

# **POVERTY ALLEVIATION:** **A Role for Technology and Infrastructure?**

CONCEPT NOTE

ENERGY

CONNECTIVITY  
(Communication and learning)

HEALTH & FOOD

**ROMA, 2015 MAY**

## CONCEPT NOTE

### **Poverty Alleviation: A Role for Technology and Infrastructure?**

The goal of the conference is twofold: to assess the results of technology-based poverty alleviation projects and to explore the social and political effects of this technology. In particular, we want to start floating an idea that may be out of the 'mainstream' of political thinking.

We all agree that peace and security are crucial to work for poverty alleviation. The common approach of international aid agencies is to build institutional and governance reform. While this is indispensable, it should not be the only focus. While rushing to create multi-party, parliamentary systems, independent judiciaries and free press, we should not forget the human factor, i.e. the need to build trust and communication among different individuals who will need, quite simply, to work together in order to make those institutions function. Today, in the twenty-first century, some of the most exciting tools available for addressing these issues are technology and innovation. Even with the best of governance and a visionary leadership, if there is no inclusive development, a country cannot move forward.

Throughout history technology has been a powerful instrument for economic and social development. Technology played a critical role in reducing poverty in vast areas of the world in the past and can play today a crucial function in the battle against poverty. It can be employed to a variety of fields, from increasing agricultural productivity to the generation of cheap energy, from providing clean water to improving health. In particular, information and communications technology (ICT) can address the problem of poverty by increasing people's access to education, health, and financial services. Strikingly, even simple technologies might make a difference in poverty reduction. The case of cellular phones in Africa is a well-known example. Likewise, small businesses and social enterprises creating access to primary goods are greatly helped by new technologies.

What we want to look at is the impact on poverty alleviation of both high-tech and simple technologies, which often spontaneously blossom out of any form of development scheme. The large number of existing projects show the growing interest of international organizations and financial institutions in technology-based projects for poverty reduction. Having not been devised and realized in a coordinated manner, these projects have grown separately and autonomously. Actually, it is even difficult to assess the “state of the art” in this field of development. Thus, there is a need to know what it has been done so far because such a finding might help the flow of patient capital toward innovative social impact investment.

The ‘tentative conclusion’ of these observations is that not only does technology have a direct impact on poverty alleviation, but it also tends to mobilize people and help to improve social inclusion. In doing so, technology underpins the role of the citizenry to help itself out of poverty without being dependent on government.

Finally, we would like to stress that we see this Conference as a form of ‘global collective thinking’: a few keynote speeches from ‘experts’, and then a long, broad string of very short case studies, which will hopefully foster an interesting discussion in different areas of poverty alleviation.

In the remainder of this document a few technology-driven projects for poverty alleviations are listed and organized according to the three sections of the Conference: 1) energy, 2) connectivity (communication and learning), and 3) food & health. The list below, far from being complete, is meant only to provide a “flavor” of how technology can be used in the battle against poverty.

## ENERGY

### **Alliance for Rural Electrification (ARE)**

ARE is an international business association representing the decentralised energy sector working towards the integration of renewables into rural electrification markets in developing and emerging countries. They promote and provide technological and financial solutions for rural electrification.

ARE enables improved energy access through business development support for more than 80 members along the whole value chain for off-grid technologies by targeted advocacy and facilitating access to international and regional funding. ARE is a proud partner of the United Nation Sustainable Energy for All (SE4All) initiative and collaborates with its membership and partners to fulfill SE4All objectives.

*<http://www.ruralelec.org>*

### **IRENA**

The International Renewable Energy Agency (IRENA) is an intergovernmental organization that supports countries in their transition to a sustainable energy future, and serves as the principal platform for international cooperation, a center of excellence, and a repository of policy, technology, resource and financial knowledge on renewable energy. IRENA promotes the widespread adoption and sustainable use of all forms of renewable energy, including bioenergy, geothermal, hydropower, ocean, solar and wind energy in the pursuit of sustainable development, energy access, energy security and low-carbon economic growth and prosperity.

With a mandate from countries around the world, IRENA encourages governments to adopt enabling policies for renewable energy investments, provides practical tools and policy advice to accelerate renewable energy deployment, and facilitates knowledge sharing and technology transfer to provide clean, sustainable energy for the world's growing population.

<http://www.irena.org/home/index.aspx?PriMenuID=12&mnu=Pri>

### **Simpa Networks**

A venture-backed technology company with the mission to make modern energy simple, affordable, and accessible for everyone. Simpa has introduced a product and business model that will make sustainable energy choices “radically affordable” to the 1.6 billion consumers who currently lack access to electricity. Simpa has initially introduced its “pay-as-you-go” pricing to household energy systems. Users pre-pay based on actual usage and each payment adds up towards the total purchase price of the solar home system. Consumers can send payments using a mobile phone. Once fully paid, the solar home system unlocks and delivers free electricity for the expected 10-year life of the product.

<http://www.treehugger.com/renewable-energy/pay-as-you-go-solar-power-india-simpa-networks.html>

### **Angaza Design**

Angaza offers a complete Pay-As-You-Go (PAYG) solution to manufacturers and distributors of clean energy products, like solar lights or cell phone chargers, in the off-grid world. PAYG technology allows consumers to purchase PAYG-ready products over time, in affordable increments, just like they purchase cellular airtime or kerosene fuel. Angaza's embedded PAYG technology can turn any manufacturer's solar-powered product into a metered device that allows energy to be purchased in small, affordable payments as it is used. Once the pre-paid amount of energy is used, the product will automatically deactivate until the next payment is received. Angaza works directly with manufacturers to effectively integrate PAYG functionality into existing products.

<http://www.angazadesign.com/payg-platform/>

### **SolarNow**

SolarNow was established in 2011 to answer the pressing demand for affordable high quality solar home systems amongst 4 million off-grid households and entrepreneurs in Uganda and later other countries. SolarNow systems use solar cells (also called photovoltaic or PV cells) to convert sunlight into electricity. The electricity is then stored in a battery. In the sun rich Africa abundant sunshine can be stored by our systems to provide light after dusk, plus additional power for TV, radio, mobile phone charging and other uses. SolarNow sells, installs and services high quality solar home systems to rural households and entrepreneurs in Africa. Clients benefit from 18 months credit and from 24 months free maintenance and warranty

*<http://www.solarnow.eu/index.php>*

### **Shared Solar**

SharedSolar takes a decentralized approach to providing electric infrastructure and service to communities that are not immediately considered viable for grid connectivity. Test case in Mali (Columbia University, Earth Institute). SharedSolar is providing pay-as-you-go electricity to achieve maximum financial and social inclusion. Customers pre-pay for the service when they want, in amounts of their choosing and there are no monthly fees. Real-time demand/supply management strategies help ensure fair distribution and high uptimes. The generation and storage capacities are sized to match existing demand. As the demand grows over time, capacity is added through more solar panel or even other energy sources like wind, hydro, diesel etc. When the grid arrives, the local distribution network and management system can be utilized without modifications.

*<http://sel.columbia.edu/shared-solar/>*

## **Eight 19**

Eight19, which takes its name from the time it takes sunlight to reach the earth - 8 minutes and 19 seconds - is a developer and manufacturer of third generation solar cells based on printed plastic. Originating from technology initially developed at Cambridge University in the UK, these flexible, robust, lightweight solar modules benefit from high-speed manufacturing and low fabrication costs. With a fraction of the embedded energy of conventional solar modules, printed plastic solar modules are particularly well suited to consumer and off-grid applications.

In 2011, Eight19 launched Indigo, a new way to deliver solar power in emerging economies that brings off-grid solar power to a new generation of users, transforming lives and accelerating economic development.

Eight19's printed plastic solar technology is designed to deliver flexible, lightweight, robust and lower cost solar cells for a variety of solar-powered applications.

*<http://www.eight19.com/news-events/eight19-spins-out-indigo-pay-you-go-solar-0>*

## **The SCORE cooking stove**

Led by the Department of Electrical and Electronic Engineering at the University of Nottingham, the project team uses thermo-acoustic technology to convert the heat from biomass fuels into sound then electrical energy, surplus heat powers the cooking. The aim was to design a combined smokeless cooking stove and generator that could be fuelled by burning various kinds of biomass. The Consortium is led by the University of Nottingham and includes City University, the University of Manchester and Queen Mary, University of London. This potentially revolutionary sound-powered stove and electrical generator is currently being tested at local universities in Bangladesh and Nepal under simulated conditions.

*<http://www.nottingham.ac.uk/news/pressreleases/2012/august/score-stove.aspx>*

### **Eastern Nile Watershed Management Project (World Bank)**

The development objective of the Eastern Nile Watershed Management Project for Africa is to increase the adoption by the Eastern Nile countries of sustainable land and water management practices in selected micro-watersheds in the Eastern Nile Basin. In particular, as agreed by the Nile Basin institutions, the overall goal or higher level objectives of the proposed Eastern Nile Watershed Management Project is to “assist Egypt, Ethiopia, and Sudan to develop and implement coordinated approaches and planning frameworks for integrated land and water management to improve environmental management and the living standards of local communities in the Eastern Nile Sub-basin.” the proposed project would have the following three components: (a) Community Watershed Management; (b) Knowledge for Cooperative Action; and (c) Project Management.

<http://www.worldbank.org/projects/P111330/eastern-nile-watershed-management-project?lang=en>

### **Renewable Energy Technology Transfer between China and Ghana and Zambia with UNDP and Danish Development Assistance as catalysts**

The project is part of the UNDP-China agreement for Strengthened Partnership signed in 2010 to promote South-South cooperation through innovative programmes. This project is one of the first examples of triangular South-South cooperation between China and Africa with support from a donor. Its objective is to ensure that Chinese renewable energy technologies are optimally responding to priorities and needs in Ghana and Zambia, and critical skills are also transferred and developed to make the technologies actually work on the ground. The project will help with achieving the objective of Sustainable Energy for All (SE4ALL) of the UN Secretary- General Ban Ki-Moon by increasing access to energy through off-grid and community-based electrification. Support will not be in the form of hardware transfer but instead will focus on creating conditions required to make adoption of renewable energy technologies more effective, removing barriers and strengthening local capacities to respond to national priorities and meet local needs.

<http://kina.um.dk/en/about-us/news/newsdisplaypage/?newsid=e73549a8-e614-4ce4-a680-f547a926d274>



## CONNECTIVITY (Communication and learning)

### Kopernik

Kopernik connects simple technology with the last mile communities to reduce poverty. The co-founders, Toshi Nakamura and Ewa Wojkowska, saw that affordable technologies like these existed, but they weren't reaching the last mile. They wanted to bridge the gap. They left a decade of service with the United Nations to launch Kopernik in 2010. Examples of this simple technology are the following: the Prime Square Fuelwood Cookstove is a top-lit updraft (TLUD) gasifier cookstove, which can be fuelled by a variety of biomass, reducing fuelwood dependency and deforestation; the 5TY-1 HAND MAIZE SHELLER MAIZE SHELLER, a very durable object made of cast iron, which does not crush or change the shape of the grain, threshing with high efficiency; adspecs self-adjustable glasses, which allow you to correct your own vision, a process known as 'self-refraction'.

<http://kopernik.info>

### Data Center Project (AFRICAN DEVELOPMENT BANK)

The Feasibility Study: The concept envisions the establishment of an internationally competitive technology park with competitive technological infrastructures. In order to be viable, the platform should be provided with an appropriate physical environment, architecture for electronic governance, effective management, distinctive human capital and state of art technological resources and facilities. Likewise, it is essential to be prepared to meet the needs of good governance and address the business and academic interests.

The small size of domestic market reinforces the need for international expansion strategies thus requiring the park to be further competitive.

The focus of the technology park should be on specific niche markets such as electronic governance, banking, tourism and all other viable technological and or scientific fields. The park should avail facilities and tools to increase business competitiveness by reducing businesses operational costs through incubators; Sharing of office space, administrative services, infrastructure and networking, data center, etc. and management skills coaching.

<http://www.afdb.org/en/projects-and-operations/project-portfolio/project/p-cv-g00-001/>

### **EAC Backbone & Lake Victoria Maritime (AFRICAN DEVELOPMENT BANK)**

The project objective is to accelerate the socio-economic development and regional integration of the five EAC Partner States through the provision of improved cross-border broadband access at lower prices and save lives in the maritime activities on Lake Victoria. Lack of adequate and affordable communications services is one of the main obstacles to economic growth and social development. Africa is still lagging behind other continents in Information and Communication Technology (ICT). It is widely recognized that without embracing ICT, the development gap between Africa and the rest of the world will continue to widen. The project comprises five main components and activities namely 1) the network design and construction of Optical Fiber Cable (OFC), 2) Maritime Communication System for Safety, 3) the initial operations and maintenance of the regional ICT backbone network, 4) establishment of a Special Purpose Vehicle for the Public Private Partnership (PPP) model, and 5) project management (including the strengthening of the Project Coordination Unit).

<http://www.afdb.org/en/projects-and-operations/project-portfolio/project/p-z1-gb0-019/>

### **East African Submarine Cable System (AFRICAN DEVELOPMENT BANK)**

EASSy is a 10,000km submarine fibre-optic cable system deployed along the east and south coast of Africa to service the voice, data, video and internet needs of the region. It links South Africa with Sudan via landing points in Mozambique, Madagascar, the Comoros, Tanzania, Kenya, Somalia and Djibouti. The cable incorporates the latest developments in submarine fibre-optic technology, making it economical to connect the eastern and southern coast of

Africa into the high-speed global telecommunications network. The system is owned and operated by a group of 16 African (92%) and international (8%) telecommunications operators and service providers. EASSy is the highest capacity system serving sub-Saharan Africa, with a 4.72Tbps, 2 fibre-pair configuration. It is the first to deliver direct connectivity between east Africa and Europe / North America. It is also the only system with built-in resilience end-to-end. EASSy interconnects with multiple international submarine cable networks for diverse, seamless onward connectivity to Europe, the Americas, the Middle East and Asia. In a related project, investors in the EASSy system are building terrestrial fibre backhauled to link the land-locked countries of the region to the cable.

*<http://www.afdb.org/en/news-and-events/article/east-african-submarine-cable-system-reaches-financial-close-the-african-development-bank-signs-loans-for-the-eassy-cable-project-4051>*

### **Lake Victoria Maritime Communication (AFRICAN DEVELOPMENT BANK)**

The proposed project consists of three main physical components that are closely interrelated: (i) improved wireless communication on Lake Victoria, making calls for help possible. This component is based on the existing GSM coverage over the lake. (ii) a Maritime Rescue Communication Centre (MRCC) capable of receiving and responding to distress calls, locating the victims, mobilizing, controlling and coordinating rescue missions. (iii) 16 Search and Rescue stations distributed around the lake, equipped with fast rescue boats and trained crews. Each SAR station has a range of up to 60 km, and is capable of providing assistance anywhere within its operating range in a specified time frame. In addition, the Project includes provisions for (iv) human capital, (v) strengthening the implementation capacity and (vi) bridging activities. Improved communications covering Lake Victoria. This component calls for extending the range of the current GSM system to its technical maximum, using the Extended Range feature. It also includes a full implementation of the network's positioning system, providing accurate location of callers in distress as well as the implementation of a many-to-many communication technology to be used during rescue missions. This is known as Push-to-Talk and is an extension of the GSM technology. It will enable the MRCC to coordinate the activities of several parties during rescue missions. This technology is essential for the success of the project, as stated in the feasibility study.

The telecommunication component will be developed in cooperation with existing commercial GSM operators. Installation of a Maritime Rescue Communication Centre for Lake Victoria. This is the command centre of all rescue missions. Its functionality is based on global models for MRCCs, operating on the high seas around the world.

<http://www.afdb.org/en/projects-and-operations/project-portfolio/project/p-z1-gb0-021/>

### **Caribbean Regional Communications Infrastructure Program (World Bank)**

The objective of the Caribbean Regional Communications Infrastructure Program for Latin America and the Caribbean is to increase access to regional broadband networks and advance the development of Information and Communication Technologies (ICT) enabled services industry in the Caribbean Region. The project has four components. (1) Regional connectivity infrastructure component will address the: (i) physical connectivity infrastructure including submarine cable infrastructure, terrestrial broadband backbone fiber networks and terrestrial or submarine cross-border links, leveraging government networks as needed, and national and regional Internet Exchange Points (IXPs), and (ii) enabling environment that would ensure Public Private Partnership in the ownership, management and competitive access to the infrastructure. (2) ICT-led innovation component will support activities that will leverage the regional broadband infrastructure to foster growth of the regional IT/IT Enabled Services (ITES) industry. (3) Implementation support component will support implementation, institutional and capacity building as well as monitoring and evaluation. (4) A fourth component is included in the overall program design.

This component will be aimed at improving government and private sector efficiency and transparency by leveraging the regional broadband infrastructure towards the delivery of a wide variety of e-services.

<http://www.worldbank.org/projects/P114963/caribbean-regional-communications-infrastructure-program?lang=en>

### **Akshaya – Mallappuram, Kerala**

(UNDP: Asia-Pacific Development Information Programme (APDIP))

Joint project between local bodies (gram panchayats) in rural areas, municipalities in urban areas and private entrepreneurs in Mallappuram district of Kerala to bridge the digital divide. Goals and objectives: To provide community access centres, which can eventually be developed as centres to provide integrated e-governance services; to provide basic functional skills (e-literacy) to every family in the state; to ensure universal access to various information and communication tools as well as technologies; to provide relevant content to the local population in the native language. The project proposes to establish 9,000 Community Technology Centres (CTCs) throughout the state, so that there is one CTC within a distance of 2 km of every household.

<http://www.comminit.com/category/partners/undp?page=16>

### **e-Choupal – Ujjain, Madhya Pradesh**

(UNDP: Asia-Pacific Development Information Programme (APDIP))

This web-based initiative of Indian Tobacco Company's international Business Division in Central India caters to soya growers for information, products and services required in soya farming. The kiosks facilitate the supply of high quality farm inputs and purchases of soya at the doorsteps of the villagers. This project was started in 42 villages of Ujjain district and around 1,800 kiosks in Madhya Pradesh and has around 3,300 kiosks in Central India. The kiosks also handle dealerships of various commodities like Hero cycles and Eicher tractors. This feature has provided extra-benefits to the villagers in terms of minimizing their cost on travel expense.

<http://www.asia-pacific.undp.org/>

### **Gramdoot – Jaipur, Rajasthan**

(UNDP: Asia-Pacific Development Information Programme (APDIP))

Aksh Optifibre Ltd is India's second largest manufacturer of optic fibre cables. The company has provided an integrated hardware and software solution for connectivity in the Gramdoot project. Gramdoot provides e-governance through broadband services to 200 gram panchayats in Jaipur district. The project also provides cable connections to rural households on which 32 television channels are telecast. High-speed non-dial-up Internet access at 70 Kbps is available to 200 villages. Land records, prevailing market rates of agricultural commodities, Hindi e-mail facilities, application for certificates and online grievance opportunities are also provided.

<http://www.asia-pacific.undp.org/>

### **Central African Backbone SOP5 (World Bank)**

The development objective of the Fifth Phase of the Central African Backbone (CAB5) Program Project for Democratic Republic of Congo (DRC) is to contribute to increase the geographical reach and usage of regional broadband infrastructure and to reduce the price of services to enable more people in the DRC to access information and communication technology services. The project comprises of three components. The first component, emergence of an inclusive digital economy will support ministère des postes, telecommunications, et nouvelles technologies de l'information et de la communication (MINPTNTIC) to enable and accelerate the emergence of an information society and the growth of digital economy by supporting information and communications technology (ICT) skills, create new business opportunity for local ICT firms, and promote ICT sector and digitalization of the recipients economy. The second component, construction, management, and commercialization of the CAB5 infrastructure through a public private partnership (PPP) scheme will support ministry of portfolio (MINPORTFOLIO) to deploy interconnected networks to form a regional network with a mix of interventions covering investment focused on improving connectivity.

The third component, enabling environment and regulatory effectiveness will support autorite de regulation de la poste et des telecommunications du Congo (ARPTC) to reinforce and strengthen its regulatory tools and capacity to promote further sector reform.

<http://www.worldbank.org/projects/P132821?lang=en>

### **Afghanistan ICT Sector Development Project (World Bank)**

The objectives of the ICT (Information and Communication Technologies) Sector Development Project are to expand connectivity, mainstream the use of mobile applications in strategic sectors in the Government, and support the development of the local IT industry in Afghanistan. The proposed Project builds on earlier World Bank support to catalyze a second wave of development of the ICT sector in Afghanistan. It will finance components focused on (1) supporting policy and regulator reforms and building strategic infrastructures to expand telecommunications services, (2) creating an enabling environment and shared facilities and services to mainstream mobile telephone based applications that improve public service delivery and support program management in strategic sectors in the government, and (3) supporting the development of the local IT industry through policy development, expanding the pool of skilled and qualified IT professionals, and financing specific shared facilities and services and setting up an incubator for ICT firms within the ICT Village. The project will also finance implementation support and capacity building activities.

<http://www.worldbank.org/projects/P121755/afghanistan-ict-sector-development-project?lang=en>

### **Leveraging ICT Growth, Employment and Governance Project (World Bank)**

The objectives of the Leveraging Information and Communication Technologies (ICT) for Governance, Growth, and Employment Project are to catalyze the growth of Bangladesh's IT and IT-Enabled Services (IT/ITES) industry for employment creation and export diversification; and establish basic e-government foundations to support public sector modernization. There are three components to the project. The first component is IT/ITES industry development. This component will increase the competitiveness of Bangladesh's IT/ITES industry by increasing the quantity and quality of skills, awareness and perception of the country. The second component is e-government.

This component will provide critical e-government technological foundations to support public sector modernization and the e-government agenda for the years ahead, and build the human capacity to leverage technology within government. The third component is project management support. This component will support the creation and functioning of the Project Coordination Unit (PCU), hire the required specialists, and support its operational needs.

<http://www.worldbank.org/projects/P122201/leveraging-ict-governance-growth-employment-project?lang=en>

### **E-government Infrastructure project – Lesotho (AFRICAN DEVELOPMENT BANK)**

The broad project objective is to foster good governance through the use of ICT. Specifically, the project will improve the country's public service delivery through the establishment of a modern core e-Government infrastructure and services. Further, it aims at strengthening access to government shared services, including data centers and portals, and facilitation of access to e-Applications for government such as automated administrative services including e-payroll, civil registration, e-health, e-procurement, e-customs and revenue management. Through this project the government will reform the systems through which services are delivered in a way that maximizes development and minimizes natural resource degradation. Embedded in the concept of sustainability is the viability of (i) national and local governance systems that are citizen-centric, socially inclusive and participatory; and (ii) the associated government operations and services that affect development outcomes.

<http://www.afdb.org/en/documents/document/lesotho-egovernment-infrastructure-project-eoi-49361/>

### **ICT project in Uganda (FAO)**

A new World Bank study on mobile applications for the agricultural and forest sector recognizes FAO's expertise on mobile data collection technology for drought preparedness in Uganda. Published in December 2013, the study ICT for Data Collection and Monitoring & Evaluation assists development organizations to stay up to date with changing technology and to identify appropriate technology channels for data collection and M&E



work. FAO's ICT work in Karamoja, Uganda, is an innovative best practice in implementing ICT in agriculture. As part of the regional DRRAP initiative, funded by ECHO, community chiefs in 55 village centers in Karamoja were given mobile applications to collect and collate digital data on signs of drought. Via its social responsibility program, Nokia provided the mobile phones and open source software to collect the data, enabling remote access to real-time information. As a result, the drought analysis is now more accurate as the transmission period has been reduced with five to seven day.

*<http://www.fao.org/emergencies/fao-in-action/stories/stories-detail/en/c/212401/>*

### **Artimondo: A micro-enterprises' network**

Artimondo was born as an e-commerce platform (already online in Europe and preparing for its imminent debut on the Chinese market) that enables artisans to both broaden their horizons and keep on operating in their own territories. An e-commerce tool that allows small entrepreneurs from each and every continent to promote their businesses all year round through a window on the world. An innovative approach that by taking full advantage of Information Technology, enables small enterprises to play a leading role in their countries' socio-economic development. This is the case of our artisans from Africa, and more generally, of those exhibitors that come from impoverished developing countries. Our objective is to provide them with some concrete support all-year round rather than just in occasion of the fair: thanks to the infrastructure developed by our company, they are now able to make the most of the Internet's huge potential with a permanent global shop window.

## HEALTH & FOOD

**Sun4Water:** a device designed and by the NGO Sun4People. The answer to diseases related to drinking unsafe water. It is an innovative device that delivers affordable clean drinking water and energy in areas that do not have access to both drinkable water and electricity. The goal is to significantly lower morbidity and mortality due to drinking unsafe water, and the cost associated with accessing drinkable water. Output water quality exceeds WHO standards. The purifying technology is a miniaturization of a solution successfully implemented by SparkleClean Tech based in India. The water is flushed by a pump through a pre-filter and a set of 3 filters and a reverse osmosis that clean the water down to 0.001 micron, making sure that no harmful viruses or particles remain in the water. Once the pump is powered, a sizeable amount of energy is available for other purposes. Part of this energy is used to guarantee the battery life, but the remaining energy can power one or two mobile phones and a few LED lamps.

*<http://www.sun4people.org/projects/>*

**Sustainable fish smoker oven for rural East Java** (The Johns Hopkins Institute for Nanobiotechnology)

The Global Engineering Innovation team, group of Johns Hopkins University Whiting School of Engineering students, has been working on designing locally sustainable, safe and affordable fish smoking ovens to promote the fish processing tradition in Tuban, an underdeveloped coastal village in East Java, Indonesia.

In partnership with Kopernik, an international NGO aiming to reduce poverty in last mile communities through simple technologies, the goal of the project is to improve the traditional fish smoking techniques that have adverse health effects, are inefficient and time consuming. The team visited Tuban twice to conduct interviews with the community members, build prototypes and test the designs.

In January 2015 the team presented their final prototype to the community and got feedback on improvements to the design. The ultimate goal is to train local craftsmen in production of the ovens and promote the creation of a sustainable market for the fish smoking ovens in the region.

<http://inbt.jhu.edu/>

### **A gallium arsenide water purifier**

A blue light-emitting diode based on gallium nitride (used in Blue-ray disks) can kill harmful bacteria and mosquito larvae in drinking water. This rather unusual application of the novel semiconductor is being explored by scientists at the University of Cambridge.

[https://www.iop.org/publications/iop/2009/file\\_44076.pdf](https://www.iop.org/publications/iop/2009/file_44076.pdf)

### **Ebola: early and fast diagnosis**

STMicroelectronics e Clonit in collaboration with the Istituto Nazionale per le Malattie Infettive “L. Spallanzani” have designed and built a portable device which allows to detect the presence of Ebola Virus in a blood sample in less then 75 minutes and at very low cost. The device is based on a molecular biology technique, RT- PCR (real time Polymerase Chain Reaction). The portable analyzer is based on the Real-Time Polymerase Chain Reaction (RT-PCR) molecular biology technique. The next step in development of the analyzer is to optimize the point-of-care Ebola-detection solution for large-scale deployment, including minimizing the threat of infection during the handling of the biological sample and lowering costs. This effort paves the way for enabling rapid diagnostic tests for Ebola as well as many other viruses that are much more widespread.

<http://www.st.com/web/en/press/t3650>

### **Project Daniel: 3D printing prosthetics lab**

Project Daniel is a 2013 project created by Not Impossible, LLC to use 3 Printers to make prosthetic arms for children of war in South Sudan. Local villagers can now use these 3D printers and lab to create prosthetics for approximately \$100 each in under six hours. The prosthetic limbs are fairly limited - fingers have basic functionality, requiring special attachments for certain activities. However, future iterations are expected to feature improved technologies down the line. By utilizing crowd-sourcing to crowd-solve healthcare issues, Not Impossible aims to provide low-cost and DIY solutions on an open-source platform, and to enable high-tech devices to reach people in need all over the world.

*<http://www.notimpossiblelabs.com/#!/project-daniel/c1imu>*

### **IanXen Xrapid**

The smart phone attachment called Xrapid turns the phone into a 200-power microscope, while the attached app - based on facial recognition software - quickly detects the parasitic protozoa in the blood smear. The app is affordable, easy to use and provides reliability of up to 98 percent. The only additional equipment required is an ordinary glass lab slide - called a "slate."

*<http://ianxen.com/how/>*

### **Peek**

The multifunctional, smartphone based Portable Eye Examination Kit (Peek) aims to empower eye health workers to diagnose eye diseases and provide a low-cost device for managing and monitoring the treatment of patients, even in the remotest of settings. Using a smart phone to scan retina, it is possible to have early diagnosis of cataracts, glaucoma, macular degeneration, diabetic retinopathy. Peek is being developed through a collaboration between the International Centre for Eye Health (ICEH) at the London School of Hygiene & Tropical Medicine, the University of Strathclyde and the Glasgow Centre for Ophthalmic Research.

*<https://www.indiegogo.com/projects/peek-retina-help-fight-avoidable-blindness>*

## **Braigo**

It is a very low cost Braille printer developed by a 13 years old Indian hacker (Shubham Banerjee). BRAIGO uses Lego robotics kit to create a low-cost braille printer. The machine could be used to print Braille reading materials on paper, using raised dots instead of ink, from a personal computer or electronic device. This concept slashes the price of a printer from more than \$2000 to around \$350 for education, teaching and home use purposes. Thus giving a more cost effective printer for the disadvantaged.

*<http://www.braigolabs.com/products/braigo-v10>*

## **New mobile application for Uganda's veterinarians – 2014 (FAO)**

The EMPRES-i Event Mobile Application (EMA) allows national veterinary authorities to use smartphones to report disease outbreaks. It also allows district veterinary officers to access disease reports submitted by colleagues. During the second half of 2013, the app was tested in a pilot which took place in ten districts of Uganda selected by the National Animal Disease Diagnostics and Epidemiology Center (NADDEC). The national authorities and district veterinary officers who took part in the pilot asserted the utility of the surveillance of animal disease, and urged that it should be expanded to all districts in the nation. FAO is encouraging other countries to test and use the app to improve disease reporting in the field. The web-based app is currently available for Blackberry devices and phones with Android technology.

*<http://www.fao.org/in-action/new-mobile-application-proves-essential-to-uganda-veterinarians/en/>*