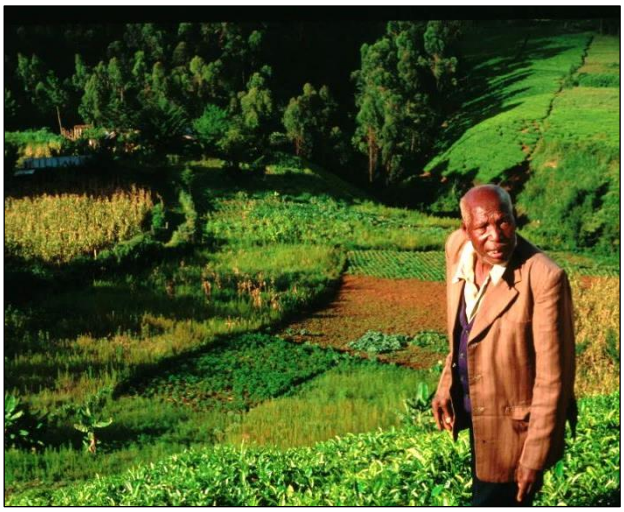
WIPO | GREEN
The Marketplace
for Sustainable Technology

Project Report

Facilitating the Transfer of Climate Technologies in East Africa:
Opportunities in Agriculture and Water Technologies



WIPO | GREEN
The Sustainable
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Climate innovation Center
Kenya

Climate innovation Center
Ethiopia

CIPIT
CENTRE FOR INTELLECTUAL PROPERTY
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CTCN
CLIMATE TECHNOLOGY CENTRE & NETWORK

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Anatole Krattiger, Anja von der Ropp, Yesim Baykal and Meghana Sharafudeen

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www.wipo.int/globalchallenges

World Intellectual Property Organization
34, chemin des Colombettes
P.O. Box 18
CH-1211 Geneva 20
Switzerland
Telephone: +4122 338 91 11
Email: global.challenges@wipo.int

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Introduction

Global Challenges Program
WIPO GREEN
World Intellectual Property Organization (WIPO), Geneva, Switzerland
wipo.green@wipo.int

Kenya Climate Innovation Center (KCIC)
Nairobi, Kenya
info@kenyacic.org

Ethiopia Climate Innovation Center (ECIC)
Addis Ababa, Ethiopia
info@ethiopiacic.org

African Agricultural Technology Foundation (AATF)
Nairobi, Kenya
aatf@aatf-africa.org

Center for Intellectual Property and Information Technology Law (CIPIT)
Strathmore University
Nairobi, Kenya
cipit@strathmore.edu

Climate Technology Centre and Network (CTCN)
Copenhagen, Denmark
k.larsen@unido.org

1.1 Background

"Water is the heart of our environment and closely relates to the development of cities and rural areas alike" is how we began the report of a related matchmaking project in South East Asia that focused around wastewater processing technologies in Indonesia, Vietnam and the Philippines and culminated in a matchmaking event in 2015[1]. This present report centers around needs related to water and agriculture, again at the nexus of climate change and technology transfer. With yet another high temperature record year, rarely has the connection between climate change and the quality and quantity of water, and of agricultural productivity, been clearer.

Much needs to happen at the nexus of water and agriculture in order to attain Sustainable Development Goal (SDG) No. 2 and end hunger, achieve food security and improved nutrition, and promote sustainable agriculture, among many other goals. Given that over 2 ½ billion smallholder farmers provide nearly 80% of food in Asia and Africa, a strategy to produce more food, feed, fiber and fuel over the long term must include a shift from mere productivity increases to a sustainability focus as Jeremy Bird, Director General of the International Water Management Institute recently described[2]. Further, small-scale farmers constitute the vast majority of food insecure people and policy interventions will have to be directed towards them. Although technology alone does not provide comprehensive

[1] WIPO GREEN. 2016. Facilitating the Transfer and Diffusion of Clean Technology: Opportunities on Wastewater Treatment in South East Asia. Report of a Pilot Project. Global Challenges Program. WIPO: Geneva. www.wipo.int/globalchallenges and ow.ly/dq2W302V6NI
[2] Bird, J. 2016. Can our Weary World Keep Feeding Us? The Huffington Post, August 8. http://ow.ly/AF4y303kMPO

solutions, it is one component that offers opportunities for partnering, especially across and between public and private sectors given their overlapping and complementary interests.

In June 2012 the Committee on World Food Security (CFS), the United Nations' forum for reviewing and following up on policies concerning world food security, issued a report acknowledging the potentially serious impact of climate change on food production in developing countries. It recommended a series of interventions which will improve the ability of farmers to manage changes in climate, including investment in supply chain infrastructure, investment in public research for adaptation, the modernization of extension services, and the re-use of water (recycling) and smart irrigation systems.

The World Intellectual Property Organization (WIPO) is prepared to play its part in facilitating the transfer and diffusion of green technologies, specifically those that lead to developmental benefits. WIPO GREEN was launched in late 2013 by WIPO together with 35 Partner organizations throughout the globe (now counting 78 Partners; see Annex 1 for a complete list). It is a marketplace that promotes the innovation and diffusion of green technologies. It does this by connecting technology and service providers with those seeking innovative solutions and, thus, catalyzes mutually beneficial commercial transactions. As the United Nations (UN) agency dedicated to promoting innovation and creativity, WIPO has a mandate, embedded in WIPO's Development Agenda, to promulgate practical intellectual property tools that drive forward solutions to environmental challenges.

WIPO GREEN encourages the exchange, sale and licensing of technologies and their associated rights on a voluntary basis. Nevertheless, not all technologies and products listed in the WIPO GREEN online database are patent protected; any transfer of these would center around know-how or trade secrets. Today, WIPO GREEN is a stable network and growing gateway to green technology solutions. This adds transparency in the marketplace and, in turn, leads to greater efficiency. The network comprises technology providers and seekers from industry; small and medium-sized entities and multinationals; public and private research institutions and universities. It is also involved with associations, banks and other finance mechanisms, relevant agencies of the United Nations, most notably the Climate Technology Centre and Network (CTCN), the Climate Technology Program hosted at *info*Dev within the World Bank Group, and the Asian Development Bank (ADB) and others from around the world.

This project's strategy was partly underpinned by the realization that fundamental changes have and are taking place in the field of IP and innovation management. First, the public sector has recognized the value of IP management, which has resulted in new, creative relationships between the public and private sectors to address urgent development needs globally. Second, the emergence of innovative industries within developing countries is beginning to be impacting home grown innovation, especially when it comes to adapting to climate change.

The WIPO GREEN project on agricultural and water technologies in East Africa entails an analysis of specific needs in a well-defined area of technology. A comprehensive understanding of needs is essential for an effective deployment of green technology. This phase of the project was carried out by several Partners and collaborators from within the WIPO GREEN Network who identified needs in Ethiopia, Kenya and Tanzania. They investigated, identified, and described precise technology needs in consultation with relevant stakeholders in all three countries, with a view to facilitating the identification of valid solutions to those needs. In this way, the project also promoted WIPO GREEN as a matchmaking and networking tool for WIPO GREEN Partners.

The Kenya Climate Innovation Center (KCIC), the Ethiopia Climate Innovation Center (ECIC) and Strathmore University's Center for Intellectual Property and Information Technology Law (CIPIT) in Kenya were contracted to facilitate the matching of technology providers with seekers in the water and agriculture sectors in Kenya and Ethiopia. Also collaborating on the

project was the African Agricultural Technology Foundation (AATF), while the United Nations Framework Convention on Climate Change (UNFCCC) and the Climate Technology Center and Network (CTCN) were a co-organizer of the event. The project was financed by funds entrusted to WIPO from the Government of Japan.

KCIC supports the growth and development of innovative clean technologies and business models for commercial markets. Their objectives are to help strengthen the domestic capacity to finance and develop clean technologies.

ECIC is a center implemented through a four-member consortium led by the Horn of Africa Regional Environmental Center. ECIC provides a holistic set of early-stage financing, business support and capacity building services to the Ethiopian private sector, including women, rural based entrepreneurs and business owners, working to develop, launch and grow innovative climate technology ventures that promote Ethiopia's climate resilience and green growth.

CIPIT is part of Strathmore Law School, and is an innovative Centre for evidence-based research and training in IP and information technology law and policy. The Centre provides practical courses and seminars targeting lawyers, business professionals, venture capitalists, media houses, and start-up incubators in areas of IP law.

AATF is a not-for-profit organization that facilitates and promotes public/private partnerships for the access and delivery of appropriate agricultural technologies for sustainable use by smallholder farmers in sub-Saharan Africa through innovative partnerships and stewardship along the entire value chain. AATF seeks to provide expertise and know-how that facilitates the identification, access, development, delivery and utilization of agricultural technologies.

1.2 Objectives of the matchmaking project

The overall objective of the project was to identify, describe and formulate specific needs in the area of water and agriculture in Ethiopia and Kenya (primary focus) as well as Tanzania, and to match green technology and service providers to those seeking them. Specifically, the intent was to:

- identify water and agriculture-related technology needs in Kenya and Ethiopia (primary focus), as well as Tanzania in consultation with national authorities, companies, associations, and international agencies, as appropriate;
- clearly formulate and upload the technology needs in consultation with the technology seekers;
- identify the technologies that correspond to the technology needs;
- hold a matchmaking event to bring together technology seekers with providers to facilitate technology transfer;
- identify and assess intellectual property (IP) issues, if any, and provide information on the IP landscape of the relevant technologies;
- offer training in IP management and licensing to SMEs; and
- share the methodology and findings of the project as well as the lessons learned for future endeavors.

1.3 Process and methodology

Based on the lessons learned from the 2015 South Asia wastewater treatment project3, the WIPO GREEN team formulated a project roadmap and disseminated a call for proposals, eventually choosing a consortium of eastern Africa-based WIPO GREEN Partners as collaborators. While this project consortium identified and formulated needs on the ground, the WIPO team and collaborators worked on finding corresponding technology and service

[3] Op cit. 1.

providers, as well as investors and other experts who could help prospective matches achieve their full potential. Simultaneously, the WIPO team worked on organizing the matchmaking event and related training sessions, eventually reaching out to the WIPO GREEN Partner CTCN, who wanted to hold a stakeholder engagement forum in the region. Combining resources, the two organizations decided to hold a joint event so as to reach the widest possible audience.

The first phase of the matchmaking project (October 2015 - January 2016) involved identification, documentation and uploading onto the WIPO GREEN database of agriculture and water needs from Ethiopia, Kenya and Tanzania. The second phase (January2016 - April 2016) involved organizing and conducting a matchmaking event which brought together seekers and technology and service providers, experts, and potential investors.

KCIC held introductory meetings with the Kenyan Ministry of Agriculture and the Kenyan Climate Change Secretariat in order to understand recent developments in agriculture and water, and to have a clear view of government priorities and relevant policies. This included reviewing the Kenya Vision 2030 Mid Term Plan 2013-2017. The document review and meetings with key ministries revealed that Kenyan government priorities in agriculture included: intensification and expansion of irrigation, value addition for agricultural products, improvement of crop and livestock production for greater food security and farmer incomes, further technologies/interventions/practices that reduce methane emissions from grazing livestock, irrigation and drainage, household water harvesting and micro-irrigation, water-lifting and watershed management. For the water sector, the priorities were identified as: waste management and pollution control, promotion and piloting of green energy, water resources management, water harvesting and storage, and urban and rural water supply.

In Ethiopia, maintaining agriculture as a major source of economic growth is one of the seven strategic pillars of the country's Growth and Transformation Plan II (2015/16 – 2019/20). The plan further identifies smallholder agriculture as the basis for agricultural sector development, with the major agricultural targets being: increasing crop productivity and production, increasing livestock productivity and production, natural resource conservation and utilization (including expanding small scale irrigation), and food security, disaster prevention and preparedness.

A comparison of the Ethiopian and Kenyan priorities shows an overlap in areas of crop improving and livestock production, as well as expanding irrigation.

Cognizant of these government priorities, KCIC mapped the Kenyan stakeholders that could have needs relevant to the scope of the project, and began an initial dialogue. As a first step, potential seekers were informed of the project. If the technology seeker was interested in taking part, subsequent meetings were arranged. Some of these involved visiting the technology seeker in order to document the technology need using the template on the WIPO GREEN database.4 Using this template allowed the team to collect relevant information on the technical nature of the need, rationale behind seeking the technology, the seeker's initial thoughts on the recommended technological solution / improvement, approximate budget, geographic scope, and level of access to basic infrastructural and regulatory facilities and services. The completed forms were shared with the WIPO GREEN team for review before the information on the needs identified was uploaded onto the WIPO GREEN database.

Simultaneously, ECIC engaged a consultant to carry out a parallel process of identifying and documenting technology needs in Ethiopia. The consultant identified companies that were potential technology seekers based on previous contacts, attendance at workshops, and through referrals from development and public organizations. These companies were then approached through a variety of means such as electronic mail, telephone calls and visits. Project documents and summaries prepared by these organizations were also reviewed.

[4] https://www3.wipo.int/wipogreen-database/

Once the collected information was entered into the WIPO GREEN template, the documents were shared with the respective companies for their comments and feedback. Finally, these technology needs assessment reports were uploaded onto the WIPO GREEN database. In addition to the efforts made by ECIC, a consultant engaged by AATF interviewed relevant stakeholders in Addis Ababa and Holeta, including Ethiopian crop, livestock and fish farmers, representatives of the Ethiopian Institute of Agricultural Research (EIAR), irrigation and agriculture experts, livestock officers, and the director of the International Water Management Institute. The needs assessment report was completed in December 2015.

In Tanzania, small scale subsistence farmers dominate the agriculture sector, utilizing over 80% of the country's arable land. There is significant potential for irrigated agriculture and a scaling up of production, and over the last decade the government has systematically focused on agriculture as the largest contributor to the national economy, and a primary tenet of the country's overall development plan.

The Agricultural Sector Development Strategy, jointly formulated by the five agricultural sector lead ministries, sets sector-based priorities and targets to be implemented simultaneously at the national and local government levels. With limited access to usable water in urban and rural areas, the strategy incorporates a strong focus on water management policies as critical to the success of development activities and increased production capacity within the sector. An underlying theme of these policies is achieving a better understanding of farmers' needs and increased stakeholder participation - heavily involving these primary beneficiaries in local planning and implementation processes. In line with this, AATF sent an interviewer to the Arusha, Dar es Salaam, Mwanza-Ilemela and Misungwi districts in order to identify primary water and agriculture related needs on the ground.

The needs related to Zanzibar Island were collected through secondary sources, relying on information provided by the agricultural extension officers based in the coastal region of Dar es Salaam. The respondents interviewed were small scale farmers who gathered in small meetings to provide their responses; agricultural officers (government, non-governmental and private sector), research officers and institutions, scientists, university staff and the officials from the Tanzania Commission for Science and Technology (COSTECH).

Section 2:

Identified needs and corresponding technologies

2.1 Overview

The needs identified from Ethiopia and Kenya were almost evenly split between the agriculture and water sectors. In Tanzania, of the 18 general needs identified, the majority (14) were water-related – although most were crosscutting and involved both fields of focus. Some organizations and seeker groups, such as Kenyatta National Hospital, Kwale Water and Sewerage Company and Nairobi Water and Sewerage Company, as well as local farmers in Ethiopia and Tanzania, had more than one need. While the nature of the needs of local small-scale farmers were often similar in content to those identified by SMEs and larger institutions / municipal bodies, they often represented general needs (as opposed to specific stand-alone projects) for low-cost solutions to make daily processes more sustainable and cost-effective. Thus the overall "project value" for these needs is harder to identify, varying greatly depending on scale and host of other factors. A summary of the technology needs is listed in Tables 1-3 for Ethiopia, Kenya and Tanzania, respectively[5].

It should be noted that the needs collected by the agencies involved in the identification process are non-exhaustive and are based on the responses provided by the specific persons interviewed by the various consultants.

Table 1: List of identified needs in Ethiopia

Company / Seeker group	Problem	Technology needed	Availability of technology	Project value (USD)
Apinec Agro Industry	Low cost queen bee rearing and ranch development	Grafting equipment, Grafting techniques on top bar hives Package bee transportation and Solar energy powered queen rearing	Technology not available locally	135,000
Eco Coffee	Weed controls, pre- and post-harvest handling and accesses electric power for the eco-friendly specialty coffee plantation	Mechanical weed controlling, solar drier and sun drying to dry coffee bean, coffee washing machine with alternative power sources and eco-friendly waste treatment	Technology not available locally	165,000
Elere Farm	Pelletize fish food processing	Automated fish feed processing plant; feed formulation	Simple pelletizing machines available locally	290,000
Guts Agro Industry	Streaming the production process of iodized salt production	Solar energy; digital or automated mixer and packing machines	Technology not available locally	164,000
Hena Farm Plc	Extending life of the fruits and vegetables	Fruit juice extracting machines, Sachet filling machine; and storage and cooling facilities	Technology not available locally	197,200
Menegesha Organic Farm	Producing quality compost for mushroom substrate	Mechanical compost turning; Humidity and air controlling systems and composting yard	Climate-controlled growing environments specifically designed for mushrooms not available locally	111,000

[5] A more comprehensive list can be downloaded from the WIPO GREEN website on ow.ly/cYxk302V8cf

Merin Agro Enterprise	Drying moist raw materials, processing efficiency, packaging and Quality control for animal feed production	Machines to dry raw materials, Automated weighing, packaging and bagging system, and Automated weighing, packaging and bagging system	Technology not available locally	107,000
Nati Coffee and Spices	Lack of access to Turmeric Solar drier and Steam curing machine	Energy efficient Steam Turmeric Curing equipment and Turmeric Solar Drier	Technology not available locally	355,859
Soil and More Ethiopia	Produce compost from flower cuts at commercial scale with optimum amount of inoculants	Commercial scale laboratory that produces inoculants; control production of inoculants	Technology not available locally	563,000
MG Technologies	Biodegradable reels	Solar plastic bottle bulb units with power back up features, Taping and branding machines, Optimal seed spacing techniques	Solar plastic bulbs not available locally	50,000
Bora Integrated Commercial Farm	Efficient technology for watering the nursery, watering seedlings in polybags and germination beds	Seedbed sprinkling equipment Fumigation type irrigation equipment A tissue culture laboratory An improved germination and propagation greenhouse center	Technology not available locally	196,000
Adama Science & Technology University	The need for good soil and water management through innovative and low cost adaptive technology	Pelletizing machine Soil testing equipment Biochar kit A demonstration farm Improvement of the pyrolysis kiln and the barrel and brick kilns currently in use	Simple pelletizing machines available locally	117,000
Ministry of Education Ethiopia	Most of Ethiopia's waste water is discharged into the environment or an open oxidation pond. This has health and environmental consequences	The program needs further support in capacity building, equipment and chemicals for laboratory. To easily modify or operate the treatment plant to meet different requirements Environmental simulation models and training on how to use them	Technology not available locally	175,000
International Development Enterprises	Despite an abundance of groundwater in many parts of Ethiopia, very little effort has been made to tap the resource	A project to scale-up the coverage of the tested and proven iDE agricultural water management solutions so as to reach more geographic locations	Technology available with IDE	2,518,042

Bahir Dar University	The need to develop drought resistant crop and drip irrigation systems for dry months	Solar powered drip technology A rain-out shelter	Solar powered drip irrigation available locally	Drip technology 50,000 Rain our shelter 104,354
Farmers and Agricultural Extension Offices and the regional Ethiopian Institute of Agricultural Research (EIAR	Long drought spells caused by prolonged dry seasons	Affordable drip irrigation technologies suited for small scale farmers.	The available technologies are expensive for the small scale farmers. The alternative technologies such as sprinkle irrigation are well suited for large scale farming	TBD
	Problems in accessing ground water	Affordable borehole drilling technologies and the associated infrastructure such as water pipes, pumps.	The use of traditional methods to fetch water has resulted to water wastage and is tiresome. The boreholes are not located close to the farmers and therefore the water transportation from the borehole to homes is a contributing factor to water wastage.	TBD
	Turbid water which is harmful to livestock and farming	On farm green technologies to enable them identify and treat water turbidity; Affordable technologies to purify water for consumption especially by their livestock.	Use of sand filters which does not address the presence of heavy chemicals in the water so it is not as effective	TBD
	Excessive rain water; loss of rain water as runoff water	Affordable rain water or runoff harvesting/collection/catchment technologies	Use of roof to collect rain water which is applicable for those farmers with houses and good roofing; Use of dams, dykes for water harvesting and storage often does not last long	TBD
	Increased soil degradation and erosion caused by heavy rains and floods Reduced water fertility due to minerals being washed away by the floods especially in the upland areas	Affordable and green soil improvement technologies Bio fertilizers making technologies	Use of chemical fertilizers which increases the soil acidity	TBD
	Lack of appropriate fish species and aquaculture farming technologies in Ethiopia	Appropriate and adaptable aquaculture (fish farming) technologies Fish feed manufacturing technologies Fish farming expertise	Reliance on the natural sources for fingerlings is not sufficient and buying fish feed is expensive	TBD

Table 2: List of identified needs in Kenya

Company / Seeker group	Problem	Technology needed	Availability of technology	Project value (USD)
Shekere Ltd	Removing turbidity and other contaminants from drinking water Developing a low-cost water purification unit	Water filter and portable water unit	Similar technologies are available in Kenya	55,000
Nyangorora Banana Processors	Inadequate machinery for processing bananas supplied by farmers and inability to meet market demand for the crisps	Automated banana crisps making machine	Simple versions of food processing machines available in Kenya	33,750
LishaBora	Inability to obtain consistent and high quality of fodder from barley grown hydroponically	Automation of the manual hydroponics system	Technology not available locally	20,000
Aviva Nest Co	Inadequate machinery to process Nerica paddy rice, Nerica by-products and waste (rice husks)	Processing paddy rice and stabilizing rice bran	Technology not available locally	600,000
Eco Agribusiness Limited	Spoilage of strawberries due to power outages and surges leading to massive post harvest losses	Solar powered cold room for storage of harvested strawberries	Technology not available locally	45,000
Ngare Narok	Not able to take the live weight of cows in the field which leads to lower income for livestock farmers in the semi-arid areas	Measuring the live weight of animals in the field and having the same information in a central database	Technology not available locally	73,000
East Africa Roselle Company Ltd	Rudimentary machines for packing hibiscus juice	Automated hibiscus harvester, pasteurizer and solar/hybrid drier	Technology not available locally	54,000
Meishan International Merchants	Drying the manure before pelletizing is a challenge especially during wet weather	A pelletizing machine that also removes excess moisture from manure	Technology not available locally	53,000
Mineral and Allied Ltd	The hydroponics systems sold to farmers are not automated which affects the quality of fodder that livestock farmers get	Technology to automate the hydroponics system used by small scale farmers so that they are able to regulate the water pH, nutrients and temperature Technology that allows remote monitoring of the hydroponics system	Technology not available locally	18,610

Human Needs Project	Limited access (less operating hours, small geographical coverage) to clean drinking water in informal settlements	Automated water kiosks with a pre-paid system that operates 24 hours a day	Technology available in Kenya	12,000
Kwale Water & Sewerage Company	High power costs related to pumping water Non-revenue water Loss of water due to illegal connections Salinity in most of the ground water sources	Employing green energy in operating pumps to cut on power consumption Improve on storage reservoirs so that there is adequate storage which will in turn minimize the pumping hours Conduct an energy audit so that the green energy and other energy sources are used efficiently Procure and install smart meters to all customers Network reticulation improvement which will help in making efficient use of the pumped water Employing GPS attached to leaky detection equipment for quick detection of leaks and remedy thereafter Environment friendly desalination technology – like a solar powered membrane desalination processes, or solar distillation	Solar mini grid can be done by local service providers Technology to build storage reservoirs available in Kenya Capacity to conduct energy audits is available Smart meters are available from local providers GPS technology for quick detection of leaks also available from local providers Desalination technology not available locally	1,505,000
Nairobi Water and Sewerage Company	Discharging chemical waste into community farms Discharging water into a valley that has led to loss of lives High power costs related to pumping water	Adoption of new water treatment technologies through use of Polyaluminium Chloride in water treatment Segregating the sludge from disinfection and pH-correction processes so that it is not discharged into the stream Covering the open channel chutes with reinforced slabs or walls Generation of Hydro Electric Power using in-pipe turbines	Technology not available locally except the reinforced slabs/walls	160,000
Thika Water and Sanitation Company	High power costs related to pumping water	Install a solar mini grid in the water treatment plant to power the 8 pumps so as to reduce operational costs Install a pre – sedimentation / de-silting tank in the water treatment plant within the existing pump house reservoirs before coagulation and flocculation to remove excess silt/grit from the river water	Solar mini grid can be done by local service providers The de-silting tank can be constructed locally	200,000

Tana Water Services Board	Inaccurate data collection Expensive expansion of existing infrastructure	TWSB seeks to acquire technology that will help them collect accurate data from the beginning so that even the projections are more realistic and likely to serve the target population for longer This includes GPS surveying systems and updated engineering data processing software	GPS surveying systems can be sourced locally though the software will be imported	5,000
Kenyatta National Hospital	Traditional toilets that use a lot of water to flush Traditional taps that are not water efficient Unsustainable use of water in the laundry department and staff quarters	Installation of Sewage Effluent Treatment Plant (SETP) for treating the sewage from staff quarters (mainly Kenyatta Estate) and reuse the water for toilet flushing, irrigating lawns, scrubbing incinerators and indirect portable reuse Installation of Gray Water Treatment Plant (GWT) with Ultra-filtration for treating kitchen and laundry wastewater to reuse in floor cleaning and irrigating lawns Energy and water efficient industrial laundry machines Low-flow and aerating taps that have flow restrictions, Dual flush cistern toilet and smart control urinals to avoid unnecessary flush	The required large-scale sewage and waste water treatment is not available locally Water efficient laundry machines, taps with flow restrictions and dual flush cisterns are available locally from international manufacturers	3,030,000
Nyeri County Referral Hospital	Inability to harvest rainwater due to insufficient resources and inappropriate rooftops	Rain water harvesting system that collects water from all the roof tops	Technology available locally	45,000
Micro and Small Enterprise Association - Garissa	Minimal access to water in Kenya's semiarid regions of Garissa and Wajir	Solar or wind powered pumps for wells to replace the diesel powered pumps Environmentally-friendly water treatment technologies	Solar/wind solutions available locally through international companies	100,000
Olkeri Water Project	High fluoride content in drinking water High power costs associated with pumping water Untreated water supplied to users	Technology to address water hardness; tests: water pumps Water treatment to make it safe for drinking	Technology available locally	16,000
Future pump	Lack of an efficient system to track payments for solar water pumps sold on hire purchase	Installation of a smart metering device connected to a solar panel for water pumping purposes	Technology available locally	5000

Afric Aqua	High fluoride and high salinity in drinking water Water quality monitoring Reduction of non-revenue water Water bottling technology Distribution network mapping and monitoring Solar transportation systems	Water quality treatment equipment (solar driven), Mobile real-time water quality monitoring systems, equipment and digital water meters Distribution network mapping and monitoring use of GPS and Google systems to map consumption patterns and support predictions Efficient solar transportation systems- solar powered bikes and tuktuks	Solar driven water treatment solutions not available locally Real-time water/networking monitoring solutions available locally Efficient solar transportation systems not available locally	50 water treatment units at 5,000,000
Kitui Industries	A semi-arid region that sometimes experiences heavy rains Need to harvest the rain in dams and use the water during the dry season	A low cost water pump that runs on bio-diesel	Technology not available locally	200,000
Happy Cow	Borehole water that is not suitable for food processing	Borehole water containing high levels of turbidity, bicarbonate, fluoride, pH and iron	Water purification solutions available locally - though they may be expensive	20,000 to 40,000
Wakulima Dairy	The current water supply from the municipal council is irregular and affects milk processing	To make the water suitable for use in food processing A water purification system Storage tank not less than 100,000 liters are needed	Water purification solutions available locally – though they may be expensive	5000
Eden Millers	Need to pelletize fish feed that is currently produced in mash form A more reliable way of drying fish pellets is needed	Hammer Mill to reduce ingredient feed particles to the right sizes Feed Mixer to ensure different ingredients are homogeneously mixed after milling Wet extruder – preferably one that can run on solar energy for efficient output of floating fish pellets whose digestibility is also improved by the heating process in extrusion Solar/Hybrid dryer that will ensure quick drying of produced fish pellets A perforated plate belt conveyor continuously running through drying chambers will ensure proper drying of pellets Automated weighing and packing component Feed formulation software for developing least cost formulations in-house and ensuring accurate ingredient balance in feeds	High quality hammer mill not locally available Feed mixer available locally A solar powered wet extruder not available locally Solar/hybrid dryer not available locally Automated weighing and packing solutions, and feed formulation software not available locally	74,000

Kisumu Polytechnic	Need for an effective and environment friendly disinfectant Fabrication of toilet parts	Carbonizing machine Machine for powdering zeolite, carbonized and uncarbonized bagasse Tea factories have a machine for grinding and drying tea leaves This technology could be important in grinding disinfected excreta and mixing it with already grinded zeolite and powdered carbonized and uncarbonized bagasse Machine for extraction of saponin at industrial level Plant for fabrication of toilet parts	Carbonizing machine, and machine for extraction of saponin not available locally Grinding and drying machine available locally	198,000
Dedan Kimathi University of Technology	Tea harvesters that compromise on the quality of plucked tea	A mechanical tea de-stalker that is efficient in removing unwanted stalks and old leaves and separating stalks and good leaves for processing	Technology not available locally	50,000

Table 3: List of identified needs in Tanzania

Company / Seeker group	Problem	Technology needed	Availability of technology	Project value (USD)
Local farmers in Mwanza and Arusha Districts	Water Turbidity caused by high sediment levels increased by the heavy rains	Low cost and on farm green technologies to enable farmers and the agricultural extension officers to identify and treat water turbidity before they use it for farming	Laboratory tests by the government are not sufficient and they are time consuming and expensive.	TBD
	Wastage of large amounts of rain water	Lack of rain water harvesting, saving and storage technologies. This is to enable the farmers harvest and store the rain water for use in the dry season. Low cost and effective rain water harvesting/collection/catchment/saving technologies before the water runs off to the farms	Use of traditional dykes, trenches and dams is not sustainable as the water then dries up immediately the dry season begins. The use of mulching to save water but this is often accompanied by increased weed growth.	TBD
	Lack of affordable irrigation technologies appropriate for small farms	Low cost drip irrigation kits for small scale farmers. Currently a drip irrigation kit costs approximately US$400-500 in Tanzania. This is not affordable for the small scale farmers who live on less than a dollar a day.		TBD
	Accessing ground water-Borehole Drilling technologies and related infrastructure	Affordable borehole drilling technologies and the associated infrastructure such as water pipes, pumps. There is need for related technologies of approximating how deep the ground water is and whether the same is safe for use without having to physically drill for the water.	In some areas, borehole drilling is done manually which is tiresome and time consuming. In areas where professional drilling is done, the related financial and technical resources are a hindrance.	TBD
	Water Salinity-climate change has seen an increase in the amount of salt dissolved in water. This water is unsuitable for farming as it hardens the soil killing the useful microorganisms.	Affordable desalination of water technologies for agriculture as well as domestic use.		TBD

	Drought and pests resistant crops; Drought resistant livestock breeds	Drought resistant crops that can withstand the long and dry seasons and yet have high yields; Improved livestock varieties which can survive the dry seasons	Some non-governmental organizations such as AATF have introduced drought resistant maize-Drought Tego. The farmers select various crop varieties such as sorghum which have natural ability to survive the drought. However this is not sufficient to impact a large number of people.	TBD
Municipal Council Mwanza, Arusha and Dar es Salaam	Non-use of waste water from industries and domestic areas	Need for waste water recycling and management technologies Waste water treatment technologies	In some areas, the residents especially in urban areas have attempted using domestic water for farming which sometimes ends up harming the crops due to the chemicals in the water.	TBD
	Poor water quality for farming, livestock rearing and aquaculture	Technologies to improve water quality and balance the PH levels	Constant water changes to remove control the toxins in the water for aquaculture requires a constant source of water; Use of chemicals increase the contaminants in the water.	TBD
	Poor or lack of efficient, affordable and environmental friendly water distribution channels	Efficient, affordable water distribution channels that are not easily damaged by the high temperatures and that are relatively easy to repair.	Use of coated pipes is an expensive activity and is not sustainable for the municipal councils.	TBD
Local farmers in Mwanza and Arusha	Shortage of water for agricultural production due to inadequate rainfall. Increased land degradation reduces the amount of land available for cultivation.	Environmental friendly water conservation technologies to conserve water and increase its productivity in agriculture	Practices such as crop rotation to conserve water and soil have been used in the past. Mulching is used when farming but it is associated with increasing crop diseases and increased weed growth.	TBD
Local farmers in many regions	Environmental friendly greenhouse farming	Greenhouse farming is on the rise in urban and semi-urban areas in Tanzania. However these farmers lack environmental friendly and affordable greenhouses		TBD

	Poor or lack of sufficient nutrients in the soil; Resistant pests and insects which destroy crops	Environmental friendly fertilizers and pesticides which will be useful to the crops but do not harm the environment.	Use of the chemical fertilizers is on the rise but the insects and pests have become accustomed to these chemicals and they have become more resistant.	TBD
	Decrease in the soil fertility and soil degradation; Increased soil erosion caused by heavy rains	Need for bio fertilizers and capacity to produce them.	Use of compost or animal waste (unprocessed) is used as fertilizer to improve the soil fertility is a short term solution.	TBD
	Impure surface water- in dams, swamps and rivers mainly caused by human activities and heavy rainfall	Affordable and portable water Filtration/Purification Technologies	Use of technologies such as decantation does not provide water for agriculture; Use of sand filters to purify water; Use of water Nano-filters by Gongali Model Company Limited Use of animal bones to purify water for consumption is prevalent but shrouded by negative beliefs even when it is effective.	TBD
	Identification of water impurities in available water bodies especially the idle seasonal waters bodies	Affordable, portable, easy to use and efficient water testing technologies	Government and municipal councils' water testing laboratories are not sufficient and are not readily available. Priority is given to domestic use.	TBD
Fishermen in Mwanza	Water hyacinth on the lake hindering the fishermen from fishing and the growth of the fish	Technologies to eliminate or control hyacinth in the lake. Ways of disposing the hyacinth once it is removed from the lake.	Fishermen remove the hyacinth manually but there are no effective ways of managing the weed.	TBD
Local fishermen along most of the coastal areas	Use of diesel fishing boats which are often noisy which scares the fish away; The diesel pollutes the water resulting in stunted growth of the fish	Low energy and affordable fishing boats preferably which can use solar energy instead of diesel	Strapping bulbs to the boats and use the light to attract the fish to the fishing nets. The bulbs are solar powered where the solar panels are charged during the day. The solar panels and the batteries are not affordable compared to diesel.	TBD

Sea Weed Farmers; National Environmental Management Council (NEMC) in Zanzibar and Dar es Salaam	Poor production of the sea weed due to high temperatures	Green and low energy water technologies which would assist in controlling water temperatures to the desired levels; Cultured seed weed varieties that can withstand the high temperatures		TBD

2.2 Summary of findings

2.2.1 Identified needs based on government priorities in Ethiopia, Kenya and Tanzania

Most of the technology needs from Kenya were related to value addition and diversification of power in order to include renewable energy as a supplement to the national grid. The technology needs for water demanded an increased access to clean drinking water, using renewables to supplement grid energy for pumping water, addressing water hardness, desalination, smart metering solutions. All of which reduce non-revenue water and in-pump generation of hydro-electric power.

When compared to Kenya's government priorities, most of the technology needs addressed the priorities of value addition and emissions reduction. There were six technology needs related to improving crop and livestock production. At the time of collecting technology needs in Kenya, there was a focus on renewables not just for commercial purposes but also for domestic use, and that explains why many companies had needs related to solar. Kenya Power's inability to consistently provide power is yet another reason for the dominance of the needs for the renewables, especially for outfits that are based outside urban centers. The high cost of electricity in Kenya is also a contributing factor.

In Ethiopia, all the technology needs were on agriculture and related to value addition, improved farming methods and the efficiency of the production process. The technology needs focused on using more advanced and renewable energy technologies to improve crop and livestock production practices for higher food security, while reducing emissions.

When compared to the Ethiopian government's Growth and Transformation plan (GTP II), and Climate Resilient Green Economy (CRGE) strategy pillars, all of the technology needs addressed the priorities of GTP II and CRGE. These include maintaining agriculture as a major source of economic growth through improving crop and livestock production practices for higher food security. Also, reducing emissions by ensuring adequate agricultural input, supply, and using lower-emission agricultural techniques to increase agricultural productivity and commercialization. As a result, the identified agricultural needs will contribute to become a source of growth and poverty reduction. A summary of the companies that submitted technology needs related to government priorities in Ethiopia, Kenya and Tanzania is provided in Table 4. It should be noted that companies with more than one technology need also addressed more than one government priority.

In Tanzania, the majority of the needs identified by small scale subsistence farmers related to access to usable water (turbidity, lack of water storage technologies, affordable irrigation, groundwater access, excess salinity, lack of wastewater treatment, reliable assessment of water quality, water pollution). This is in line with ground realities – the agrarian economy means the great majority of livelihoods in Tanzania are highly reliant upon water, but access to usable water supplies in both urban and rural areas is extremely low throughout the country.

Table 4: Identified needs as compared to government priorities in Ethiopia, Kenya and Tanzania

Government Priority	Kenya: Company/Institution	Ethiopia: Company/Institution	Tanzania: Company/Institution
Agriculture			
Intensification and expansion of irrigation	Future pump	International Development Enterprises	Local farmers through the Government Agricultural Extension Offices in Mwanza and Arusha
Value addition for agriculture products	Nyangorora, Aviva Nest Co., Eco Agribusiness, East Africa Roselle Co., Ngare Narok	Guts Agro, Hena Farm, Nati Coffee & Spices, Soil & More Ethiopia	Local farmers through the Government Agricultural Extension Offices in Mwanza and Arusha
Improving crop and livestock production	LishaBora, Meishan International Merchants, Mineral & Allied, Eden Millers Ltd., Dedan Kimathi University	Eco Coffee, Elere Farm, Menegesha Organic Farm, Merin Agro, MG Technologies, Bora Integrated Commercial Farm, Adama Science & Technology University, Bahir Dar University	Local farmers through the Government Agricultural Extension Offices in Mwanza and Arusha
Water			
Waste management and pollution control	Nairobi Water and Sewerage Company, Kenyatta National Hospital, Kisumu Polytechnic	Ministry of Education Ethiopia	African Agricultural Technology Foundation, Local farmers through the Government Agricultural Extension Offices in Mwanza and Arusha, Municipal Council Mwanza, Arusha and Dar es Salaam, Municipal Council Mwanza, Arusha and Dar es Salaam; Local farmers through the Government Agricultural Extension Offices, Fishermen in Mwanza Government Agricultural Extension Offices
Promotion and piloting of green energy	Thika Water and Sewerage Co., Kwale Water and Sewerage Co., Nairobi Water and Sewerage Co., Micro & Small Enterprise Association, Afri Aqua	Apinec Agro, Guts Agro, Bahir Dar University	African Agricultural Technology Foundation, Sea Weed Farmers; National Environmental Management Council (NEMC) in Zanzibar and Dar es Salaam
Water resource management	Tana Water Services Board		African Agricultural Technology Foundation
Water harvesting and storage	Nyeri Referral Hospital		African Agricultural Technology Foundation, Local farmers through the Government Agricultural Extension Offices in Mwanza and Arusha
Urban and rural water supply	Shekere Ltd., Human Needs Project, Thika Water and Sewerage Co., Kwale Water and Sewerage Co., Nairobi Water and Sewerage Co., Olkeri Water Project, Afri Aqua, Happy Cow, Wakulima Dairy		African Agricultural Technology Foundation, Local farmers through the Government Agricultural Extension Offices in Mwanza and Arusha, Municipal Council Mwanza, Arusha and Dar es Salaam

2.2.2 Time frame

In all three countries, the date when the technology sought was needed ranged from either as soon as possible to within the next two years (early 2018), reflecting the urgent nature of the needs identified and how critical development of the agriculture and water sectors is to

economies, civil societies and livelihoods in all three countries. As the projects all involve a number of components and phases, the timing when each component will commence varies accordingly.

2.2.3 Investments sought

For Ethiopia, the estimated project values had not been included in many cases which is due to the fact that fully developed feasibility studies have not yet been carried out. In some cases, the estimated project value ranged from USD 50,000 to 2,5 million. The highest project estimate value was from the International Development Enterprises, which wants to scale-up the coverage of the tested and proven agricultural water management solutions so as to reach more geographical locations.

In Kenya, the financial requirements ranged from USD 5,000 for a technology to collect accurate data on the population to be served by certain water installations to USD 3,000,000 for water efficient plumbing works and recycling of waste water by Kenyatta National Hospital.

In Tanzania, given that the respondents were mainly small scale farmers, the focus was on achieving the lowest cost possible based on the limited financial resources available. In those situations, while the solutions themselves may vary in cost, the key is to sustainably support the price of scaling up, either through financial support or other innovative methods of cost-reduction and cost-sharing.

2.2.4 Geographic scope

In the case of Ethiopia, the geographic scope of implementation is national, except in two projects. Kenya and Tanzania, however, intend to supply to neighboring countries, mainly in the East African region. In Kenya, all the technologies sought are to be used locally (in specific counties), but some of what is produced using the technologies will eventually be sold in East Africa, and possibly even beyond. In Tanzania, all of the needs are focused on the domestic market, reflecting the nature of the stakeholders involved.

2.2.5 Existing critical mass and experience

In Ethiopia, all the organizations had some experience related to the technologies identified. Examples can be given from the input side, production process, and marketing. Most of the projects are expansions that intend to build up on the experience gained. In Kenya, the seekers' experience in trying to incorporate technologies ranged from minimal to a high level of experience. The majority of the companies seeking technologies and services had a moderate to high level of experience in the relevant areas while two, Aviva Nest and East Africa Roselle Company had minimal prior experience with the technology they required. In Tanzania, similarly, most primary stakeholders interviewed had some to a great deal of experience in attempting to find solutions to their needs, with the primary barriers being cost, maintenance capacities, and conflicting cultural traditions preventing wide-spread dissemination and uptake of the relevant technologies.

2.2.6 Technical, financial and intellectual property (IP)/licensing support

Seekers in all three countries reported they would need technical or, in some cases IP/licensing and financial support, mainly in the form of grants or loans to facilitate the acquisition of the technologies they seek. Transaction costs were found to be a significant barrier, particularly in the case of small-scale farmers and SMEs.

Some technology seekers from Ethiopia and Kenya had previously attracted funding or technical assistance from government/development organizations like Nikken-Japan, Engineers Without Borders, USAID, Kenya Industrial Research and Development Institute,

county government of Nyamira, Fanisi Capital, Wagenigen University, Alliance for a Green Revolution in Africa, International Fertilizer Development Center, USDAF Power Africa Challenge, ICCO Cooperation project, Cornell University and the Kenya Climate Innovation Center. In Kenya, three of the technology seekers (Eco Agribusiness Ltd, East Africa Roselle Company Ltd and Meishan Internal Merchants) are start-ups who have not yet received funding support from external parties. Other seekers are water utility companies that require public private partnerships for their projects to be implemented, such as Kwale Water and Sewerage Company, Nairobi Water and Sewerage Company, Tana Water Services Board and the Kenyatta National Hospital. Most of the small and medium enterprises have previously attracted funding for their businesses. Institutions like the Nyeri County Hospital and the Kenyatta National Hospital cited challenges of accessing funds from government to pursue development projects.

Most stated that IP support was not immediately a priority, apart from those where innovation is involved, like in the case of Shekere, Kisumu Polytechnic and Dedan Kimathi University of Technology.

2.2.7 Physical infrastructure

For Ethiopia, access to financial services and electric power are the major limitations mentioned by the projects, with many reporting that frequent interruption of electric power has affected the efficiency of the companies.

In Kenya, many of the limitations identified cited poor roads and high electricity costs. Many highlighted financial challenges, issues with sourcing raw materials like barley for hydroponics, ability to establish an effective distribution network, the powering of hydroponics units, and installation of underground water pipes in certain areas of the country.

A cross-cutting challenge and opportunity identified by the water utility companies, is the high power required to pump water, which they want to manage the cost of by installing renewable energy like solar or wind.

In Tanzania, the primary limitations identified were a lack of access to financial services, and a lack of infrastructure providing access to usable water.

2.2.8 Regulatory issues

In Ethiopia, eight companies reported that they did not have any regulatory issues that need to be addressed by relevant bodies in the country. Two companies reported that the absence of quality standards from the government for the products they are producing is negatively affecting their competitive ability.

In Kenya, three companies said they had no regulatory issues that needed addressing. Other companies noted the need for a variety of certifications from regulatory authorities (varied depending on the product), including the Kenya Bureau of Standards Certification, Hazard and Critical Control Points (HAACP) certification, and ISO 22001 standards. Others cited the need for clearances from agencies such as the National Environmental Management Authority, as well as compliance with relevant national and regional policies.

None of the seekers interviewed in Tanzania cited regulatory barriers as a significant factor (except in relation to a lack of adequate government laboratory facilities for testing and assessing water quality).

2.2.9 Technology transfer

In terms of the kind of technology transfer being sought, all the companies in Ethiopia and Kenya are interested in technology transfer, and either licensing, buying equipment, project development, products purchase or consultancy.

Technologies related to solar can be found in the East African region and are being offered by a growing number of solar companies that are setting up. However, wind technology would need to be imported. Items like pelletizing machines are available in Kenya but their quality is usually questionable. Many institutions that have pelleting machines in Kenya have imported them from China. Machines for processing and packaging agricultural commodities like hibiscus juice, banana crisps etc. can be accessed locally from companies like DK Engineering. Machines for processing animal feeds are available locally, but more established companies import from countries like China.

Treatment solutions for ground water that has excess salts or that requires purification are available from companies like Davis and Shirtliff or Grundfos which has a presence in Kenya. However, the scale of wastewater treatment solutions sought by Nairobi Water and Sewerage Company and Kenyatta National Hospital may not be adequately available locally. The water efficient taps, toilets can easily be obtained locally, though not the high capacity washing machines.

Bahir Dar University from Ethiopia requires a solar powered drip irrigation system which is available in Kenya. The system required to automate the solar water pump and water kiosks is available in Kenya.

In Tanzania, most respondents cited the lack of access to existing technology solutions as the greatest barrier to transfer. In most cases, even though the technologies are available locally and outside of the country, seekers lacked the capacity (particularly financial) to access these solutions.

Section 3:

The matchmaking event

The matchmaking event for this project took place from April 5 to 7, 2016 in Nairobi (see Annex 2 for the list of participants and Annex 3 for the detailed program). The event, which was titled 'Facilitating the Transfer of Climate Technologies in East Africa: A CTCN Stakeholder Forum and a WIPO GREEN Matchmaking Event', was jointly organized by WIPO and CTCN in cooperation with KCIC, AATF, and CIPIT. It was supported by the Japan Patent Office (JPO).

The overall objectives of the event were:

- to facilitate matchmaking between agriculture and water technology seekers and providers from sub-Sahara Africa;
- to hold high level discussions around technology transfer and climate change adaptation and mitigation; and
- to link climate change goals with business contributions.

The matchmaking event was opened by the Cabinet Secretary, Ministry of Environment, Natural Resources and Regional Development Authorities, Prof Judi Wakhungu and His Excellency, Mr. Tatsushi Terada, the Ambassador of Japan to Kenya.

The event was successful in terms of the levels of participation – day 1 had over 150 participants, while days 2 and 3 had about 100 each (Annex 2). The content was widely stated to be engaging and useful.

Ten letters of intent were signed between technology providers and seekers (Table 5).

Table 5: Organizations that signed letters of intent at the matchmaking event

Seeker	Provider
Happy Cow	AG Environment
Kwale Water and Sewage Company	Swissquest Water Supplies LTD
Wakulima Dairy LTD	AG Environment
Kenyatta Hospital	AG Environment
Human Needs Project	AG Environment
APINEC Agro Industry	ICIPE
Kwale Water and Sewage Company	Davis & Shirtliff LTD
Shekere LTD	AG Environment
Gongali Model LTD	Maji Milele LTD
Afric Aqua	SEGi – A Korean SME

Other development organizations were interested in engaging technology seekers but could not sign letters of intent due to organizational restrictions, such as the Africa Development Bank (which was interested in the needs of three seekers).

On April 8, WIPO and Strathmore University's CIPIT offered a one day training on IP management, particularly aimed at SMEs (see Annex 4 for the list of participants and Annex 5 for the detailed program). The training was attended by 29 participants. The training involved a case study that was instrumental in helping participants understand the complexities involved in negotiating IP issues in real life situations. The IP training complemented the matchmaking event and the Seminar where participants were informed on the key IP issues involved in technology transfer.

The sub-regional seminar was covered by several online media platforms including:

- Tech Trends Kenya http://techtrendske.co.ke/ftct-forum-identifies-green-technologies-as-key-to-building-resilient-economies-in-africa/
- AfricaBusiness.com http://africabusiness.com/2016/04/05/facilitating-the-transfer-of-climate-technologies-in-east-africa/
- Biashara Point East Africa http://biasharapoint.com/blog/facilitating-the-transfer-of-climate-technologies-in-east-africa-2/
- Mashada http://www.mashada.com/blogs/p/242789/kenya-climate-innovation-center-seminar
- Diaspora Messenger http://diasporamessenger.com/2016/04/kenya-climate-innovation-center-seminar/
- China Org.cn http://www.china.org.cn/world/Off_the_Wire/2016-04/05/content_38181490.htm
- Ministry of Environment, Kenya http://www.environment.go.ke/?p=2118
- AllAfrica.com http://allafrica.com/stories/201604131016.html
- Xinhua http://english.sina.com/news/2016/0405/905007.html
- News 24 http://www.news24.co.ke/Business/News/east-africa-mulls-strong-linkages-to-enhance-green-technology-transfer-20160406
- CoastWeek.com http://www.coastweek.com/3915-itn-04.htm

Section 4:

Conclusions and lessons learnt

Through the course of this matchmaking and training event, the combined WIPO GREEN/consortium team identified a variety of factors could that be improved in order to ensure even more effective participation in such a matchmaking project. They include the following:

4.1 Accounting for institutional timeframes and limitations

This applies both to the organizers as well as the participants. Similar projects should more actively account for the pace at which decisions are taken in public and private sector institutions and their protocols and processes. This would enable higher participation rates and clearances to plan additional activities. In many ways, interacting with SMEs can be easier, simply because they are smaller institutions whose decision makers are few and within closer reach. For most SME technology seekers involved in the project, documenting the technology need took 1-2 weeks from the time of initial engagement. Furthermore, motivation to participate is often higher in such institutions. In many public sector institutions, the decision making process involves broader consultations and approvals, which can yield significantly slower results.

Furthermore, from Kenya, feedback on the technology need template mentioned it was long and often took time for seekers to fully understand the technical elements involved. However, it is important to balance this with the information that technology providers require in order to be motivated and interested in the relevant need. It could be useful if the initial questionnaire is shorter, or if there was greater guidance (and thus additional resources in terms of advisory personnel / expertise) from the project team.

4.2 Preparation and introductory seminars for the matchmaking team as well as participants when collecting needs

Future projects could implement more intensive preparation for the project team as well as the participants. For the team collecting information on the ground, it was felt that it would have been useful to have a meeting of the minds on the details of the technology need template – i.e. what kind of information is absolutely mandatory (taking into account the inability of some participants, for example, to estimate costs) and the requisite depth.

Additionally, it would be useful to have more time to talk to potential participants and build appreciation for the matchmaking process. It was noted that many participants only fully appreciated the whole exercise after attending the matchmaking event and interacting with other seekers and providers. In future it might be worthwhile starting with an introductory workshop that will bring together the three groups: seekers, providers and financiers so that participants are better prepared and fully understand the task at hand. It was interesting to listen to seekers talking of other needs that were not mentioned during documentation. As seekers listened to their peers and what they were looking for, the picture became clear. For instance, Micro and Small Enterprise Authority in Garissa initially described a need for technology to sink boreholes and treat drinking water. During the matchmaking event, he was keen on getting a technology provider and financier to support the development of a machine that helps to preserve meat in a way that mimics the traditional way of drying meat. The meat can then be consumed when the head of the family is away for long periods of time in a part of the country where electricity is limited to the urban centers. The technology was being sought by a group of women in the semi-arid area of Garissa that have found a business opportunity in mechanizing the traditional meat drying process.

In some cases, the needs identified have the potential for broader applicability. For the water utility companies in Kenya, the problems documented in the course of the technology needs

assessment are reflected in many other utilities around the country. Technology providers for these utilities will find that the problems reappear in many instances. Such as excess fluoride in drinking water is a problem that affects all the water sources that lie along Kenya's Rift Valley. Salty water is a problem that is prevalent in the entire coastal region of Kenya while almost all the water utility companies struggle with non-revenue water and high electricity costs. These seekers may have benefitted from being introduced beforehand in order to share information and resources.

The process of identifying technology needs should begin with a one-day seminar where potential technology seekers come together and get to hear firsthand about the project. During the seminar technology seekers should be guided on how to fill the form and what kind of information is required. Thereafter all the potential technology seekers interested in participating in technology transfer should fill their forms by a specified date and submit to the contracted agency. When potential technology seekers are contacted individually, it takes time for some of them to develop trust in the project, and for those who collect the data, they have to keep explaining the same details to each new technology seeker they approach. With an introductory workshop (whatever the format – whether face to face or virtual), the technology needs assessment is likely to take less time, create trust and awareness to a wider group, and achieve even more success.

4.3 Matchmaking process

In the time available between the documentation of the needs and the event, it has not been possible to identify providers related to all the needs identified in the process. In some instances, it was not possible to bring providers to the matchmaking event. Various reasons are part of the cause: in some instances there was no relevant provider in the respective networks of the partners involved in the project, some of the providers contacted were not active in the region, the need identified did not justify a trip or simply other prior obligations. The matchmaking event provides an opportunity for the parties to physically meet, an important element to build trust, but the connection does not need to be dependent on the attendance of the event. Organizing such an event is also resource-intense. More additional avenues to meet virtually before, after or independent of the event might be useful to complement the process.

4.4 Training on IP, business plan development, and finance related to technology transfer

Technology transfer is beneficial to many companies and institutions and the demand for renewable energy in the water and agriculture sector is high pointing to the need to focus on "greening" the Water-Energy-Food nexus in developing countries. Many companies pointed out that the technologies they were seeking stemmed from a need to increase efficiency in their operations and reduce operating costs, e.g. address the problem of high electricity costs, recycle waste water or harvest rainwater that has previously gone to waste.

Many institutions and companies are interested in technology transfer, although where innovation is involved some are not sure how IP issues are relevant and will be addressed. At first, some companies were hesitant to describe the technology needs that had innovative elements.

Furthermore, while reviewing the business plans of various companies, it was noted that some of the plans did not fully reflect what was being implemented. Some of the businesses were doing or expected to implement much more than was captured in the project documents. Hence, providing training on writing a business plan would help entrepreneurs to develop more comprehensive documents.

It was a plus for the matchmaking event to touch on business plans and IP management and how these are a crucial part of technology transfer. In addition to the presentations given

during the matchmaking event, capacity building and training were delivered in line with the objectives of the project. The participants were provided with basic training in IP related issues, including IP and business development, technology licensing and contract negotiation.

4.5 Greater emphasis on financial support

Almost all the technology seekers require financial assistance to be able to complete the technology transfer process. In fact, many of them only participated in the project after being assured that development partners will be present during the matchmaking event. Throughout the event, many seekers were actively looking for potential funders. At the end, it was clear that financing plays a big role in enabling technology transfer, even between neighboring countries.

The main hurdle remains financing, as, for example, solar/wind projects to supplement power from the grid require huge upfront investment which is not readily available. Many water utilities and public institutions like hospitals hardly get enough money from government to cover development costs, yet the management in these institutions sees the benefits accrued from, for instance, harvesting rainwater and hence not relying on the municipal water company to meet all their water needs for a hospital.

During the matchmaking event, it was evident that not all the required technology needed to come from developed countries because some of the solutions being sought were already available locally, and the main hindrance that prevented companies from engaging was finance. Some of the companies might obtain financial support in the form of loans from local banks; however, some of the companies do not have the required know-how on approaching banks and processing loans. Hence, organizing a general orientation (workshop) about getting access to credit service from banks could be useful as well.

On the other hand, some companies especially the start-ups and the water utility companies may not be able to secure loans even from banks. For such companies, the presence of development partners that can financially support technology transfer, during the matchmaking event is crucial.

4.6 Overall conclusion

- Significant interest in WIPO GREEN has been created among the participants, especially technology seekers and providers.

- Technology needs in the area of water and agriculture by SMEs, municipal bodies and small-holder farmers were identified, consistent with government priorities.

- Corresponding technologies for water and agriculture have been identified locally and outside of the region, which can be relevant in other developing countries.

- Connections were made between technology providers and seekers, in the form of introductions. Some parties have signed letters of intent and one memorandum of understanding. WIPO GREEN needs to be involved in an on-going manner to get the expected outcomes from these connections.

- Some ideas emerged that could help to make the matchmaking process more effective. They relate primarily to more time for the introductory workshop, additional offline introductions before the event, financial support for some SMEs, and small grants to facilitate the development of business plans based on introductions made at the matchmaking event.

- Attendance at the matchmaking event was high and feedback from participants very positive.

- The session on business plan development generated interest. Capacity building in the form of IP management training has provided local SMEs with greater awareness of the tools available to protect their intellectual assets and of the issues involved in negotiating transactions.

Annexes

1. WIPO GREEN Partners[6]

Advance Water Technologies (UK)
African Agricultural Technology Foundation (Kenya)
Asia IP Exchange / Hong Kong Trade Development Council (China)
Asian Development Bank (Philippines)
Asia-Pacific Industrial Property Center - Japan Institute for Promoting Invention and Innovation (Japan)
Association of University Technology Managers (USA)
Australian CleanTech (Australia)
Bowler Engineering Consultancy (Switzerland)
Brazilian Forum of Innovation and Technology Transfer Managers (Brazil)
CambridgeIP (UK)
China Technology Exchange (China)
CleanTek Market (Australia)
Climate Technology Centre and Network, UNEP/CTCN (Denmark)
Climate-KIC (Switzerland)
Crosstaff Solutions (Canada)
Danish Patent and Trademark Office (Denmark)
EcoMachines Ventures (UK)
Engineers Without Borders (UK)
Environmental Law Institute / Eco-Patent Commons (USA)
General Electric (USA)
Ghana Bamboo Bikes Initiative (Ghana)
GIVEWATTS (Sweden)
Haier (China)
infoDev / The World Bank (USA)
Innovation Insights (Switzerland)
Inovent (Turkey)
Institut National de la Propriété Industrielle (France)
International Centre for Trade and Sustainable Development (Switzerland)
International Chamber of Commerce (France)
International Federation of Intellectual Property Attorneys (Switzerland)
International Federation of Inventors' Associations (Switzerland)
International IP Commercialization Council (IIPCC) (Hong Kong)
IP Nexus (China)
InvenTrust (USA)
IP*SEVA, Intellectual Property for Sustainable Energy Ventures (USA)
IPEx Cleantech Asia (Singapore)
Japan Intellectual Property Association (Japan)
Japan Patents Attorneys Association (Japan)
Kenya Climate Innovation Center (Kenya)
King Abdullah City for Atomic and Renewable Energy (Saudi Arabia)
Kopernik (Indonesia)
Korea Technology Finance Corporation (Republic of Korea)
Kuwait Environment Public Authority (Saudi Arabia)
League of Arab States (Egypt)
Leonhard Ventures (Germany)
Licensing Executives Society International (USA)

[6] As of May, 2017. For more details, please visit www.ow.ly/BGyOT

Magnefico GmbH (Switzerland)
National Institute of Industrial Property (Brazil)
NEUW Ventures (Switzerland)
Office Marocain de la Propriété Industrielle et Commerciale (Maroc)
Patent Agents Association, India (India)
Patenterprise (Switzerland)
PatSnap (Singapore)
Public Interest Intellectual Property Advisors (USA)
Qualcomm (USA)
Queensland University of Technology (Australia)
R20 Regions of Climate Change Action (Switzerland)
Robin Paul Advisory (Malaysia)
Sabancı University (Turkey)
Sathguru Management Consultants (India)
SEED Initiative (Germany)
Siemens (Germany)
Singapore-ETH Centre for Global Environmental Sustainability (Singapore)
Solben (Mexico)
South-South Global Assets and Technology Exchange (China)
Strathmore University / Center for Intellectual Property and Information Technology Law (Kenya)
Team E-Kansai (Japan)
TechnologieAllianz (Germany)
Technology Development Foundation of Turkey (Turkey)
Teijin Limited (Japan)
The Ground_Up Project (Switzerland)
The Innovation Hub (South Africa)
United Nations Environment Program (Kenya)
United Nations Global Compact (USA)
United Nations Industrial Development Organization (Austria)
United Nations Office for South-South Cooperation (USA)
Villgro Innovations Foundation (India)
VisionEdge Technologies (Singapore)
Waseda Environmental Institute (Japan)
Waterpreneurs (Switzerland)
World Business Council for Sustainable Development (Switzerland)

2. List of participants at the sub-regional seminar

Country	Institution	Name
Australia	Global CCS Institute	Mark Bonner
Burundi	Consultant	NjeJimana Jeanine
Burundi	MEEATU	Nindamutsa Astere
Burundi	MEM	Nkunzi Nawafanya
Cyprus	PPL International	Bobby Namiti
Denmark	Climate Technology Centre and Network (CTCN) Advisory Board	Matthew Kennedy
Denmark	UNEP	Scott Willis
Ethiopia	Apinec Agro-Industry PLC	Wubishet Adugna
Ethiopia	EIAR	Kidist Gonfa
Ethiopia	Elere Farm	Fanta Tekefe
Ethiopia	Ethiopian Institute of Agricultural Research (EIAR)	Getahun Mitiku
Ethiopia	Ethiopian Institute of Agricultural Research (EIAR)	Mahsente Tadese
Ethiopia	Hena Farm PLC	Jiregna Gindaba
Ethiopia	Menagesha farm	Tilahun Zegeye
Ethiopia	Menagesha Integrated Organic Farm PLC	Dejene Woldemariam
Ethiopia	Merin	Merin Mengesha
Ethiopia	MG Greennovations PLC	Million Gezahegn
Ethiopia	Ministry of Agriculture	Wassihun Mascesha
Ethiopia	Nati Coffee & Spices PLC	Getachew Mamo
Ethiopia	National Designated Entity	Yamelakesira Tamene Bekele
Ethiopia	TSS group	Mohammed Osman
Germany	GIZ	Marion Geiss
Japan	Japan Intellectual Property Association (JIPA) and the Japan Institute of Promoting Invention and Innovation (JIPII), Tokyo	Yorimasa Suwa
Kenya	3GIP	Tracy Kadesa
Kenya	5D services	Noel Ndunya
Kenya	ACTS	Aschalew Tigabu
Kenya	ACTS	Kennedy Mbera
Kenya	African Agricultural Technology Foundation	Caroline Muchiri
Kenya	African Center for Technology Studies (ACTS)	Mourine Chepkemoi
Kenya	Africaqua Ltd	David Kuria
Kenya	Africaqua Ltd	Kelvin Gacheru
Kenya	Africart	Victor Mutuku
Kenya	AVIVA NEST	Karwitha Kiugu
Kenya	C.A.T	Alex Wago
Kenya	Carbon Africa	Timothy Cowman
Kenya	Center for Intellectual Property and Information Technology Law (CIPIT)	Isaac Rutenberg
Kenya	ClimateCare Ltd	Tom Owino
Kenya	CTIPFAN	Anne Kariuki
Kenya	Cute	Francis nyagaka
Kenya	Danish embassy	Anne Angwenyi
Kenya	Davis & Shirtliff	Asenath Kiprono
Kenya	Dedan Kimathi	Hasaan Langat
Kenya	DFID/FICCF	Noelle O'Brien
Kenya	DK Engineers Ltd	Gitau Kamau
Kenya	Eco Agribusiness Limited	Samuel Karimi Rukwaro
Kenya	ELI	Francis Keya
Kenya	Entrepreneur	Ivy Kibet
Kenya	FICCF	Nancy Omolo

Kenya	Garissa Water Supply Co.	Abdi Hajj
Kenya	GIZ	Joshine Mutero
Kenya	Green max	Crystal Okudo
Kenya	HNP	Margaret Koli
Kenya	ICIPE	Caroline Oyula
Kenya	ICIPE	Loise Kawira
Kenya	IDRC	Evans Kituyi
Kenya	IDRC	Michele Leone
Kenya	iHUB	John Paul
Kenya	INAK	George Otieno
Kenya	Intellecap	Cosmas Koech
Kenya	IRRI	Rosemary Murori
Kenya	KAIROS	Sarah Karange
Kenya	KAM	Victor Gathogo
Kenya	Karios production	Amos Omollo
Kenya	Kenya Association of Bus Manufacturers	Carey Mbaraka
Kenya	Kenya Industrial Research and Development Institute (KIRDI)	Arthur Onyuka
Kenya	Kenya Industrial Research and Development Institute (KIRDI)	Carolyn Njuguna
Kenya	Kenya Industrial Research and Development Institute (KIRDI)	Joan Khalifa
Kenya	Kenya Industrial Research and Development Institute (KIRDI)	K.Khisa
Kenya	Kenya Industrial Research and Development Institute (KIRDI)	Kenneth Chelule
Kenya	Kenya Industrial Research and Development Institute (KIRDI)	Lucy Wangai
Kenya	Kenya Industrial Research and Development Institute (KIRDI)	Rose Mboya
Kenya	Kenya Industrial Research and Development Institute (KIRDI)	Willis Makhoha
Kenya	Kenya Rainwater Association	Stephen Njoroge
Kenya	Kickstart International	Nick Moon
Kenya	Kisumu Polytechnic	Caleb Awiti Auma
Kenya	Kitui Industries Ltd	Cedric Kuloba
Kenya	KWAWASCO	Swaleh Kidzuga
Kenya	Maji Milele Ltd	James Muhoro
Kenya	Meishan Ltd	Ann Tobiko
Kenya	Meishan Ltd	Joel Melita
Kenya	Meishan Ltd	Joseph Wandua
Kenya	MENRRDA	Charles Mutai
Kenya	MENRRDA	Francis Tunje
Kenya	MESPT	Eliud Wachira
Kenya	Micro and Small Enterprise Authority	Hassan Noor Sheik Ahmed
Kenya	Mineral & Allied	Peter Chege
Kenya	Ministry of Energy	Faith Odongo
Kenya	Ministry of Environment	Pacifica Ogola
Kenya	Ministry of Water	David Nyantika
Kenya	Nairobi City County	Leah Oyake
Kenya	Nairobi Water	Gideon Nguu
Kenya	NEMA	Anne Omambia
Kenya	NEMA	N.Otieno
Kenya	NTV	Zeynab Wandati
Kenya	Nyangorora	Ombasa Eric
Kenya	Olkeri Water Project	Agnes Njoroge
Kenya	Proactive Merit Ltd	Kathy Mbondo
Kenya	Shekere Ltd	Waang'oe Moses
Kenya	Simba & Simba Advocates	Nderitu June
Kenya	SNV Netherlands Development Organisation	Brian Harding
Kenya	Solar World EA Ltd	James Mungai

Kenya	SWISS QUEST	James Wainana
Kenya	Swiss Quest Water Suppliers	Steve Muema
Kenya	Transconcept	Joseph Otieno
Kenya	University of Nairobi	Peter Kea
Kenya	Viability Africa	Anthony Esilaba
Kenya	Viability Africa	Natasha Georgete
Kenya	Viability Africa	Sally Gakii
Kenya	Wakulima Dairy Ltd	Charles Mithamo
Kenya	WATER SERVICES TRUST FUND Nrb	Nabangala Ann
Kenya	World Bank	Ali Mohamed
Kenya	World Bank	Mary Njoroge
Korea	Korea Technology Finance Corporation	John Kim
Morocco	OMPIC	Nour-Eddine Boukharouaa
Netherlands	DNVGL	Eelco Kruizinga
Norway	Det Norske Veritas Germanischer Lloyd (DNV-GL)	Edwin Aalders
Norway	Det Norske Veritas Germanischer Lloyd (DNV-GL)	Mats Rinaldo
Norway	MFA	Einar Telnes
Rwanda	EXPERT	Charles Mugabo
Rwanda	GEAR Ltd	Innocent Kabenga
Senegal	ENDA	Libasse Ba
South Africa	DNV GL, Durban, South Africa	Grant Little
South Sudan	National Designated Entity	David Batali Oliver Samon
South Sudan	National Designated Entity	Patrick Taban Abdullai Waran
South Sudan	National Designated Entity	Wani Nelson
Switzerland	WIPO	Anatole Krattiger
Switzerland	WIPO	Anja Von der Ropp
Switzerland	WIPO	Yesim Baykal
Tanzania	Gongali Model	Askwar Hilonga
Tanzania	Soil & More	Hussen Ahmed
Turkey	Agcevre	Derya Ertugrul
Turkey	Agcevre	Mehmet Burak Durucu
Turkey	Soil & More	Mehmet Cakir
Uganda	Directorate of Water Development of the Ministry of Water and Environment	Richard Cong
Uganda	MRMD	Gerald Baingi
Uganda	National Designated Entity	Maxwell Otim Onapa
United Kingdom	Climate Technology Initiative-Private Financing Advisory Network (CTI-PFAN)	Peter Storey

SUB-REGIONAL SEMINAR

WIPO/IP/NBO/2/16/INF/1 PROV. 2
ORIGINAL: ENGLISH
DATE: APRIL 7, 2016

Facilitating the Transfer of Climate Technologies in East Africa: A CTCN Stakeholder Forum and a WIPO GREEN Matchmaking Event

organized by
the Climate Technology Centre and Network (CTCN)

and
the World Intellectual Property Organization (WIPO)

in cooperation with
Kenya Climate Innovation Center (KCIC)

African Agricultural Technology Foundation (AATF)

and
Strathmore University Center for Intellectual Property and Information Technology Law (CIPIT)

with the support of the Japan Patent Office (JPO)

Nairobi, April 5-7, 2016

PROGRAM

prepared by the Secretariat

Tuesday, April 5, 2016

8.30 – 9.00 Registration and Networking at the Marketplace

9.00 – 9.45 **Welcome Remarks and Objectives of the Regional Seminar**

Speakers: Professor Judi Wakhungu, Cabinet Secretary, Ministry of Environment, Natural Resources and Regional Development Authorities, Nairobi

H.E. Ambassador Tatsushi Terada, Embassy of Japan, Nairobi

Mr. Anatole Krattiger, Director, Global Challenges Division, World Intellectual Property Organization (WIPO), Geneva

Mr. Matthew Kennedy, Vice-chair, Climate Technology Centre and Network (CTCN) Advisory Board, Copenhagen

Mr. Edward Mungai, Executive Director, Kenya Climate Innovation Center (KCIC), Nairobi

9.45 – 10.30 **Formal Opening of the Marketplace, Coffee and Networking**

10.30 – 11.30 **High-Level Discussion on Climate Change and the Importance of Low-carbon Technologies and Technology Transfer**

Moderator: Mr. Anatole Krattiger

Speakers: Ms. Pacifica Achieng, Director, Climate Change, Ministry of Environment, Natural Resources and Regional Development Authorities, Nairobi

Mr. Nick Moon, Chief Executive Officer, Kickstart International, Nairobi

Dr. Leah Oyake, Chief Environment Officer, Nairobi City County, Nairobi

Panel discussion

11.30 – 12.30 **Innovation, Development and Transfer of Adaptation and Mitigation Technologies**

Moderator: Mr. Matthew Kennedy

Speakers: Mr. Izael Da Silva, Deputy Vice-Chancellor, Strathmore University, Nairobi

Mr. Arthur Onyuka, National Designated Entity, Kenya Industrial Research and Development Institute, Nairobi

Panel discussion

12.30 – 14.00 Lunch hosted by KCIC/WIPO

14.00 – 15.30 **Linking Government Climate Change Goals (Intended Nationally Determined Contributions (INDCs)) and Business Contribution**

Moderator: Mr. Peter Storey, Global Coordinator, Climate Technology Initiative-Private Financing Advisory Network (CTI-PFAN), Helsinki

Speakers: Mr. Mats Rinaldo, Climate Change Programme, Det Norske Veritas Germanischer Lloyd (DNV-GL), Oslo

Ms. Karwitha Kiugu, Founder, Aviva, Nairobi

Mr. Hussen Ahmed, Managing Partner, Soil & More, Addis Ababa

The panel will introduce Technology Seekers and Technology Needs and discuss challenges (including technological, regulatory, and financial) and potential synergies.

15.30 – 16.00 Networking Break and Coffee

16.00 – 17.00 **Current State of Play: Roundtable - Climate Adaptation and Mitigation Technologies within the Eastern Africa Region**

Moderator: Ms. Anne Angwenyi, Team Leader, Green Growth and Employment Programme, Danida, Nairobi

Speakers: Mr. Ernest Chitechi, Outreach and Partnerships Manager, Kenya Climate Innovation Center (KCIC), Nairobi

Ms. Caroline Muchiri, Legal Associate, African Agricultural Technology Foundation (AATF), Nairobi

17.00 – 17.30 Summary of the Day, and Introduction to Day 2 and 3

17.30 – 19.30 Reception and Networking

<u>Wednesday, April 6, 2016</u>

9.00 – 9.15 **Working Group Announcements**

- Presentation and re-affirmation of the CTCN objectives about technology transfer.
- Presentation of ambitions and objectives of Stakeholder Forum Chapters.

Participants will be divided into sectorial groups

9.15 – 10.45 **Working Group Meetings**

- Facilitator presents process and objectives (incl. icebreaker)
- Initial round of presentations in each group.
- Facilitator presenting working format and pre-defined questions to address.

Brainstorming focus areas of the chapter to address

10:45 – 11.15 Networking Coffee Break

11.15 – 12.30 **Working Group Meetings (continued)**
- Continuation of brainstorming
- Collection of ideas
- Processing and preparation for presentation

Sorting into themes and potential sub-groups (Chapters)

12.30 – 13.30 Lunch

13.30 – 14.30 **Working Group Meetings (continued)**
- Consolidating the discussions
- Addressing original questions

Preparing final day presentation

14.30 – 15.00 **Summary of the Day**
- Summing up and impressions of progression

Briefing note about the process and presentations planned for last day

15.00 – 17.00 **Matchmaking Session and Marketplace**

Thursday, April 7, 2016

9.00 – 10.15 **Business Plan Development**

Moderator: Mr. Peter Storey

Speakers: Mr. Sharshank Verma, Head of Advisory Services, Global Village Energy Partnership (GVEP) International, Nairobi

Mr. Grant Little, Station Manager, DNV GL, Durban, South Africa

10.15 – 11.00 **IP in Technology Transfer**

Moderator: Mr. Anatole Krattiger

Speakers: Mr. Yorimasa Suwa, Deputy Leader, WIPO GREEN Project, Japan Intellectual Property Association (JIPA) and the Japan Institute of Promoting Invention and Innovation (JIPII), Tokyo

Mr. Isaac Rutenberg, Director, Center for Intellectual Property and Information Technology Law (CIPIT), Nairobi

Ms. Anja von der Ropp, Program Officer, WIPO, Geneva

11.00 – 11.30 Coffee and Networking at the Marketplace

11.30 – 13.00 **Financing Climate Change Actions**

	Moderator:	Mr. Brian Harding, Climate Change Adaptation and Resilience Specialist (Global), SNV Netherlands Development Organisation, Nairobi
	Speakers:	Mr. Bobby Namiti, East-Africa Regional Coordinator, Climate Technology Initiative-Private Financing Advisory Network (CTI PFAN), Nairobi
		Ms. Wangari Kirumba, National Environmental and Management Authority (NEMA), Adaptation Fund, Nairobi
		Mr. Peter Odhengo, Ministry of Finance, Kenya, Green Climate Fund, Nairobi
	Panel discussion	
13.00 – 14.00	Lunch	
14.00 – 15.00	**Report of the Working Groups**	
15.00 – 15.30	Coffee and Networking at the Marketplace	
15.30 – 16.30	**Lessons Learned**, **Regionalization, Regional Thematic Groups and Next Steps**	
	Speakers:	Mr. Edward Mungai
		Mr. Anatole Krattiger
		Rapporteur of the Working Groups
	Panel discussion	
16.30 – 16.45	Closing Remarks	

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4. List of participants of the IP management training

Country	Organization	Name
Ethiopia	APINEC	Wubishet Aduqua
Ethiopia	EIAR	Getahun Mitiku
Kenya	Africa University	Festus Mbuimwe
Kenya	AFT-TALK AFRICA	Winnie Kamau
Kenya	Biogen Kenya	Bryan Piti
Kenya	Eeleven Limited	Norman Ernesto
Kenya	GEARBOX	William Maluki
Kenya	Gongali Model/Nelson Mandela	Askwar Hilonga
Kenya	GSSL	Allan Marega
Kenya	HNP	Margaret Koli
Kenya	ICIPE	Caroline Oyula
Kenya	INAK	George Otieno
Kenya	Isiez Ltd	Mwangi Shirley
Kenya	Kaplan & Stratton Advocates	Elaine Mbugua
Kenya	Keekonyokie	Chege Kimani
Kenya	Keekonyokie	Kelvin Ngugi
Kenya	kenya Biologics	Chris Kolenberg
Kenya	Kings Biofuel Ltd	Festus Ngugi
Kenya	Kings Biofuel Ltd	Paul K. Kiruki
Kenya	KIPI	David Njuguna
Kenya	Lane Mideast	Antoney Githua
Kenya	Lane Mideast	Kelly Gathogo
Kenya	Onfon Media	Walter Nyabaro
Kenya	PIIPA	Mboi Msati
Kenya	Simba & Simba Advocates	Perpetua Mwangi
Kenya	Transconcept	Josepf Otieno
Kenya	Ukulima Tech	Brenda Anne
Kenya	Ukulima Tech	Elizabeth Ochieng
Kenya	WISDOM	Dan Waithaka

5. Program of the IP management training workshop

ORIGINAL: ENGLISH
APRIL 8, 2016

Workshop on IP Management and Green Technologies

Organized by:
the World Intellectual Property Organization (WIPO)

in cooperation with

Kenya Climate Innovation Center (CIC)
Strathmore University Center for Intellectual Property and Information Technology Law (CIPIT)
Kenya Industrial Property Institute and
Climate Technology Centre and Network (CTCN)

with the support of the Japan Patent Office (JPO)

Nairobi, April 8, 2016

PROGRAM

prepared by the Secretariat

8.30 – 9.00 **Registration and coffee**

9.00 – 9.45 **Session 1: Opening Remarks and Key Principles of IP**

Moderator: Ms. Yesim Baykal, Senior Program Officer, Global Challenges Division, WIPO, Geneva Switzerland

Speakers:

The IP Toolbox:
Mr. Isaac Rutenberg, Director Strathmore University Center for Intellectual Property and Information Technology Law (CIPIT), Nairobi

Principal Issues in Contracts:
Mr. Anatole Krattiger, Director, Global Challenges Division, WIPO, Geneva, Switzerland

How do large companies manage IP; Approaches for SMEs
Mr. Yorimasa Suwa, Japan Intellectual Property Association and JIPII, Tokyo

The services of Public Interest Intellectual Property Advisors (PIIPA)
Mr.Mboi Misati, Senior Patent Examiner, Kenya Industrial Property Institute (KIPI), Nairobi Public Interest Intellectual Property Advisors, Inc. (PIIPA)

9.45-10.10 **Anonymous submission of at least 3 questions**

10.00 – 10.15 **Session 2: Case Study, Round 1**

Distribution, discussion and assignments of the Great Elephant™ case study as a negotiation exercise on business strategy and constructive use of IP

10.15-11.30 **Case Study, Round 2**

Coffee in three groups (actors):
- a university start up and associated university
- a "social" enterprise and cooperation agency
- a multinational company

Distribution of confidential business information to each group

Identification of "needs" and "wants" of each of the three actors

11.30-11.45 **Case Study, Round 3**

Allocation of Negotiation Groups

11.45-14.00 **Case Study, Round 4**

Business Lunch

Resource people will circulate to each negotiation group. Should the group require specific technical, strategic and legal advice, it can be made available for a limited time and free of charge! However, the

advisers will only respond to well formulated and relatively specific questions.

14.00-14.30 **Case Study, Round 5**

Presentation of Negotiation Results

14.30-16.00 **Case Study, Round 6**

Discussion of Results, Emerging Issues, Alternative Options, and Q&A

Resource People:

Mr. Anatole Krattiger, WIPO

Mr. Isaac Rutenberg, CIPIT

Mr. Edwin Aalders, DNV and CTCN, Copenhagen

Mr. Yorimasa Suwa, JIPA/JIPII

Ms. Yesim Baykal, WIPO

16.00-16.45 **Session 3: IP related supporting services for SMEs**

Moderator: Mr. Edward Mungai, Executive Director, (KCIC), Nairobi,

Speakers: Mr. David Njuguna, Chief Patent Examiner, Kenya Industrial Property Institute

Dr. Isaac Rutenberg, Strathmore University/CIPIT

Mr. Anatole Krattiger, WIPO

Discussion

16.45-17.30 **Closing Session**

Lessons learned and Questionnaire

Closing Comments

6. Intellectual property assessment

6.1 Introduction

Matching seekers and providers is, at its heart, an exercise in promoting technology transfer. It is a transaction involving IP rights (IPRs). Technology which is not protected by IPRs does not need to be licensed per se because there are no legal restrictions to use technology that is not protected by IPRs. Examples of IPRs include patents, trademarks, design rights copyright and trade secrets/know how.

The basic mechanism for transferring technology protected by IPRs is a technology transfer license. This is a private law contract between a seeker and a technology holder, i.e. a provider. Such contract defines the mutual rights and obligations with respect to the technology sought by the seeker. The contract particularly identifies the technology together with the pertinent IPRs. It defines to which extent the rights can be used by the licensee and what remuneration is due in turn. A variety of further legal terms include the geographical scope and possible limitations of the technology use, the duration of the license, the choice of the applicable law, possibly clauses on dispute settlement, etc. All such terms are to be negotiated by the individual parties to the license. Since each case has its particularities, the content of a license may vary widely so that the license negotiations will require significant due diligence from both parties. Besides acquiring the right to use IP protected technology, a license agreement can be a vehicle to obtain special know-how or technical support from the provider in order to be optimally useful to the seeker.

Thus, the process of licensing and understanding the IP environment for the technology of interest requires significant capacity on the part of both parties to an agreement. The section below identifies a few basic, but relevant IP issues which might be crucial to the success of any technology transfer agreement.

It should be noted at the outset that many of the seekers did not require IP support at the current stage of their projects (unless some specific innovative element was involved). However, it can't be stressed enough that this short text does not replace any professional legal advice and the reader is strongly recommended to make use of knowledgeable professionals already before entering into licensing negotiations.

6.2 Freedom-to-operate

Freedom-to-Operate (FTO) means a situation at a given point in time where a specific project can be carried out without infringing third parties IP or other rights. An FTO analysis undertakes to identify the risk of infringement of third parties' rights. For example, an FTO analysis may review the risk of patent (or trademark) infringement through making, using or selling a product, or of carrying out a technological method. If the FTO analysis identifies any relevant third party IPRs, a technology seeker may wish to obtain a license from the rights holder to avoid the risk of a costly and uncertain infringement procedure. For this reason, any seeker of technologies is well advised to conduct an FTO analysis, reviewing all potential third party rights that may apply to a given technology. Since IPRs are territorial rights, an FTO analysis will be needed for the territory which is of interest for the seeker's project.

A qualified practitioner should carry out the FTO analyses. This is for example a professional IP service provider with legal as well as technical competency to thoroughly analyze both the technologies described in the patents and the potential legal implications for the intended project by the technology seeker. Such service provider can be, for instance, a patent attorney. Patent attorneys are generally licensed by the relevant Industrial Property Office and preferably educated in law and in the relevant field of science or technology.

Patents are identified through searches in patent offices' collections of patent documents, such as the Ethiopian Intellectual Property Office (EIPO), the Kenya Industrial Property

Institute (KIPI), the Business Registrations and Licensing Agency (BRELA) in Tanzania, the Zanzibar Business and Property Registration Agency (BPRA) or the Office of the African Regional Intellectual Property Organization (ARIPO).7 However, not all the data are available online. The WIPO PATENTSCOPE8 database, besides providing access to international Patent Cooperation Treaty (PCT) applications, comprises also patent documents for a number of participating national and regional patent offices, such as KIPI and ARIPO. Hence, PATENTSCOPE can be used as a starting point for a patent search to some extent, while it is important to be aware that a thorough search must include further sources of information.9 Where information is not available online, the search must include a file inspection at the patent office of the territory of interest.

Recommendations in an FTO analysis are based on an evaluation of the IPR information identified in a search. Such recommendations are a measure of the risk assessment associated with commercialization of the subject technology. Unfortunately, an FTO search will most likely not identify all relevant IPRs, in part because in many cases documents not are electronically indexed and not readily available. Limited searches necessarily result in an incomplete picture of the IP landscape surrounding the subject technology. Where information is not available online, searches must include visits to the IP offices in order to search physical files in the countries of interest for the intended commercialization project. For example, if a technology is to be sold or produced in Ethiopia, FTO-associated risks can be minimized/eliminated only by visiting the patent-granting government authority and conducting a thorough search of the stored physical records. It is therefore necessary to contact local practitioners to conduct in-person searches of the records in order to conduct FTO analyses for Ethiopia. Such an exercise should be considered in view of the associated cost, particularly where the likelihood of an FTO issue appears to be low from the online searches and analysis, for example where patent applications for the same subject matter have been refused in other countries.

Finally, FTO analyses are based on the technologies as described to the lawyer at the time of the interviews and in any reviewed documents. Any changes to the technologies may cause the conclusions set forth in the FTO analysis to be invalid and/or to require an updated search and analysis. Details not relayed to, or misunderstood by, the lawyer conducting the FTO analysis may affect the accuracy of the FTO analysis.

6.3 Ownership

The provider is only capable of licensing IPR protected technology that it owns or controls. The complex rules pertaining to ownership may cause unexpected results when the issue of ownership is explored in detail.

Ownership of IPRs is regulated by statutes and by contracts. Regarding statutes, Section 30 of the Industrial Property Act 2001 (IPA), and Section 31 of the Kenya Copyright Act 2001 (KCA) stipulate that the inventor or author is the initial owner of any rights to a patent or copyright, respectively. Furthermore, Section 32 of the IPA and Section 31 of the KCA provide that ownership of the right to a patent or copyright is automatically transferred to an employer where the inventor/author is an employee. Similarly, the rights to a patent or copyright for any “commissioned works” belong to the commissioning party. Where joint authors/inventors are obliged to assign their rights to separate employers, ownership of the IPRs is to be shared by the separate employers.

Notwithstanding the above statutory provisions, any desired ownership agreement can be determined between parties via a valid contract. Through contracts, ownership can be shared between inventors/authors, between institutions, or shared between inventors/authors

[7] ARIPO is the African Regional Intellectual Property Office and grants regional patents covering countries including Kenya, Uganda, and Tanzania. Ethiopia is not a member of ARIPO.
[8] http://www.wipo.int/patentscope/en/
[9] A list of a number of offices with online databases is available from the WIPO website at http://www.wipo.int/patentscope/en/national_databases.html.

and institutions. Compensation for agreements in ownership can also be specified via contract.

6.4 Validity

The provider is only capable of licensing IPRs that are still in force. Any transfer of IPR from a provider to a seeker should involve an analysis of the validity of the IPR. A validity analysis involves carrying out a substantive examination of the IPRs, much like a patent granting authority (or other IPR granting authority) would do in granting the original IPR.

The typical route to invalidating IPRs, such as a patent, involves a trial before a court or tribunal. The court may be asked by a party to invalidate the IPR for a number of reasons, such as a failure to satisfy the statutory requirements for the granting of the IPR, insufficient disclosure, or fraud. The court can review the requested invalidation and may conclude in favor of the requesting party. In such instances, the original IPR ceases to be a right under which the IPR owner or licensee can obtain relief. However, courts procedures are costly and time consuming and may block the intended commercial activity for years.

For each seeker/provider pair, or for each technology that is the subject of a potential transfer license, an FTO analyses should be carried out in preparation of the licensing negotiations. It may happen that providers from countries and regions with more developed IP regimes have their technologies protected in large and developed markets, but do not have protected those same technologies in less developed countries, such as Ethiopia, Kenya and Tanzania. This illustrates again that licensing and FTO issues are relevant and complex and need to be addressed in the context of a matchmaking exercise. Overall, increased training and capacity building are required to enable prospective parties to licensing agreements implement their projects in the best and most efficient manner – from the point of creating initial awareness, to disseminating easily accessible resources to ensure all parties to a technology transfer licensing negotiation are well informed and capable of structuring a fair deal. This is a key focus of WIPO GREEN and the activities of its network and significant resources are available from the WIPO GREEN website as well as the general WIPO website

Despite the desirability of increased the awareness by technology seekers and providers for these issues, given the complexity of the matter, it is essential to obtain professional advice for a solid FTO analysis and to obtain reliable recommendations.