO contributes to workshops with scientists and local stakeholders, learning events and the provision of scientific information.

3.1.2 Supporting information services and knowledge dissemination

3.7. The United States also supports the provision of information services to scientists and policymakers with a special focus on developing countries through the Global Forest Information Service (GFIS). GFIS provides a framework for sharing forest-related data and information through a single gateway at <http://www.gfis.net>. It promotes the dissemination and sharing of forest information and knowledge among the global forestry community by developing a common information exchange platform, building capacity and enhancing partnerships among forestry information providers and users. The information resources accessible through GFIS are freely available, and provide direct access to the original information.

3.8. Cognizant of the opportunities gained in scientific information dissemination and exchange, FORNESSA, together with its strategic partner IUFRO, found it necessary to initiate and support efforts towards establishing an online FORNESSA Information Service (FORNIS – <http://www.fornis.net>) as a gateway for African scientists to showcase their contributions towards the achievement of the global objectives on forests. The information service supports information and knowledge-sharing and facilitates an efficient and effective flow of scientific information amongst researchers, research institutions, policymakers, and forest industry and forest communities. Based on the promising results of the first phase of FORNIS, the activities in 2011, 2012 and 2013 contributed to the further development of FORNIS, including partnership and website development.

3.9. In a world where information is rapidly produced, shared, and updated, it is essential that students are well equipped to access the latest resources and actively participate in this exchange. While many forestry professionals rely on the GFIS Internet gateway to access key resources, GFIS aims to expand its education index to cater more to students than ever before. The US Forest Service allocation will contribute to the efforts of IUFRO towards improving the quality, relevance, and, accessibility of available forestry education information in collaboration with the International Partnership for Forestry Education (IPFE).

3.10. The IUFRO Strategy 2010-2014 emphasizes the need to increase the visibility of science-based research findings by enhancing communication within IUFRO, with other scientists and students, as well as with stakeholders and the general public. In order to respond to this need articulated in the IUFRO Strategy, a set of web-based communication and information tools and

services addressing key issues and emerging themes will be developed on basis of the unique expertise of GFIS.

3.2 US role in the establishment of the Clean Technology Fund

3.11. The Clean Technology Fund (CTF) is a multilateral, multi-billion dollar effort to reduce the growth of greenhouse gas emissions in developing countries by helping to finance the additional costs of deploying commercially-available cleaner technologies over conventional alternatives. The CTF provides financial incentives for cleaner projects that leverage development bank financing and attract new investor capital into low carbon sectors. To receive funding, developing countries must develop national investment plans that stimulate low carbon growth and the scalable uptake of clean technologies. The United States is also a contributor to the Strategic Climate Fund (SCF), its Forest Investment Programme, the Pilot Programme for Climate Resilience (PPCR), and the Programme for Scaling-Up Renewable Energy in Low Income Countries (SREP). The SREP focuses on deploying renewable energy to increase energy access in Ethiopia, Honduras, Kenya, Liberia, Maldives, Mali, Nepal and Tanzania. The PPCR is assisting 18 countries, including small island States and other countries vulnerable to changing climatic conditions.

3.3 Copenhagen Accord climate change-related technology transfer

3.12. During the December 2009 Copenhagen Fifteenth Conference of the Parties of the United Nations Framework Convention on Climate Change (UNFCCC), the United States made a major commitment to promote climate change-related technology transfer. (For an exhaustive analysis of the support the United States is providing for climate change mitigation and adaptation in developing countries, see the forthcoming "US 2014 Climate Action Report: The Sixth National Communication of the United States of America under the United Nations Framework Convention on Climate Change," particularly Chapter 7. Although this assistance is available to "developing countries", defined as non-Annex I Parties to the UNFCCC, the "Least Developed Countries", as a subset of non-Annex I Parties, receive much of this support.

3.13. The Copenhagen Accord contains a commitment by developed countries to collectively provide resources approaching \$30 billion in the period 2010-2012 to support developing countries in their efforts to adapt to and mitigate climate change. In accordance with the fast-start commitment made in Copenhagen, the United States has provided \$7.5 billion during the three-year fast-start finance period. Of this amount, \$2.3 billion was provided in FY 2012. The three-year fast-start finance total consists of more than \$4.7 billion of Congressionally appropriated assistance and more than \$2.7 billion from US development finance and export credit agencies.

3.4 Greenhouse Gas Inventory Improvement Project

3.14. Building on a previous successful partnership with seven nations of Central America, the US Agency for International Development (USAID) and the Environmental Protection Agency (EPA) are continuing support to build capacity for compiling national greenhouse gas (GHG) inventories to countries in Southeast Asia and Africa. The project focuses on developing long-term national inventory management systems, improving the methods and data used in the agriculture, forestry and other land use (AFOLU) sectors, and training regional experts. Currently, direct assistance is being provided in collaboration with the UNFCCC Secretariat to a number of countries and regional programmes. The project is also beginning new work in Colombia and will be holding a number of economic modelling workshops in Latin America. In addition, the project is further refining the Agriculture and Land Use (ALU) software, which helps governments easily and accurately complete their national GHG inventories for the AFOLU sectors.

3.5 Private Financing Advisory Network

3.15. Initiated by the Climate Technology Initiative (CTI) and supported by USAID, the Private Financing Advisory Network (CTI PFAN) is a multilateral public-private partnership that nurtures promising, innovative clean and renewable energy projects by bridging the gap between investors and clean energy entrepreneurs and project developers. CTI PFAN brings together private sector companies with experience in financing climate-friendly projects and technologies to screen business plans and select the most economically viable and environmentally beneficial projects. For those entrepreneurs and businesses selected, CTI PFAN provides guidance on feasibility, project structure, investment and financing, business plan preparation, and introductions to

investors. CTI PFAN works through regional networks in Latin America, Asia, Eastern Europe, and Africa and through dedicated in-country networks in numerous countries.

3.6 Climate Change Technologies Investment Index

3.16. USAID is partnering with the World Bank to develop a new investment index for climate-friendly technologies, the Climate Investment Readiness Index (CIRI). CIRI's goal is to provide useful information to the public and private sectors on the various national-level barriers to low-carbon technology deployment and investment and on country performance in terms of the policies, institutions, laws, and regulations (including enforcement) that contribute to an enabling environment for private investment. The CIRI will build on existing measures, such as the World Bank's "Doing Business Index", while identifying sector-specific barriers and incentives. The CIRI will also guide donors and developing country governments towards concrete measures for improving the enabling environment for private sector investments in clean technologies. The CIRI has been initially piloted in South Asia and will be extended to other regions in future years.

3.7 Global Alliance for Clean Cookstoves

3.17. In September 2010, US Secretary of State Clinton announced the Global Alliance for Clean Cookstoves, a public-private partnership led by the United Nations Foundation to save lives, improve livelihoods, empower women, and combat climate change by creating a thriving global market for clean and efficient household cooking solutions. The Alliance's 100-by-20 goal calls for 100 million homes to adopt clean and efficient stoves and fuels by 2020. Today the Alliance has over 700 partners. The World Health Organization (WHO) estimates that roughly four million annual deaths are associated with exposure to cookstove smoke each year, and that pollution from these cooking stoves is the fourth worst health risk factor in the world.

3.18. The United States Government has committed up to \$114 million to the Alliance over five years. Participating US agencies include the State Department, the Environmental Protection Agency, the Department of Energy, the Department of Health and Human Services (National Institutes of Health (NIH), Centres for Disease Control and Prevention), the Overseas Private Investment Corporation, the Peace Corps, and USAID. The US Government has made a broad set of commitments to help the Alliance, which include leading diplomatic activities to advance the Alliance and the cookstoves sector; mobilizing financial resources towards research, financing, and on-the-ground activities; providing top-level US experts; and leveraging US investments with other donors, with an eye towards helping the Alliance achieve its 100-by-20 target. The US Department of Agriculture and the National Oceanic and Atmospheric Administration are also supporting this effort with technical expertise. This is a significant example of technology transfer to address one of the world's pressing health, economic, and environmental problems.

4 INCENTIVES RELATED TO HEALTH TECHNOLOGIES: US NATIONAL INSTITUTES OF HEALTH TECHNOLOGY TRANSFER AND CAPACITY BUILDING ACTIVITIES

4.1. Biomedical and behavioural research funding activities of the NIH, an agency within the US Department of Health and Human Services, have contributed to technology transfer and research capacity-strengthening in many LDCs. For new technologies developed by scientists at the NIH and the Food and Drug Administration (FDA), the NIH licenses biological materials and associated patent rights, when applicable, to institutions that have the capability of bringing products to the market in or for LDCs. In addition, scientists often provide know-how to those receiving biological materials such as vaccine seed strains with specialized growth requirements. Most of these technologies are associated with diagnostic tests, treatment, vaccination, and prevention for pathogens such as dengue, rotavirus, Haemophilus Influenzae type b (Hib), human papillomavirus (HPV), typhoid bacteria, meningococcus, varicella-zoster and HIV. This technology transfer permits the building of manufacturing capacity and associated skillsets in developing countries that also serve the needs of LDCs by providing access to vaccines that meet their public health needs. These activities, which have been reported in previous versions of this report, are ongoing and continue to be a major part of the activities of the NIH.

4.1 HIV/AIDS Clinical Trials Networks and Clinical Trial Units (CTUS) and Clinical Research Sites (CRSS)

4.2. The NIH-funded Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome (HIV/AIDS) Clinical Trials Networks and their Clinical Trial Units/Clinical Research Sites (CTU/CRS) will pursue clinical trials to address the highest priorities in HIV/AIDS research, including: (a) vaccine research and development; (b) translational research/drug development; (c) optimization of clinical management, including co-morbidities such as tuberculosis (TB), hepatitis and cancer; (d) microbicides; (e) prevention of mother-to-child transmission of HIV; and (f) prevention of HIV infection. The networks' leadership groups and CTU/CRS are being re-competed by NIH and will be broader in scope with a new focus on research toward a cure for AIDS, TB and hepatitis. Under these programmes, collaborative basic and clinical research is carried out between researchers worldwide, including in Africa, Asia, Europe, South America, and the United States. These research and training programmes support the expansion of basic and clinical research skillsets in developing countries, including LDCs, the strengthening of infrastructures to support the development of new drugs and vaccines, and the exchange of scientific knowledge worldwide, including better understanding in more developed countries of needs in developing countries.

4.2 Multilateral Initiative on Malaria (MIM)

4.3. NIH, together with the Special Programme for Training and Research in Tropical Diseases (TDR) located at the WHO, co-founded the MIM in 1997 and has supported its activities in LDCs and elsewhere since then. MIM's mission is to increase and enhance worldwide research on malaria by facilitating multinational research cooperation. NIH has also established malaria research facilities in Mali and Uganda and has trained local scientists and physicians to conduct malaria research from within endemic countries, including those in several LDCs in Africa. NIH also has established an international network of centres of excellence for research focused on malaria endemic countries.

4.3 NIH infectious disease research focus in Africa

4.4. NIH supports and has funded research activities in 36 African countries, including the following WTO LDC Member countries in Africa: Benin, Burkina Faso, Cameroon, the Democratic Republic of the Congo, The Gambia, Kenya, Malawi, Mali, Rwanda, Senegal, South Africa, Tanzania, Uganda, Zambia, and Zimbabwe. These research activities contribute directly to the strengthening of research capacity in these countries, thereby enhancing prospects for further transfer of technology in the future.

4.5. HIV/AIDS, tuberculosis, and malaria cause millions of deaths each year. These three diseases are a major cause of poverty through their debilitating impact on the active workforce, and significantly affect economic development and stability of the region. NIH's National Institute of Allergy and Infectious Diseases (NIAID) supports HIV/AIDS research in many African countries, with most projects conducted in areas with the highest incidence of infection and disease, namely Botswana, Kenya, Malawi, Rwanda, South Africa, Zambia, and Zimbabwe. The recent emergence of multidrug-resistant tuberculosis (MDR TB) and extensively drug-resistant tuberculosis (XDR TB), especially in the context of HIV/AIDS infection, is being addressed by NIAID-funded projects conducted in South Africa, Tanzania and Uganda. Malaria remains a major threat, and NIAID conducts clinical, epidemiological, drug, and vaccine and vector research in African LDC countries such as Burkina Faso, Cameroon, The Gambia, Malawi, Mali, Senegal, Tanzania, and Uganda.

4.6. Neglected diseases such as filariasis, schistosomiasis, sleeping sickness, and others are receiving renewed attention, with NIAID projects in countries such as Kenya, Malawi, Mali, and Uganda. NIAID supported a major polyvalent pneumococcal vaccine trial in The Gambia that was 77 per cent effective in preventing pneumococcal infections caused by the vaccine serotypes. NIAID recently supported a clinical trial in Madagascar (an African country with high contraction rates of syphilis but low HIV) that demonstrated equivalence of azithromycin and benzathine penicillin (the current standard) for treatment of early syphilis. Much NIH-supported research has helped not only with training in state-of-the-art research techniques, but also to improve the conduct of clinical trials in Africa.

4.4 NIH research training programmes for low and middle-income developing countries

4.7. NIH's Fogarty International Centre runs several research training programmes that include training for LDC biomedical researchers and research institutions and contribute to technology transfer and capacity building in LDCs. Among these are the AIDS International Training and Research Programme (AITRP), the Global Infectious Disease Research Training Programme (GID), and the International Clinical, Operational, and Health Services Research and Training Award for AIDS and Tuberculosis (ICOHRTA-AIDS/TB). The AITRP programme includes researchers from Bangladesh, Cambodia, Haiti, Lesotho, Malawi, Mozambique, Rwanda, Senegal, Tanzania, Uganda, Zambia, and Zimbabwe. The GID helps to train researchers from Bangladesh, Tanzania, Mali, Malawi, Uganda, Cameroon, Cambodia, Senegal, and Papua New Guinea, among others. The ICOHRTA-AIDS/TB programme trains researchers from Haiti, Uganda, and Zimbabwe and has provided funds for planning grants in Malawi, Tanzania, and Botswana, and elsewhere.

4.8. NIH's Fogarty International Centre, along with 11 NIH Institutes and Offices, also supports a "Global Research Initiative Programme for New Foreign Investigators (GRIP)" that promotes productive re-entry of NIH-trained foreign investigators into their home countries as part of a broader programme to enhance the scientific research infrastructure in developing countries, to stimulate research on a wide variety of high priority health-related issues in these countries, and to advance NIH efforts to address health issues of global import. This reverse "brain flight" initiative promotes capacity-building by providing contributions to salaries of NIH-trained foreign researchers returning home and support for research projects. The GRIP programme is divided into two components: Behavioural and Social Science; and Basic Science. The programme provides support for researchers from Malawi, Tanzania, Uganda and several other countries.

4.5 Technology licences

4.9. The NIH was the first contributor to the Medicines Patent Pool (MPP) in licensing US Government-owned patents related to the use of HIV anti-retroviral (ARV) protease inhibitor drugs. The MPP promises to enhance access to ARV treatment for people living with HIV/AIDS in developing countries and enable the development of new combinations of ARVs and adapted formulations for developing countries. The NIH-licensed patents resulted from research undertaken by the NIH and the University of Illinois at Chicago. The licence is seen as a first step for an expected ongoing collaboration as NIH's Office of Technology Transfer and the MPP consider additional potential license agreements to add other NIH-managed patents to the pool for technologies that may have potential as new HIV therapeutics.

4.10. In 2011, the NIH became a founding contributor and active participant in the World Intellectual Property Organization (WIPO) Research initiative, established to share innovation in the fight against neglected tropical diseases (NTDs), malaria, and tuberculosis by providing access to intellectual property for pharmaceutical compounds, technologies, know-how and data available for research and development for NTDs, malaria and tuberculosis. On behalf of the NIH and FDA, the NIH contributed intellectual property from its internal research programmes for over 70 technologies. These technologies are made available for licensing to help in the development of diagnostics, vaccines, and therapeutics to improve public health in the LDCs. The NIH technology transfer community has continued its activity in this programme, hosting meetings with WIPO Research representatives and possible collaborators and participating in a panel discussion at the International Biotechnology Industry Organization (BIO) meeting in June 2012.

4.11. In December 2012, the NIH developed a model licence term sheet for the transfer of technologies that can be developed to diagnose, treat or prevent NTDs, HIV, malaria, and tuberculosis by non-profit institutions, including non-governmental organizations and public-development partnerships (PDPs). The NIH worked with PDPs and NGOs to develop the terms and ensure they were reasonable. In 2013, the NIH used this term sheet in licence agreements with the Infectious Disease Research Institute (IDRI) and the Programme for Appropriate Technology in Health (PATH). Both IDRI and PATH have established successful histories of developing and bringing products to middle-and-low-income populations. The PATH licence transferred technologies related to in-vitro diagnostics for onchocerciasis, lymphatic filariasis, and loa loa infection. In the interest of global public health, the NIH broadened the scope of use for this term sheet by licensing influenza vaccine technology, an additional infectious agent, to IDRI. More licence agreements are currently being negotiated under this initiative.

4.12. The NIH continued to transfer human-bovine rotavirus technology to new institutions, licensing the technology to Chinese companies Sinovac, Beijing Minhai Biotechnology Co. and Beijing Xiweike Biotechnology Co., bringing the total of worldwide licensees by September 2013 to twelve.

4.13. The NIH continued to expand its Chinese licensees, adding Dalian Hissen BioPharm Co., Ltd. (Dalian), and granting an additional licence to Yisheng Biopharma Holdings (Yisheng). Dalian, a first-time NIH licensee, executed separate internal use agreements, one for a varicella-zoster virus strain and a second for a rotavirus subunit vaccine technology. Yisheng expanded its existing relationship with the NIH by executing a third agreement, this one for conjugate vaccine technology for *Haemophilus influenzae* type b (Hib).

4.14. Furthermore, the NIH licensed biological materials to the Company for Vaccine and Biological Product Development in Vietnam for production of a live-attenuated tetravalent dengue vaccine for Vietnam only. The same biological materials, as well as patent rights in Brazil, were also licensed to Fundacao Butantan for Brazil and South America. In 2013, the NIH completed a licence agreement with GlaxoSmithKline (GSK) for dengue vaccine technology to be sold worldwide as an inactivated vaccine. A second agreement with the Company for Vaccine and Biological Product Development in Vietnam transferred biological materials for the development of a HPV vaccine for Vietnam.

4.15. The NIH also completed four licences with Indian Immunologicals. One licence was for a cell line that Indian Immunologicals intends to use for influenza and rabies vaccine production. A second agreement was for biological materials to be used in development of an HPV serotype (18 vaccines for sale in India only). A third agreement transferred technology for improved bacterial expression of antibodies; this same technology was also licensed to Celltrion (Republic of Korea). Finally, a fourth agreement was extended to allow Indian Immunologicals to continue to use certain materials in their development of a vaccine.

4.16. The NIH has licensed biological materials to Shantha Biotechnics, Ltd. (India) for use in producing a *Haemophilus influenzae* type b (Hib) vaccine. In addition to India, Shantha anticipates selling the Hib vaccines in developing world countries worldwide, including Africa, initially mostly through public tenders or tenders to the United Nations Children's Fund (UNICEF) and WHO. Shantha also licensed technologies and associated biological materials for the manufacture and distribution of a HPV vaccine worldwide, including countries eligible for support from the Global Alliance for Vaccines and Immunization (GAVI) Alliance. In addition to the Shantha HPV licence, the NIH has non-exclusively licensed the same second-generation HPV vaccine technology to three companies for worldwide product distribution, including GAVI-eligible countries. These other companies are PaxVax, Sanofi Pasteur and GSK. The NIH will be able to continue to license this technology, which includes biological materials for vaccine manufacturing, to other interested parties.

4.17. In order to facilitate distribution of the HPV vaccine Gardasil® to underserved women in the developing world, the NIH reached an agreement with Merck (a licensee of the NIH's patent rights covering the vaccine) to incentivize the distribution of vaccine to these at-risk populations. The arrangement enables Merck to include Gardasil® broadly in its worldwide tiered-pricing strategy, including any donative or not-for-profit transfers to distribution networks, governments or directly to individuals in developing world nations. For this agreement, "developing world" nations are defined by the GAVI Alliance, which include many WTO LDC Members. In May 2013, Merck and GSK, which manufactures the HPV vaccine Cervarix®, announced that they had reached agreements with GAVI to supply their respective HPV vaccines at lower prices to developing countries.

4.18. Two entities licensed technologies related to the development of chicken pox/shingles vaccines. Wuhan Institute of Biological Products and Shantha Biotechnics, Ltd. executed or extended agreements with the NIH for access to varicella strains and associated cell lines for their internal product development efforts.

4.19. Three agreements were executed or extended related to biological materials for development of a typhoid vaccine. Bharat Biotech, Ltd. executed a new agreement for biological materials for their internal use in the typhoid vaccine development. Innovative Biotech, Ltd.

(Nigeria) and Novartis Vaccines Institute for Global Health both extended existing typhoid vaccine licence agreements for commercial development and internal use, respectively.

4.20. The NIH extended a licence for biological materials to Welson Pharmaceuticals (China) for the development of rheumatoid arthritis treatments for China.

5 INCENTIVES FOR US INVESTMENT IN AFRICA

5.1 Bilateral Investment Treaties

5.1. US Bilateral Investment Treaties (BITs) improve the climate for US investment in the economies of our partner countries by advancing important reforms and encouraging the adoption of policies that facilitate and support foreign investment; however, it is worth noting that technology transfers are primarily private sector decisions and should not be a pre-condition for investment. US BITs establish a framework of reciprocal protections that include non-discriminatory treatment, free transfer of investment-related funds, prompt, adequate, and effective compensation in the event of an expropriation, limitations on specified performance requirements, and transparency in governance; they also provide investors from each party the right to submit an investment dispute with the government of the other party to international arbitration. These treaties provide important incentives for US companies to engage in foreign direct investment (FDI), in joint ventures, and in other forms of investment in partner countries that can lead to the transfer of technology and know-how. As of 2012, the United States had signed six BITs in Sub-Saharan Africa, four of which were with WTO LDC Members, including the Democratic Republic of the Congo, Senegal, Rwanda and Mozambique. In August 2009, a BIT negotiation between the United States and Mauritius was launched. In June 2012, the US and the East African Community (EAC) issued a joint statement on their Trade and Investment Partnership, which included a statement that the governments have agreed to explore a regional investment treaty. As of September 2013, the United States has entered into exploratory talks regarding a BIT with Gabon and Ghana.

5.2 Trade and Investment Framework Agreements

5.2. US Trade and Investment Framework Agreements (TIFAs) help enhance trade and investment relations between the United States and key trade and investment partners. Over the last several years, the United States has launched 12 trade and investment agreements in sub-Saharan Africa – eight bilateral TIFAs with Angola, Ghana, Nigeria, Liberia, Mauritius, Mozambique, South Africa and Rwanda; four regional TIFAs with the Common Market for Eastern and Southern Africa (COMESA), EAC, and UEMOA (West African Economic and Monetary Union); and a Trade, Investment, and Development Cooperative Agreement (TIDCA) with the five countries of the Southern African Customs Union (SACU). The United States and the Economic Community of West African States (ECOWAS) are currently negotiating for a TIFA. Together, these 13 agreements cover 22 WTO LDC Members (Angola, Benin, Burkina Faso, Burundi, Democratic Republic of the Congo, Djibouti, The Gambia, Guinea, Guinea Bissau, Lesotho, Madagascar, Malawi, Mali, Mozambique, Niger, Rwanda, Senegal, Sierra Leone, Tanzania, Togo, Uganda and Zambia). The United States is using TIFAs and the TIDCA with sub-Saharan African countries to encourage new trade and investment by implementing country-and-region-specific strategies that promote trade and investment.

5.3 Overseas Private Investment Corporation (Opic): mobilizing private investment in emerging markets

5.3. The Overseas Private Investment Corporation (OPIC) is the US Government's development finance institution that focuses on mobilizing private investment in more than 150 emerging markets around the globe. In doing so, OPIC seeks to open up and expand new markets for American businesses, and new opportunities for the people of developing nations. Working with the private sector, OPIC helps US enterprises gain footholds in emerging markets, catalysing revenues, jobs and growth opportunities, both in the United States and abroad. Specifically, OPIC tailors its products – political risk insurance, project debt financing and privately-managed investment funds – to support the specific needs of a business or project. OPIC has a history of innovation, flexibility, and responsiveness in mobilizing private investment to achieve US development objectives. OPIC actively partners with both private and public financial institutions, US and other government institutions, as well as other stakeholders.

5.4. Over the agency's 40-year history, OPIC has supported more than \$200 billion of investment in over 4,000 development projects. OPIC focuses on regions that the United States considers to be foreign policy priorities, national security priorities and development priorities, e.g., the Middle East and North Africa (MENA), Afghanistan and Pakistan, and sub-Saharan Africa. Moreover, OPIC focuses on such key sectoral priorities as Renewable Resources/Clean Technology, agribusiness, and small and medium-enterprise (SME)/microfinance. The agency's current total portfolio exposure is \$16.4 billion, of which 65 per cent (\$10.7 billion) is in financing, 15 per cent (\$2.6 billion) is in investment funds, and 19 per cent (\$3.1 billion) is in insurance. OPIC operates on a self-sustaining basis at no net cost to the American taxpayer. In Fiscal Year (FY) 2012, OPIC generated a net profit of \$272 million, enabling the Agency to be fully self-sustaining and to help reduce the federal deficit for the 35th consecutive year. Since the agency's creation in 1971, OPIC has generated more than \$5 billion of reserves from its transaction earnings.

5.5. In FY 2012, OPIC committed more than \$1.55 billion to the renewable resources sector, up almost half a billion dollars over the previous fiscal year. OPIC's focus on sustainable agriculture and clean water manifested in projects designed to improve food security and the delivery of potable water in Africa, Latin America and Eastern Europe, drove much of the increase, accounting for \$575 million of the FY 2012 portfolio. In addition, over the past two years, OPIC has made significant efforts to expand its work in Africa, resulting in a 300 per cent increase in the agency's commitments to the region last year (e.g., sub-Saharan Africa comprised only 4 per cent of OPIC's global portfolio of loans, guarantees and political risk insurance in 2001, and now comprises 21 per cent). To that end, OPIC has a senior staff member in the new US-Africa Clean Energy Development and Finance Centre, based in South Africa. That Centre will provide technical and financial support for clean energy project development by providing the US private sector, as well as sub-Saharan African developers, with a centralized means to identify and access US Government support for their clean energy export and investment needs. The Centre also will coordinate its resources with those of the US private sector, multilateral development banks, local development banks, private banks, and private equity firms. Finally, OPIC also supports the African Clean Energy Financing (ACEF) programme, which is focused on catalysing private sector investment in clean energy projects in Africa by providing support for early stage project development costs. ACEF, a four-year programme, was developed by OPIC, the US Department of State, the US Trade and Development Agency (USTDA) and USAID.

5.4 African Growth and Opportunity Act

5.6. The African Growth and Opportunity Act (AGOA), enacted in 2000, has been at the centre of US trade and investment policy toward sub-Saharan Africa, which has sought to promote open markets, expand US-Africa trade and investment, stimulate economic growth, and facilitate Sub-Saharan Africa's integration into the global economy. AGOA provides incentives to promote economic and political reform and trade expansion and builds on the US Generalized System of Preferences (GSP) programme to provide duty-free access for most of the products produced in eligible sub-Saharan African countries. The additional products include value-added agricultural and manufactured goods such as processed food products, apparel, and footwear. Since the enactment of AGOA in 2000, the United States has worked closely with African governments, the private sector, and civil society stakeholders to improve AGOA utilization and to help them make the most of AGOA's trade benefits. The US Government crafted and put into place the regulatory framework for AGOA, actively promoted the programme throughout Africa, and developed trade capacity-building programmes to help African governments and firms identify and develop the market opportunities available under AGOA. AGOA continues to support the efforts of Sub-Saharan African countries undertaking economic, political, and social reforms and provides incentives for countries considering such reforms.

5.7. As of July 2013, 39 sub-Saharan African countries were eligible for AGOA benefits, including 20 WTO LDC Members. Helping AGOA beneficiary countries improve their capacity to trade and to make the most of the opportunities afforded under AGOA has been a major focus of US Technical Capacity Building (TCB) programmes. AGOA has resulted in a substantial increase in two-way US -African trade, with African countries now exporting a more diverse range of value-added products to the United States. Moreover, African economies have been using trade benefits generated by AGOA to grow their economies and reduce poverty. The five-year \$200 million African Global Competitiveness Initiative (see Section XIII.A.), is a key element of TCB in support of AGOA. The AGCI supports the work of the four USAID-managed regional Trade Hubs for Global Competitiveness located in Gaborone (Botswana), Nairobi (Kenya), Accra (Ghana), and Dakar

(Senegal). Each Hub is staffed by a team of experts in trade-related fields and responds to region-specific needs.

5.5 The Generalized System of Preferences

5.8. In addition to AGOA, until August 2013, the Generalized System of Preferences (GSP) programme provided duty-free access to the US market for a wide range of products from 43 eligible LDC beneficiary countries (out of a total of 126 GSP beneficiary countries). Legal authorization of the GSP programme expired as of July 31, 2013. The US Administration is working with the US Congress to reauthorize the programme.

6 NATIONAL SCIENCE FOUNDATION (NSF) PROGRAMMES

6.1. To support basic research that will build a foundation for generating sustainable, science-based solutions to agricultural problems in developing countries, the National Science Foundation (NSF) has awarded 24 grants in the first three years of the Basic Research to Enable Agricultural Development (BREAD) programme. The five-year programme is jointly funded with the Bill & Melinda Gates Foundation. Through its partnership with the Gates Foundation, the NSF awards grants to US institutions and their international collaborators to promote novel, creative approaches and technologies to address common constraints faced by small-holder farmers. Among the grants is one to scientists at Pennsylvania State University, the University of Wisconsin-Madison, and the Bunda College of Agriculture (Malawi) to exploit a recent discovery that drought tolerance is correlated with the development of a unique tissue that allows maize roots to expand in area and scavenge for scarce water while minimizing impact on yield. By identifying the genetic loci responsible for this response, the scientists hope to offer a new approach to development of drought-tolerant maize. Other grant-awardees include scientists at Montana State University, Commonwealth Scientific and Industrial Research Organisation (CSIRO) Plant Industry-Black Mountain (Australia), International Maize and Wheat Improvement Centre (CIMMYT) (Nairobi, Kenya), and the Chinese Academy of Sciences who have used a novel genetic approach using genetic suppressors to develop new lines of wheat that are resistant to rusts, fungal pathogens that cause some of the most devastating disease in wheat. Other grants will test a novel approach to develop a vaccine for contagious bovine pleuropneumonia, a deadly cattle disease in Africa; explore the use of a special type of black carbon to improve soil fertility and crop yield; and study genetic mechanisms in chickpeas as a step towards improving nitrogen fixation. A complete list of 2010, 2011, and 2012 BREAD awards can be accessed at <http://www.nsf.gov/bio/pubs/awards/bread10.htm>.

6.2. In its fourth year, the BREAD Programme took a novel approach to fulfilling its goals, using a two-stage process involving small cash prizes articulating novel or under-studied scientific challenges facing smallholder farmers in the developing world and Early Concept Grants for Exploratory Research (EAGER) proposals to explore new, high-risk/high-payoff research stimulated by the prize-winning ideas. Ideas were accepted in any area of basic research and technology development in all fields of biological and physical sciences and engineering as long as the proposed research challenge or idea was consistent with the BREAD Programme objectives. From among hundreds of submissions from researchers at all academic levels from around the world, 13 individuals were selected to receive a \$10,000 cash prize for their entries that are showcased on the BREAD Ideas Challenge website (see: <http://www.nsf.gov/bio/bread/>). Winning challenges include calls to create new breeds of indigenous root crops, to help reduce farmer dependence on expensive fertilizers by creating a nitrogen-fixing organelle in small-holder crops, and to create alternatives to the use of costly liquid nitrogen in the livestock artificial insemination process. Information about BREAD and the call for EAGER proposals is available at the BREAD programme website as well as at the BREAD Ideas Challenge website: (http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=503285&org=BIO).

7 US DEPARTMENT OF STATE PROGRAMMES

7.1 Science and technology agreements

7.1. Recognizing the importance of international science, technology and innovation cooperation to economic growth and development, the United States fosters dialogue through bilateral and multilateral mechanisms. With some partners, the United States utilizes Science and Technology (S&T) agreements to provide a framework for increased international collaboration.

These agreements facilitate cooperation between US technical agencies and their foreign counterparts on topics such as public health, watershed management, agriculture, environment and biodiversity protection, biotechnology, earth sciences, marine science and the alternative energy. These agreements support S&T relationships that also strengthen our science and technology partners' science education systems, build institutional and human resource capacity and promote a deeper appreciation of the innovation ecosystem and its role in technology transfer/commercialization. For example, the United States supports programmes that highlight the importance of strengthening university/private sector linkages to commercialize research.

7.2 Special Self-Help Programme

7.2. Another initiative that has a science and technology-related impact is the State Department's Special Self-Help (SSH) Programme, which supports funding of community-based development projects that often have a technology transfer component. Programmes have included installation of solar energy panels in community facilities, construction of computer laboratories, eco-tourism, and others. The SSH Programme began in 1964 as an experimental programme in Togo, and has grown to be one of the most visible and successful US assistance programmes in Africa. In FY 2009, US \$949,749 in SSH funds were granted to projects in WTO LDC Members. In FY 2011, this had increased to US\$1,527,756 in SSH funds granted for 234 projects in WTO LDC Members; and in FY 2012 grants increased to US\$1,535,000.

7.3 Open Skies agreements

7.3. Open Skies agreements between the United States and key partner countries have vastly expanded international passenger and cargo flights to and from the United States, promoting increased travel, trade, and business contacts, enhancing productivity, and spurring high-quality job opportunities and economic growth. Open Skies agreements do this by eliminating government interference in the commercial decisions of air carriers about routes, capacity, and pricing, freeing carriers to provide more affordable, convenient, and efficient air service for consumers. The United States has achieved Open Skies with over 100 partners from every region of the world and at every level of economic development. Since 1999 the United States developed Open Skies agreements with 18 Least-Developed Countries: Sierra Leone, Tanzania, Burkina Faso, Gambia, Rwanda, Benin, Senegal, Uganda, Samoa, Madagascar, Maldives (the Maldives was an LDC when the agreement was reached, but is no longer considered an LDC), Ethiopia, Mali, Chad, Liberia, Lao PDR, Zambia, and Yemen. The increased travel, trade, and business contacts promoted by expanded air traffic facilitate private sector technology transfer.

7.4 Biotech outreach

7.4. Technology transfer in biotechnology requires the development and implementation of science-based regulatory systems to enable LDCs to utilize products of the technology. In support of USAID's work in building capacity for legislative frameworks and regulatory systems, and in coordination with the US Department of Agriculture's (USDA) Foreign Agricultural Service (FAS), the State Department's Economic and Business Affairs Bureau works directly with other countries and with international bodies, like the WTO and APEC, to ensure policies will be science-based and transparent, creating the necessary environment for LDCs and the private sector to make use of the technology. Funds have supported outreach programmes in many LDCs (or programmes have included participants from LDCs) over the years, including most recently in: Burkina Faso, where biotechnology experts presented at several conferences; Malawi, where a regional scientist conducted roundtables on biotechnology; and Brazil, where participants from Malawi, Mozambique and Uganda took part in an international conference on agricultural biotechnology.

7.5 The Secretary's Award for Corporate Excellence

7.5. The Secretary of State's Award for Corporate Excellence (ACE), established by the State Department in 1999, recognizes the important role US businesses play abroad as good corporate citizens, including promoting technology transfer, and encourages US companies to further their efforts to engage in responsible business conduct through corporate social responsibility, innovation, exemplary business practices, and support for human and labour rights, environmental stewardship and democratic values worldwide. US companies are nominated by Chiefs of Mission worldwide and the winners are chosen by the Principals' Award Selection Committee.

7.6. In 2012, the two ACE winners and all the finalists for the award were from regions where least developed countries are prominent. Sorwathé, a tea production company in Rwanda, was the small and medium-size enterprise category winner, for its efforts to support adult literacy and worker association and collective bargaining rights, as well as leading the industry in advancing the abolition of child labour, undertaking sustainable forestry and water management, and producing socially and environmentally responsibly grown high quality tea. The 2012 ACE winner in the multinational company category was Intel in Vietnam, for this technology company's efforts to lead in environmental protection through the generation of electricity through solar power; participation in transformative educational programmes focusing on faculty and curriculum development, including through sending local educators for university training in the United States; and providing scholarships to disadvantaged children, youth and women.

7.7. These companies exemplify the transfer of technology and promotion of sustainable development to the countries in the Africa and South-East Asia regions. In 2011, two of the ACE winners and nearly half the finalists for the award were from regions where least developed countries are prominent. The ACE winning multinational company, Procter & Gamble, was recognized for the implementation of science and technology standards, establishment of sustainable partnerships to establish a network of schools, early education programmes and support for orphanages, and the reduction of its carbon footprint at its facilities in Pakistan. Procter & Gamble also received the ACE for its work in Nigeria to improve local communities' water supply through education and purification technology, support for the health and well-being of new and expectant mothers and children through mobile clinics, and innovative educational programmes for teenage girls. ACE finalists, Cargill and General Motors', respectively, were recognized for their work to address food security issues, improve access to nutritious food in India and GM's efforts to create partnerships with global organizations to prevent malnutrition in infants and children, and contributions to the local market of a skilled labour force in Uzbekistan. Joy Global in South Africa was recognized as a 2011 ACE finalist for using apprenticeship programmes that contributed to the development of the local workforce by providing male and female South Africans advanced skills in technical, mechanical, and electrical engineering disciplines and fostering economic empowerment opportunities for those affected by years of apartheid.

8 US DEPARTMENT OF COMMERCE PROGRAMMES

8.1 International Trade Administration

8.1. The Department of Commerce's International Trade Administration (ITA) has supported other units within the Department, such as the Commercial Law Development Programme (CLDP), the technical assistance arm of the Office of the General Counsel at the Department of Commerce, and the US Patent and Trademark Office (USPTO), as well as other US Government agencies to deliver IPR technical assistance programmes to LDCs.

8.2 Small business tools

8.2. As part of an overall strategy to empower businesses, particularly small businesses, to obtain and enforce IPRs, the US Department of Commerce in cooperation with other US Government agencies, continues to enhance its multiple tools and means of assistance for US small businesses doing business abroad. Small businesses in the United States are often on the cutting edge of new technologies. However, such businesses may be hesitant to export products, make investments or form partnerships overseas that involve their latest technology because of fears that their IPRs could be violated. The US Department of Commerce, by teaching small businesses how to protect and defend their rights overseas, increases the likelihood that these businesses will be willing to operate overseas, including in WTO Member LDCs.

8.3. The US Department of Commerce continues to actively promote these small business tools to other countries, because these tools may also be useful and applicable to their small businesses. The US Department of Commerce has developed a website, <http://www.stopfakes.gov/>, used by the entire US Government, which hosts a number of online resources, including information about key US Agencies and programmes. In FY 2012, the US Department of Commerce's International Trade Administration led an effort to redesign the website in an effort to make it more widely accessible and user friendly. STOPfakes.gov also contains information on ITA's joint International IP Advisory Programme with the American Bar Association, which provides free legal consultations on IPR-related matters for businesses investing and doing business in WTO LDC Members, as well

as other countries. Additionally, the expansion of the International IP Advisory Programme to Senegal, Angola, and Mozambique aimed to help US businesses in those markets.

8.4. In addition, many other tools on STOPfakes.gov are available to LDC businesses, which can use them to protect their own IP rights. For example, the IPR Training Module, hosted on the STOPfakes website, is available in English, French and Spanish; the United States encourages LDCs to use the module for their small businesses. The module familiarizes small businesses with IPRs, explaining IPRs' relevance to their businesses and how to protect and enforce IPRs in the United States and abroad. WTO Member LDCs and other countries are welcome to use this resource free of charge. STOPfakes.gov also serves as a means for reporting IPR enforcement issues to the Commerce Department and Federal enforcement authorities.

8.3 Commercial Law Development Programme

8.5. CLDP provides commercial law technical assistance to governments and private sectors of developing and transitional countries in support of their economic development goals. Its programmes are demand-driven and customized to address priority issues for governments and firms interested in doing business in those countries. CLDP's unique government-to-government approach helps improve legal and regulatory environments, which are essential to attract foreign investment and promote domestic private sector growth. Strong IPR protection systems, in particular, can help assure foreign companies that they can transfer technology without fear that it will be stolen, and can provide incentives for domestic innovation. In recent years, CLDP has conducted a number of programmes benefitting LDC members of the WTO, examples of which are cited below.

- **Workshop on the Implementation of an Interagency Approach to IP Protection and Enforcement- Kenya and the EAC:** CLDP and the Kenya Anti-Counterfeit Agency (ACA), in collaboration with USPTO, the US Department of Justice (USDOJ), the US Department of Homeland Security (USDHS), the International Chamber of Commerce, and the US Embassy in Nairobi, organized a three-day regional workshop held on 7-9 August 2012 in Nairobi, Kenya. Approximately 80 officials from Kenya, Uganda, Burundi, Tanzania and Rwanda came together to determine the best way to implement an interagency approach to IP protection and enforcement among the key partner agencies and the private sector. The workshop aimed to impress upon the relevant Kenyan government and EAC region officials the import of IP protection and enforcement for trade and investment, and hence the economic development of Kenya and the EAC region, by establishing an effective framework and mechanisms by which counterfeited and pirated goods can be interdicted and removed from Kenya and the EAC region's markets. The anticipated result is an increased efficiency, consistency, and effectiveness in the protection and enforcement of IP rights in Kenya and the EAC region.
- **Regional Workshop on the Practical Approaches to IP Utilization and Protection in Africa:** In coordination with the Africa Intellectual Property Group (AIPG), CLDP organized this regional workshop from 19-21 March 2013 in Dar es Salaam, Tanzania, to discuss and learn about the practical approaches, successes, challenges and future strategies to the protection and utilization of intellectual property (IP) as a facilitator of innovation, entrepreneurship, trade and investment. AIPG is a voluntary Africa-wide association of IP owners, officials, practitioners, institutions, and industry associations, with a shared desire to determine practical and innovative solutions to the challenges posed by counterfeiting and piracy, as well as the effective utilization of IP rights to foster innovation and economic growth in Africa. Some 170 East, West, and Southern African IP officials, IP practitioners, IP stakeholders, and private sector, from 19 Anglophone and Francophone African countries gathered to ascertain the role of regional leadership in determining harmonized policies and legislation, the facilitation of inter-regional IP protection, and the impact of IP on creative industries, branding, innovation, and food security.
- **The Rise of Africa's Digital Economy at the 2013 AGOA Forum:** As part of the 2013 US Sub-Saharan Africa Trade and Economic Cooperation (AGOA) Forum, held 9-13 August in Addis Ababa, Ethiopia, CLDP worked with the US State Department to develop and conduct a panel focused on Entrepreneurship and Technology. The theme of

this year's AGOA forum is "Sustainable Transformation through Trade and Technology" and the CLDP-supported panel, "The Rise of Africa's Digital Economy – Entrepreneurship and Innovation in the ICT Sector" addressed growth opportunities and challenges in the emerging information and communications technology sector in sub-Saharan Africa. It focused on digital business, government and the emerging digital consumer; increased access to IT through cloud computing, cell phones and broadband; and the spread of new digital technologies in the film, music, software and mobile app sectors. The panel also emphasized "doing business" aspects of the digital economy, such as innovation policies, IPR issues, investment considerations and skills development.

8.4 National Institute of Standards and Technology

8.6. The National Institute of Standards and Technology (NIST) is the host agency for the FLC, described above in paragraph 6. The Stevenson-Wydler Technology Innovation Act of 1980 required all federal agencies to make technology transfer part of their mission. More recent legislation such as the Technology Transfer Commercialization Act of 2000 and the America Competes Act of 2007, mandated that federal agencies report technology transfer activities. Since 2007, NIST's Technology Partnerships Office has been responsible for preparing reports on technology transfer for the Department of Commerce, as well as summarizing the activities reported by federal agencies and FFRDCs NIST.

8.7. NIST uses the following technology transfer mechanisms: Patents and Licensing; Cooperative Research and Development Agreements (CRADAs); User Facilities; Technical Publications; Participation in Documentary Standards Committees; Standard Reference Materials and Data; Calibration and Accreditation Services; Software Tools; Small Business Innovation Research (SBIR) Grants; Guest Researchers; Conferences, Workshops, and Inquiries; and Training. The most recent version of this annual report is posted at: <http://www.nist.gov/tpo/publications/upload/DOC-FY2012-Annual-Tech-Transfer-DOC.pdf>.

8.8. NIST has research laboratories, user facilities, and other programmes focused on advancing the measurement science, standards, and technology, and promotes the transfer of technology. For example, NIST promotes the transfer of technology to developing and LDCs with its Guest Researcher Programme. This programme provides opportunities for technically qualified individuals to work at NIST with Institute staff on projects of mutual interest for periods ranging from a few months to several years, with a key benefit being access to NIST facilities, staff, and research tools. Guest researchers (or their home institutions) may retain rights to inventions conceived while at NIST. NIST also operates two unique and valuable laboratory user facilities: the Centre for Neutron Research and the Centre for Nanoscale Science and Technology. The NIST Centre for Neutron Research (NCNR) provides cold and thermal neutron measurement capabilities. The Centre for Nanoscale Science and Technology NanoFab Facility provides a means to access advanced nanofabrication and measurement instrumentation. Each year, NIST hosts hundreds of foreign guest researchers at its facilities, including three from LDCs in 2012 and ten in 2013. NIST also consults and reports on technology transfer from US government laboratories and provides consultation and assistance on US technology transfer legislation and procedures to other countries.

8.9. In 2012, researchers from the following LDCs participated in this programme:

- Senegal – 1;
- Uganda – 1; and
- Nepal – 1

8.10. In 2013 (to date), researchers from the following LDCs participated in this programme. Please note that seven of the researchers identified in 2013 were "new" (marked with an asterisk below). The remaining three researchers were also at NIST in 2012 and counted in that total.

- Senegal – 1;
- Uganda – 1;

- Bangladesh – 3*;
- Ethiopia – 1*;
- Burkina Faso – 2*;
- Nepal – 1; and
- Tanzania – 1*

9 TRADE CAPACITY BUILDING IN LEAST DEVELOPED COUNTRIES

9.1. "Aid for Trade" or Trade Capacity Building (TCB) assistance is a cornerstone of the US Government's strategy to promote economic growth through trade and to enable developing countries to negotiate and implement market-opening and reform-oriented trade agreements. TCB helps to improve the linkage between trade and development by providing developing countries with tools to maximize trade opportunities, including through fostering environments favourable to technology transfer. The United States considers its TCB activities to be an integral element in its efforts to provide incentives for technology transfer.

9.2. The United States obligated over \$118 million to TCB activities specifically in LDCs in FY 2012. Cumulative US TCB to LDCs from FY 2001 to FY 2012 totalled over \$4.2 billion.

10 MILLENNIUM CHALLENGE CORPORATION

10.1. The Millennium Challenge Corporation (MCC) is a US Government corporation that provides development assistance designed to achieve poverty reduction through economic growth by investing in areas such as agriculture, water supply and sanitation, banking and financial services, energy, health, education and community services, governance, and transport (road, water and air). Created in 2004, MCC has signed 26 compacts with 25 countries worth more than \$9.3 billion.

10.2. MCC is currently implementing threshold programmes or compact agreements with eight WTO LDC Members: Burkina Faso, Lesotho, Malawi, Mozambique, Niger, Senegal, Tanzania, and Zambia. Additionally, MCC has also completed programmes with Benin, Mali, Rwanda, Sao Tome and Principe, a LDC that is in the WTO accession process, and Vanuatu, an LDC that is a new WTO Member.

11 US DEPARTMENT OF TRANSPORTATION

11.1. The US Department of Transportation (DOT) plays an important role in maintaining the strong, interconnected global transportation system vital for economic growth in the United States and abroad. DOT is engaged in a wide range of activities designed to enhance the transportation capacity and infrastructure of Sub-Saharan African countries.

11.2. The Safe Skies for Africa Programme (SSFA) is based on the premise that "Safe Skies" are a prerequisite for increased trade and investment and long-term economic development in Africa. Safer air travel promotes the business contacts through which private sector technology transfer occurs. The safety and security components complement US Government efforts to conclude Open Skies agreements with key African countries and promote code-share agreements between US and African airlines. Since 2008, the SSFA continued in its mission to promote sustainable improvements in aviation safety in Africa as a means of advancing economic development and increased investment between the United States and Africa. The overarching goal of the programme is to increase the number of African nations meeting International Civil Aviation Organization (ICAO) standards for safety and security. Recently Nigeria, with technical assistance from the US Federal Aviation Administration (FAA), met ICAO standards for safety and security. Through the efforts of the SSFA programme aviation safety and security has been enhanced across sub-Saharan Africa. The SSFA programme supports a bilateral and regional approach to the development of ICAO-compliant Civil Aviation Authorities. The DOT programme has trained African experts at the Federal Aviation Administration facility in Oklahoma City, and in-country where appropriate. These capacity building efforts have resulted in hundreds of personnel receiving state-of-the-art training to address airworthiness, operations, air navigation, aviation

security (in partnership with the Transportation Security Administration), as well as accident investigation processes and procedures (in partnership with the US National Transportation Safety Board).

12 US DEPARTMENT OF AGRICULTURE (USDA)

12.1 Technology transfer reporting of the USDA

12.1. USDA publishes an annual technology transfer report (see https://www.ars.usda.gov/sp2UserFiles/Place/01090000/FY2012_AnnRpt_USDA.pdf for the most recent report). USDA broadly defines technology transfer as the adoption of research outcomes for public benefit. The science-based innovations from USDA intramural research programmes create new technologies, processes, products and services that benefit the nation by increasing productivity, increasing efficiency, and enhancing the global competitiveness of the US agriculture sector. To facilitate technology transfer, USDA uses both contractual instruments such as CRADAs, invention licences and material transfer agreements, and the public dissemination of research results through publication and public releases of improved plant germplasm. Because USDA's research mission is to transfer technologies for broad public use by the most effective mechanism available, USDA pursues patent protection and licensing only when a private sector partner is needed for effective technology transfer. This is usually the case when the complementary assets needed to manufacture, market and distribute a new technology can only be provided by a commercial partner. In such cases, patent protection is required to protect the commercial partner's investment. The USDA annual report on technology transfer provides additional details about the variety of mechanisms used for technology transfer, as well as descriptions of the various types of technologies that have been transferred.

12.2. By sharing knowledge and technology through close collaboration with national and international research institutions in other countries and in the United States to increase institutional research capacity and speed technology development, Agricultural Research Service (ARS) collaborations both transfer technology and enhance international relationships through US trade and diplomacy. A list of formal international agreements can be found at: <http://www.ars.usda.gov/research/projects.htm?slicetype=International>. In addition, ARS is engaged in research specifically targeting developing countries through the Feed the Future webpage (<http://www.ars.usda.gov/Research/docs.htm?docid=22832>) and other programmes in partnership with USAID and others.

12.2 US National Plant Germplasm System (NPGS): technology transfer in the form of germplasm and related information

12.3. All countries rely heavily on production of non-indigenous crops to meet food needs. This interdependence highlights the need for cooperation in conservation and exchange and use of plant genetic resources that support agricultural production everywhere. It is increasingly important that countries cooperate to enable world food production to meet the needs of future generations. The US Government has been actively involved in the collection and preservation of plant germplasm since the early 1800s. For a comprehensive account of plant genetic resources in the United States, see the US Country Report on the State of Plant Genetic Resources for Food and Agriculture: (http://www.fao.org/fileadmin/templates/agphome/documents/PGR/SoW2/country_reports/americas/US.pdf). Today, the USDA/ARS National Plant Germplasm System (NPGS) has the primary federal responsibility for the ex situ preservation of germplasm collections of crop plants and their wild relatives.

12.4. The NPGS has long recognized that all countries are interdependent in their need for plant genetic resources. The activities of the NPGS embody this recognition, not only through the conservation and distribution of germplasm and associated information to scientists worldwide, but also through the support and capacity building for genetic resources conservation in many other countries. This collaboration has taken the form of both contributions that will benefit all countries and individual support to specific countries. To assist all nations, the NPGS partnered with Bioversity International and the Global Crop Diversity Trust to develop a new germplasm information management system, GRIN-Global, which will become the global standard for safeguarding, managing and publishing this invaluable information. The software is freely available and can operate on any of four database platforms, all of which have versions that do not require licensing fees. GRIN-Global is being implemented by CGIAR Centres (originally the Consultative

Group on International Agricultural Research), and by some national plant genetic resource systems, including the USDA/ARS NPGS.

12.5. The demand for germplasm from the NPGS is great. Although germplasm is used extensively for cultivar improvement, it is also used for a wide variety of other scientific studies, most of which ultimately contribute to improvements in crop production. In response to requests from researchers, breeders and administrators worldwide, the NPGS distributed an average of more than 191,954 accessions annually between the years 2003 – 2013. In the first eight months of 2013, over 165,000 samples have been distributed. Approximately 70 per cent of the accessions were distributed to US scientists and 30 per cent to foreign scientists, including CGIAR Centres. Scientists in 140 countries received germplasm, notably including Afghanistan, Bangladesh, Benin, Burkina Faso, Burundi, Cambodia, Eritrea, Ethiopia, Haiti, Lesotho, Madagascar, Mali, Myanmar, Niger, Rwanda, Senegal, Sierra Leone, Sudan, Tanzania, Uganda and Zambia. In 2012, over 2,400 samples of accessions originally collected in Ethiopia were repatriated to the national genebank at the Institute of Biodiversity Conservation. In 2013, 80 accessions of Amaranthus were distributed to a University researcher in Benin in support of the breeding programme for adaptable crops.

12.6. In recent years, the US Government has provided funds for many additional projects on germplasm conservation and utilization. NPGS scientists have collaborated with USDA/Foreign Agricultural Service and the USDA/ARS Office of International Research Programmes on these projects. In Bangladesh, scientists at the Bangladesh Agricultural University in Mymensing, Bangladesh, with the technical cooperation of NPGS scientists, collected, evaluated, preserved and distributed germplasm of landraces and wild relatives of traditional fruits and vegetables. Over several decades, in addition to the "technology transfer" by distributing germplasm, NPGS personnel have provided training in all aspects of germplasm maintenance, evaluation, documentation, and enhancement to many scientists from numerous countries. In some cases, organized programmes involved training of numerous scientists from one country.

12.7. NPGS personnel are working with collaborators from multiple countries as their genebanks implement GRIN-Global. In cooperation with Bioversity International, they have conducted workshops on GRIN-Global for multiple countries. They provide technical assistance to the Bioversity International team members in responding to questions to the help desk and training users in the software. They also continue to update training and reference materials, as well as language translations of the interface. Additional enhancements and refinements to GRIN-Global are ongoing.

Distribution of Germplasm According to WTO LDC Members or Observer Countries (2002 – 2013) *

Afghanistan	152
Bangladesh	51
Benin	80
Burkina Faso	14
Burundi	66
CGIAR	21,774
Cambodia	42
Ethiopia	5,653
Haiti	40
Lesotho	28

Madagascar	78
Mali	39
Myanmar	20
Niger	772
Rwanda	452
Senegal	75
Sierra Leone	313
Sudan	337
Tanzania	317
Zambia	248

*through August 2013

13 US AGENCY FOR INTERNATIONAL DEVELOPMENT

13.1. USAID is the principal US Government agency involved in implementing the goal of promoting economic growth and reducing poverty in developing countries around the world. USAID's overarching goal in economic growth is to help partner countries achieve rapid, sustained and broad-based growth that includes all vulnerable groups. Encouraging technology transfer and respecting IPR is important in reaching this overarching goal.

13.2. In support of economic growth, agriculture, and trade, USAID endeavours to: (a) develop well-functioning markets in developing countries; (b) enhance access to productive opportunities for the poor, women and other disadvantaged groups; and (c) strengthen the international framework of policies, institutions and public goods that support growth prospects and opportunities for poor countries. Examples include research and development of special initiatives on agricultural, health and other problems specific to developing countries and promoting international standards — from trade to IPR — that provide sound models for developing economies to emulate.

13.3. Helping LDCs integrate into the world economy is a major feature of USAID's economic growth and trade activities, which focus on trade and investment policy, institutional analysis and reform, trade capacity building and technical training, environmentally sound natural resources management, and the promotion of US-Africa private sector development. As mentioned, USAID plays a key role in providing Aid for Trade or TCB assistance to the LDCs. USAID is the second largest US provider of TCB after MCC. From 1999 to 2009, USAID provided over \$805 million in TCB assistance to 43 LDCs.

13.4. The programmes below are examples of USAID programmes that directly or indirectly promote technology transfer.

13.1 African Global Competitiveness Initiative

13.5. As one of USAID's main TCB programmes in sub-Saharan Africa, the African Global Competitiveness Initiative (AGCI) has supported the incubation and expansion of USAID-managed Regional Trade Hubs for competitiveness in sub-Saharan Africa (Botswana, Ghana, Kenya, and Senegal). The five-year (2006-2010) \$200 million AGCI was designed to help expand African trade and investment with the United States, with other international trading partners, and regionally within Africa by improving the export competitiveness of sub-Saharan African enterprises. AGCI's objectives were: (a) to improve the business climate for private sector-led trade and investment;

(b) to strengthen the knowledge and skills of sub-Saharan African private sector enterprises to take advantage of market opportunities; (c) to increase access to financial services for trade and investment; and (d) to facilitate investments in infrastructure. Further information about the Hubs can be found on the Internet at <http://www.watradehub.com/> (for the two hubs in West Africa); <http://www.satradehub.org/> (for Southern Africa); and <http://www.competeafrica.org/> (for Eastern and Central Africa). A compendium of African trade-related success stories and case studies from 2011 is available for consultation at the following link: http://pdf.usaid.gov/pdf_docs/pnads418.pdf.

13.2 Feed the Future

13.6. Feed the Future (FTF), the United States Government global hunger and food security initiative, supports country-driven approaches to address the root causes of hunger and poverty. Through this Presidential Initiative, the United States is helping countries transform their own agricultural sectors to grow enough food sustainably to feed their people. As a result, valuable food aid can be used for unforeseen catastrophes rather than for chronic food insecurity or predictable cycles of drought or flooding. USAID is charged with leading FTF, which involves coordinating efforts with eight other US agencies. With the establishment of the Bureau for Food Security within USAID, experts in agriculture, research, nutrition, and the private sector have been brought together to guide and coordinate the Agency's efforts around food security.

13.7. At the 2009 G-8 Summit, the President pledged at least US\$3.5 billion for agricultural development and food availability over three years to leverage and align more than US\$18.5 billion from other donors in support of a common approach. Under the direction of the US Global Hunger and Food Security Coordinator, USAID seeks to advance global food security by comprehensively addressing the underlying causes of hunger and under-nutrition, investing in country-led plans; strengthening strategic coordination; leveraging the benefits of multilateral institutions; and making sustained and accountable commitments. Under FTF, USAID-private sector partnerships will catalyse agricultural-led economic growth and development by: bridging the gap between innovative agricultural productivity solutions and sustainable market demand; improving the enabling environment for market led growth; and linking large commercial institutions with smallholder partners. USAID is working in collaboration with its partners on innovative co-investment models, private sector partnerships, reducing risk, improving the enabling environment, commercialization of new technologies, and capacity building. In providing technical assistance, USAID also seeks to expand markets and trade in LDC countries and FTF focus countries by: expanding market information; post-harvest market infrastructure; and access to business development and financial services, all of which promote technology transfer and trade. Moreover, the FTF's technical assistance will enhance animal, plant, and food safety by: improving standards and creating strong regulatory frameworks; reducing the time and cost of border movement of goods; and creating an enabling environment for agribusiness growth.

13.3 USAID Global Development Alliance (GDA)

13.8. The Global Development Alliance (GDA) mobilizes the ideas, efforts and resources of governments, businesses, and civil society by forging public-private alliances to stimulate economic growth, develop businesses and workforces, address health and environmental issues, and expand access to education and technology. The GDA business model links US foreign assistance with the resources, expertise, and creativity of governments, business, and civil society. Through public-private partnerships, USAID and its partners combine their assets to address pressing development problems and achieve a solution that would not be possible for any individual partner alone. Through fiscal year 2009, USAID has cultivated more than 1,000 alliances with 3,000 unique partners, leveraging billions of dollars in combined public-private resources for development. Working with multinational corporations, regional and local companies, USAID is building alliances that can have a significant impact on major development challenges. USAID has partnered with Starbucks in the last ten years to build capacity in the global coffee supply chain. The USAID/Starbucks partnerships improve coffee quality, certify sustainable practices and provide premium prices, which raise local incomes. Working in several countries in Africa, Latin America and Asia, the impact has been substantial. For instance, USAID/Mexico's programme directly affected nearly 12,000 people in 45 communities by improving best practices in the coffee supply chain and thereby raising the quality of production. In Rwanda, Starbucks tripled the amount of beans it sourced from local farmers from 2006 to 2008, when it first sold Rwandan coffee as part of its high-end Black Apron Exclusives line.

13.9. In 2005, USAID created a new obligating instrument – the collaboration agreement – to provide funding directly to non-traditional partners. For example, the Private Financing Advisory Network (PFAN), an alliance of private sector companies and investors, receives funding from USAID to help developers of climate-friendly technologies in developing countries find financing. Through the alliances of the GDA, USAID has not only gained additional financial resources for development activities, but also new technologies, intellectual capital, and technical and managerial expertise that enhances its ability to address an increasingly complex set of development challenges. The partnership activities stimulated by the GDA continued in 2012 and 2013.

13.4 USAID Global Broadband and Innovations (GBI)

13.10. The US Agency for International Development's new Global Broadband and Innovations (GBI) programme has been designed to focus the Agency's attention and resources on leveraging the adoption of Information and Communication Technologies (ICTs) across its development portfolio. The GBI Programme focusses strategically on two priority areas:

- Extending the reach of broadband, including enhanced mobile networks, into more remote rural areas as a key infrastructure for extending the reach of socioeconomic services through USAID's NGO and contractor partners, as well as others working within the international, national, and local development community; and
- leveraging the extension of these broadband and mobile networks for delivering network-enabled value-added application support across USAID's development portfolio.

13.11. A fundamental component of achieving this second priority is the leveraging of public-private partnerships (PPPs). Toward this end, the GBI Programme and NetHope have come together to form the GBI Alliance. This relationship places a priority on the second of these two focus areas, recognizing that within the NetHope ecosystem, there is a connectivity component as well.

13.12. NetHope is a consortium of 32 of the largest international non-governmental organizations (NGOs) working in over 180 countries. NetHope's partners include several US-based high tech companies such as Intel, Cisco, Microsoft, and Google and international industry associations such as the Global VSAT Forum (GVF). Other supporting organizations include the Rockefeller Foundation, the Bill and Melinda Gates Foundation, and the W.G. Kellogg Foundation. NetHope's core mission is to serve as a catalyst for ensuring its members have access to the best information and communication technology and practices when serving people in the developing world.

13.13. Their focus is on five strategic initiatives:

- Connectivity;
- field capacity building;
- emergency response;
- shared services;
- innovation.

13.14. Through the GBI Alliance, USAID will be working closely within the NetHope ecosystem to target high priority areas needing special attention, develop requirements for common ICT solution sets, and ultimately develop and make available across the NGO community, shared solutions that can be implemented by NGOs as core components of their projects. The goals of this collaboration are to reduce implementation time, lower implementation and operational costs, enhance the quality of support through shared solutions, and help ensure richer and more scalable, replicable, and sustainable use of ICT solutions.

13.5 Power Africa

13.15. Increased availability of low cost, environmentally friendly electricity is critical to economic development and trade with West Africa. In FY 2005, USAID's West Africa Programme continued to provide support to the West Africa Power Pool (WAPP), an industry organization created by electrical utilities in the region with the goal of increasing investment in the sector. The WAPP entered a new phase of its development with the approval in principle by the Energy Ministers of the ECOWAS States at the end of October 2005 of the Articles of Agreement for a Power Pool organization. In FY 2005, construction began on the West Africa Gas Pipeline by a consortium of US and West African companies and the first deliveries of gas occurred in 2010. USAID's investment in the pipeline helped regulators and governments create the enabling environment allowing for this US\$615 million investment that will bring low cost fuel to power plants in Benin, Ghana, and Togo.

13.16. USAID also provides technical assistance to the Southern, West, and Central Africa Power Pools. The objective of this support is to increase access to reliable, affordable electricity through economically based, cross-border energy trading, while also building the capacity of the continent's electricity utilities to deliver essential services in a commercially viable manner.

13.17. Power Africa, a new US Presidential Initiative to double access to power in sub-Saharan Africa, has supported this transfer of assets from the public to private sector. US President Barack Obama, through Power Africa has committed to providing seven billion dollars over the next five years to support six African countries, including Nigeria. Power Africa will bridge the gap between Africa's power shortage and its economic potential by working with US, international and African partners – private sector and government -- to take the steps needed, from helping countries develop newly-discovered resources responsibly, to building out power generation and transmission and expanding the reach of mini-grid and off-grid solutions. The US Government will work closely with the African Development Bank and other donors and investors to enhance the energy sector resources available. All the partners in the Power Africa initiative recognize that business and government must make long-term commitments to solve Africa's energy deficit. Tough reforms are required on the part of government. Business needs to provide long-term, sustainable solutions. US Government partners need to provide support for deserving projects in a clear and effective way. Power Africa exists to enable these steps to be taken.

13.6 USAID Partnership for Enhanced Engagement in Research

13.18. The Partnerships for Enhanced Engagement in Research (PEER) is a joint programme supported by USAID, the National Science Foundation, and the National Institutes of Health that assists developing country scientists by giving them the opportunity to conduct research in collaboration with NSF- and NIH-funded scientists on topics related to social and economic development issues such as health, climate change, agriculture, water, biodiversity conservation, and disaster mitigation. PEER awards, which are made directly to the developing country institutions, build capacity and engage developing country researchers to address key global development challenges, while leveraging US scientific expertise and building long-term scientific relationships. For more information, visit:

<http://sites.nationalacademies.org/pga/dsc/peer/index.htm>.

13.7 USAID Higher Education Solutions Network (HESN)

13.19. USAID has created a constellation of seven Development Laboratories that harness the intellectual power of great American and international academic institutions and that catalyse the development and application of new science, technology, and engineering approaches and tools to solve some of the world's most challenging development problems. The Laboratories will help USAID and other development stakeholders to discover more innovative, results-driven, efficient, cost effective and accessible solutions to global development challenges in areas such as global health, food security and chronic conflict. The HESN will create a novel constellation of seven Development Labs that will enable USAID and other development stakeholders to:

- Improve the understanding of development problems and solutions through better data and analytics;
- test, evaluate, and catalyse technologies for development;

- design, create, and incubate revolutionary approaches in addressing development problems, including the incubation of new low-cost technologies and innovations;
- promote entrepreneurship to sustain and scale these tools and approaches; and
- harness the enthusiasm and interest of students for development.

Development Laboratories are currently functioning in Duke University, Texas A&M University, the College of William and Mary, Michigan State University, Makerere University (Uganda), the University of California at Berkeley, and the Massachusetts Institute of Technology.

13.8 USAID'S South Asia Regional Initiative for Energy (SARI/ENERGY)

13.20. The regional energy programme of USAID, SARI/EI, will focus on the promotion of cross-border energy trade (CBET) in its Phase IV (FY 2013-2017). By the creation of enabling systemic conditions for CBET, the programme aims to improve the prospects of trade and investment in the transmission projects across the borders as well as power generation projects. As a platform for discussion, debate and deliberation on CBET issues, SARI/EI plans to set up and support three Task Forces (TFs), each one aimed at one of the following objectives:

- (i) Progressive harmonization of policy, legal and regulatory issues;
- (ii) Expansion of sub-regional electricity transmission system interconnections; and
- (iii) Establishment of a South Asia regional electricity network and markets.

13.21. As a result of SARI/EI, sub-regional grids in North-Eastern, Eastern and Southern regions of South Asia are at different stages of development. The three projects, which involve infrastructure power transmission interconnections investment of US\$1.1 billion, are: an India-Nepal 150 MW Interconnection (\$57 million), a Sri Lanka-India undersea interconnection (\$867 million), and an India-Bangladesh 500 MW link (\$154 million). Of these projects, the India-Bangladesh connection is expected to be operational soon.

13.22. The activities of SARI/EI TFs, especially TF1 and TF2, will engender conducive atmosphere for bringing above-mentioned projects to fruition as well as germinate ideas of new cross-border projects. TF1 will promote infrastructure interconnections by addressing technological barriers faced by those projects, e. g., lacking capacity to design, operate, and handle HVDC technology. Similarly, TF2 will help create energy markets and mechanisms for transparent trade practices. Thus, SARI/EI efforts will give a serious fillip to the energy trade across the borders of the South Asian nation, which will, in turn, foster and brighten the opportunities for trade and investment in the power sector of the region.

13.9 Coral Triangle Initiative on Coral Reefs, Fisheries, and Food Security

13.23. The Coral Triangle Initiative (CTI-CFF) on Coral Reefs, Fisheries, and Food Security is a multilateral partnership to sustain the Southeast Asia region's extraordinary marine and coastal biological resources. Recognized as the global centre of marine biological diversity, the Coral Triangle region is shared within the waters of six countries – Indonesia, Malaysia, Papua New Guinea, the Philippines, Timor-Leste, and the Solomon Islands – where one in three people of the region rely upon coastal fisheries for their primary food security each day. The CTI-CFF was officially launched in December 2007 during the 13th Conference of the Parties to the UN Framework Convention on Climate Change in Bali, and endorsed by the six heads of state at the CTI-CFF Summit in May 2009. Home to some 363 million people, the region faces immediate risk from a range of factors, including over-fishing, unsustainable fishing methods, land-based sources of pollution and climate change. The United States Government was the first financial supporter and partner to the CTI, pledging a commitment of over \$41 million over five years to a regional USAID/RDMA (Regional Development Mission-Asia) programme to support the Coral Triangle countries to implement the Initiative. In cooperation with the CT national governments and the international community, this five-year programme provides technical assistance and helps build capacity to address critical issues including food security, climate change, and conservation of marine biological diversity upon which production fisheries and tourism depends. The US team providing support to the CTI-CFF involves the State Department, the US Agency for International

Development (USAID), National Oceanic and Atmospheric Administration (NOAA), a consortium of NGOs (World Wildlife Fund, The Nature Conservancy and Conservation International), and a contractor (ARD) which functions as the Programme Integrator. Additional support is provided by USAID's bilateral missions in Indonesia, the Philippines and Timor-Leste. Altogether, US Government support totals more than \$60 million.

13.24. Support from the US Government promotes the adoption of best practices in regional ocean governance and the management of coastal and marine ecosystems to ensure the long-term provision of the essential services they provide to local people. Such best practices include strengthening institutions to sustain impact; harmonizing and implementing an ecosystem approaches to fisheries management policy and practice across the region; establishing a six-country system of marine protected areas and management effectiveness framework; and Region-wide Early Action Plan for Climate Change Adaptation paired with local toolkits and capacity. This support has significantly enhanced the policy, practice, and human capital to make scientifically informed decisions and also has helped advance the best practices to conserve natural ocean capital in the face of climate change and ocean change.

13.10 Consultative Group on International Agricultural Research

13.25. USAID supports CGIAR, which is a global research-for-development partnership consisting of a Consortium of international agricultural and natural resources research centre and its funders, working with partners to achieve the CGIAR vision. The CGIAR's vision is to reduce poverty and hunger, improve human health and nutrition, and enhance ecosystem resilience through high-quality international agricultural research, partnership and leadership. The CGIAR was established in 1971, and its donors include both developing and developed countries, international and regional organizations and private foundations.

13.11 Support for biotechnology

13.26. Agricultural biotechnology offers an important tool, which along with traditional breeding, and improved resource management, enhances crop, livestock, and aquaculture productivity. This increases the incomes of small-scale agricultural producers in an environmentally sustainable way by:

- Reducing pesticide use and excess fertilizer use that pose threats to biodiversity and human health;
- Battling damaging plant diseases and pests by developing new resistant crop varieties;
- Making widely grown food crops more resilient and stress tolerant, thereby helping farmers adapt to a changing climate;
- Enhancing the nutritional quality of key staple crops to counter malnutrition and improve the health of farmers and consumers; and
- Enabling better livestock disease diagnosis and the development of more effective livestock vaccines.

13.27. Since 1989, USAID has taken an innovative approach to biotechnology, integrating technological development with policy reforms necessary for safe and effective application in developing countries. This integrated approach ensures that countries can safely access biotechnology, if they choose to do so, and that a broader range of technologies are made available for the benefit of small-scale farmers. This is accomplished by jointly building technical capacity in crop research and development through biotechnology and also making sure that decision-makers have the resources they need to make informed decisions about biotechnology and biosafety.

13.28. Through USAID's agricultural biotechnology programmes, developing countries build the capacity to develop the crops they need in a safe manner. The programmes engage the expertise of faculty and staff from the United States and developing country universities, private sector, nongovernmental organizations, and international institutions such as the CGIAR, to form an integrated strategy for developing and managing this technology.

13.29. The goals include:

- Developing new crops for smallholder farmers to improve the availability of food and strengthen livelihoods;
- Developing and strengthening biosafety systems to regulate biotechnology;
- Increasing developing countries' capacity for technology development;
- Increasing public understanding of biotechnology and biosafety;
- Helping public research systems address regulatory and IPR issues as they move crops from laboratory to field; and
- Supporting environmental research to inform biotechnology risk assessment and management.

13.12 Programme for Biosafety Systems

13.30. The Programme for Biosafety Systems (PBS), managed by the International Food Policy Research Institute (IFPRI), supports the development and implementation of national biosafety systems in Africa and Asia. PBS addresses biosafety through an integrated programme of research, capacity development, and outreach.

13.13 South Asia Biosafety Programme

13.31. The South Asia Biosafety Programme is dedicated to assisting the Governments of Bangladesh, India and Pakistan in further strengthening institutional governance of biotechnology. The programme builds on existing efforts to advise governments on enhancing and streamlining government systems to realize the benefits of agricultural biotechnology within a transparent, efficient and responsive regulatory framework that ensures the safety of new foods and animal feeds, and protects the environment.

13.14 Agricultural Biotechnology Support Programme II

13.32. Agricultural Biotechnology Support Programme II, a USAID-funded consortium of public and private sector institutions managed by Cornell University, focusses on the safe and effective development and commercialization of bioengineered crops as a complement to traditional and organic agricultural approaches. Current ABSPII partner countries include India, Bangladesh, the Philippines, Indonesia and Uganda, with several in-country ABSPII representatives.

13.15 AFRICAN AGRICULTURAL TECHNOLOGY FOUNDATION

13.33. The African Agricultural Technology Foundation (AATF) facilitates public-private partnerships to access proprietary technology and to ensure the delivery of biotechnology through the local private and public sectors. Through USAID support, AATF's management of these linkages upstream and downstream of public sector research has established international partnerships to develop insect-resistant cowpea, nitrogen-use efficient rice varieties, and drought tolerant maize using modern biotechnology. AATF works in several African countries, including Nigeria, Uganda, Kenya, Burkina Faso, Ghana, Tanzania, Mozambique and South Africa.

14 US PATENT AND TRADEMARK OFFICE PROGRAMMES

14.1 Global Intellectual Property Academy

14.1. The USPTO trains and offers technical assistance on IPR protection and enforcement to countries around the world, including LDCs. Without a strong system of IPR protection, foreign businesses will be hesitant to make their technology available to developing country partners and developing country innovators will not be able to capitalize on their creativity. In FY 2012, the USPTO's Global Intellectual Property Academy (GIPA) conducted more than 140 training, technical

assistance, and capacity building programmes for over 9,200 participants from 129 different countries. Most participants came from developing and least-developed countries. USPTO's website at <http://www.uspto.gov> hosts seven IPR e-Learning modules in Arabic, English, French, Russian and Spanish. By the end of FY 2012, the e-learning modules had received almost 21,000 hits since they were first placed on the USPTO website in early 2010. In addition, the USPTO has IPR Attachés posted at several US embassies or consulates. These Attachés work with host governments and NGO's to provide IPR technical assistance and capacity building programmes of particular interest to one or more countries in their region.

14.2. In 2007, the USPTO completed construction of GIPA that includes a 20,000 square-foot training facility at its headquarters in Alexandria, Virginia. Through this dedicated space, the USPTO efficiently delivers targeted training to foreign IP officials. Training focuses on pertinent information for IP office administrators, examiners, judges, prosecutors, customs officers, and other government and law enforcement officials. LDC representatives attended five GIPA programmes in the United States in 2012 as well as additional programmes at the USPTO such as the State Department's International Visitor Leadership Programme and the Foreign Mission Embassy Programme. Countries represented at these programmes included: Bangladesh, Benin, Bhutan, Burkina Faso, Burundi, Cambodia, Central African Republic, Chad, Democratic Republic of the Congo, The Gambia, Lao PDR, Lesotho, Liberia, Madagascar, Malawi, Mali, Mozambique, Nepal, Rwanda, Senegal, Sierra Leone, Sudan, Tanzania, Togo, Uganda, Yemen, and Zambia.

14.3. The USPTO's GIPA and IP Attachés also provide IP-focused technical assistance and capacity building to foreign officials in their home countries. Programmes have focused on IP rights enforcement as well as patent, trademark, and copyright policy and best practices. Participants at these in-country or regional programmes offered in FY 2012 included government officials from Albania, Algeria, Argentina, Armenia, Bangladesh, Benin, Bhutan, Brazil, Brunei Darussalam, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Central African Republic, Chad, Chile, China, Croatia, Czech Republic, Democratic Republic of Congo, Estonia, Fiji, Finland, The Gambia, Georgia, Hungary, India, Indonesia, Jordan, Kenya, Korea, Lao People's Democratic Republic, Latvia, Lesotho, Lithuania, Madagascar, Malawi, Malaysia, Mali, Mongolia, Mozambique, Pakistan, Papua New Guinea, Paraguay, Peru, Philippines, Romania, Russia, Rwanda, Senegal, Serbia, Sierra Leone, Singapore, Slovenia, Sudan, Sweden, Tanzania, Thailand, Togo, Tunisia, Uganda, Ukraine, Vietnam, and Zambia.

14.4. USPTO conducts regional technology transfer programmes around the world. For example, in FY 2012, GIPA conducted a series of webinars on technology transfer with the National Council on Entrepreneurial Technology Transfer, discussing various IP issues in technology transfer transactions, including IP commercialization, protecting inventions, trade secrets, and more. Those webinars were targeted to researchers and inventors. In addition, in November 2012, GIPA held a workshop on IP Management and Technology Licensing for technology transfer professionals from throughout the world, including a number of LDCs. The topics included promoting innovation, identifying patentable inventions, the role of the technology transfer office, IP management tools, and case studies.

14.5. The United States provides further elaboration of its technical assistance, training and technology transfer activities specific to IPR in its 2011 Report on activities carried out in relation to Article 67 of the TRIPS Agreement.

14.2 Patents for Humanity Pilot Programme

14.6. From February 2012 to April 2013, the USPTO conducted the Patents for Humanity Pilot Programme to encourage assistance to LDCs and the less fortunate. The programme, a voluntary prize competition, provided business incentives for patent owners and licensees to apply their technology to humanitarian purposes. The USPTO received 81 applications from participants describing how they used their technology to combat global challenges in four areas: Medical Technology, Food and Nutrition, Clean Technology, and Information Technology. Volunteers from academia served as judges, ultimately selecting ten recipients. At an awards ceremony held on 11 April 2013, with support from the Kauffman Foundation, these ten winners received recognition of their efforts and a certificate to accelerate select matters at the USPTO on any technology in their portfolio. More information about the recipients can be found at: http://www.uspto.gov/patents/init_events/patents_for_humanity/awards2013.jsp. With the pilot

programme concluded, the USPTO is evaluating how to continue addressing global challenges to reach the less fortunate.

15 TECHNOLOGY TRANSFER FROM US UNIVERSITIES

15.1. A major avenue for technology transfer from the United States is our university system, where foreign students are educated and then bring that training to private and public employment, often in their home countries.

15.2. Since US universities are largely established as non-for profit (tax exempt) entities, the education they provide is subsidized by the US taxpayer in the form of foregone tax revenues. The private endowments that enable foreign students to attend US universities on financial aid were built with tax exempt donations.

15.3. In 2012, there were 764,495 international students enrolled in US institutions of higher education, representing 3.7 per cent of the total US higher education enrolment. Many of the foreign students gravitate to the same US universities, where the portion of foreign students may reach 20 per cent or higher. The top three countries of origin for foreign students in the United States were China (194,029 students), India (100, 270) and South Korea (72,295). The LDC with the most students enrolled in US institutions of higher education in 2012 was Nepal with 9,621 students. The chart below shows enrolment by students from all LDCs at US universities for the 2011/2012 academic year.

15.4. The top five most popular fields of study for international students in the United States in 2010/2011 were: Business and Management (21.5 per cent of total); Engineering (18.7 per cent); Physical and Life Sciences (8.8 per cent); Mathematics and Computer Science (8.9 per cent); and Social Sciences (8.8 per cent). The top five most popular fields of study for international students in the United States in 2011/2012 were Business and Management (21.8 per cent of total); Engineering (18.5 per cent); Mathematics and Computer Science (9.3 per cent); Social Sciences (8.7 per cent); and, Physical and Life Sciences (8.6 per cent).³

15.5. Some foreign students at US universities enter the United States as non-immigrant exchange visitors ("J-1") subject to Section 212(e) of the Immigration and Nationality Act residency requirement that makes students ineligible to remain in the United States after completing their studies. This law applies to all students participating in programmes sponsored and/or funded by the US Government or for nationals of certain countries based on an established exchange visitor skills list. In these cases, the J-1 visa requires that students spend 24 months outside the United States before they can be issued a permanent residence or a work visa to the United States, although travel to the United States for temporary business or tourism is acceptable. Foreign students subject to the Section 212(e) requirement may also apply for this requirement to be waived if there is no objection from the foreign government, direct interest from a US Government agency, or if the visa holder is subject to persecution in his or her home country or usual foreign residence. However, generally, the Section 212(e) requirement encourages students to return to their home countries after completing their studies and thereby further supports technology transfer abroad.

LDC Student Totals by Place of Origin, 2011/2012.⁴

Origin	2011/2012
Afghanistan	371
Angola	779
Bangladesh	3,314

³ <http://www.iie.org/Who-We-Are/News-and-Events/Press-Center/Press-Releases/2010/2010-11-15-Open-Doors-International-Students-In-The-US>.

⁴ Institute of International Education, International Student Totals by Place of Origin, 2010/11, Open Doors Report on International Educational Exchange. Retrieved from: <http://www.iie.org/opendoors>.

Origin	2011/2012
Benin	313
Bhutan	100
Burkina Faso	631
Burundi	103
Cambodia	333
Central African Republic	28
Chad	84
Comoros	9
Congo, Dem. Rep. of	320
Djibouti	8
Equatorial Guinea	164
Eritrea	110
Ethiopia	1,334
The Gambia	383
Guinea	104
Guinea-Bissau	12
Haiti	889
Kiribati	48
Lesotho	46
Liberia	159
Madagascar	133
Malawi	258
Mali	402
Mauritania	61
Mozambique	67
Myanmar	807
Namibia	63
Nepal	9,621
Niger	247
Rwanda	465
Samoa	51
Sao Tomé and Príncipe	1
Sierra Leone	130
Solomon Islands	13
Sudan	180

Origin	2011/2012
Tanzania	906
Timor	40
Togo	250
Tuvalu	3
Uganda	779
Vanuatu	8
Yemen	269
Zambia	535
Total	24,931

15.6. Common practices that encourage technology transfer from US universities are:

- Publication of research results in the open academic literature that is accessible globally through the Internet, and read by scientists, engineers, and researchers in all sectors;
- personal interaction between creators and users of new knowledge (e.g. through professional meetings, conferences, seminars, industrial liaison programmes and other venues);
- collaborative research projects;
- entrepreneurial activity of faculty and students occurring outside the university without involving university-owned intellectual property; and
- licensing of intellectual property to established firms or to new start-up companies.⁵

⁵ National Research Council, Managing University Intellectual Property in the Public Interest (Washington, DC, National Academies Press, 2011) page 2.