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MAKERERE UNIVERSITY

MAKERERE UNIVERSITY SCHOOL OF PUBLIC HEALTH RESILIENTAFRICA NETWORK (RAN)

Innovation Projects under Incubation-Funded

ResilientAfrica Network (RAN) www.ranlab.org sources and supports Resilience Innovations at each of the 4 Resilience Innovation Labs (RI Labs) using three approaches:

1. Resilience Innovation Challenges (RICs) or Design Thinking Ideation: - Guided by specific intervention pathways, we issue competitive calls for ideas. This targets new emerging ideas and is RAN's main approach to sourcing resilience innovations.
2. Resilience Innovation Acceleration Program (RIAP) Or Crowd-Sourcing: This is RAN's alternative source of innovations targeting existing projects with a potential to impact on resilience.
3. Collaborative Resilience Innovation Design (CRID) - Innovation project co-creation, Experts sit with community members to co-create system-level 'platform' projects.



'Solutions through Innovation'

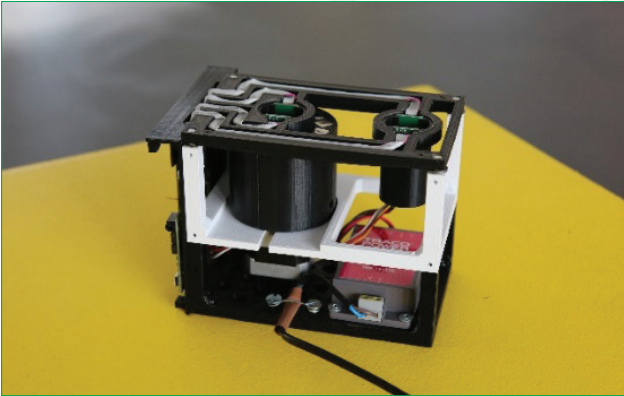


First Round of Projects selected for support under the RAN Innovation Acceleration Program (RIAP) under the Eastern Africa Resilience Innovation Lab

1. Matibabu: A non-invasive technology for Malaria diagnosis, <http://www.matibabu.thinkitlimited.com/>

Team Lead: Brian Gitta, gittabrian@gmail.com,

Members: Joshua Businge, Josiah Kavuma, Simon Lubambo and Sekitto Shafic



Matibabu is a pocket-sized hardware device that uses a beam of red-light to detect malaria parasites in blood tissues. The technology is simple to use, non-invasive, low cost and does not require blood drawing devices making it viable in primary care settings in hard-to-reach areas where the microscope is not accessible. The innovators are currently preparing to start off with clinical tests with their iterated prototype (Matiscope).

2. Root IO: A community radio technology with the potential to revolutionize last-mile communication, <http://rootio.org/>

Team Lead: Chris, Csikzentmihalyirobotic@gmail.com,

Members: Jude Mukundane and Moses Odokonyero



RootIO is a technology that combines radio technology and the reach of mobile phone coverage to transmit radio-signals in the community. The mobile phone handset quickly becomes a radio transmitter when attached to a portable hardware set. This implies that a radio station can be set up in any community anywhere, and the same station can be re-deployed to different communities in a very short period of time. Community leaders then have a more robust tool that they use in community mobilization to address development challenges. A prototype of this technology has been tested and optimized in four pilot areas in Northern Uganda reaching about 8, 000 people through health talk shows, conflict resolution, marketing of local produce and announcements. With carefully selected and prepared content, the technology has the potential to transform last mile communication in various communities especially information related to disaster preparedness and response, peace building and mobilization for social change.

3. Earthworm Domestication: Unearthing the potential of earthworms

Team Lead: Fred Kabi, fred.kabi@gmail.com;

Members: John Okiror, Abas Kigozi



Earthworm Domestication is a unique method of breeding earth-worms locally and processing them as an alternative feed to poultry. The challenge has been producing earthworms in high required volumes enough to compete with the silver-fish market (Given that silver-fish is also consumed by human beings). Innovators have continued to refine a breeding unit to rapidly produce large masses of Earth worms under a controlled environment using bio- mass waste as the substrate. Communities have now adopted using local technology to process the earthworms into a form that can be mixed with chicken feed as a protein source.

4. Low cost Solar Irrigation Pump:
Transforming agriculture in semi-arid sun-rich areas

Team Lead: Prof. Byaruhanga Joseph, jbyaruhanga@yahoo.com

Members: Ojara Peter, Mario Etunganan Jacob



Innovators have fully developed a prototype for a very-low- cost solar powered irrigation pump that is cast from local scrap materials. Having been tested in several communities in Uganda, this pump has the potential to substantially increase access to low cost solutions for local irrigation and water transfer for other purposes. It can deliver water to a height of 15 meters and horizontal distance of 300 meters. The team is also testing mechanisms for longer distance delivery systems to transmit water over longer distances through serial reservoirs. This technology has the power to transform social attitudes and perceptions about irrigation as a means to increased crop yields in sub-Saharan Africa.

5. Improved Pull and Push: An innovative approach to inter-cropping that dually suppresses nuisance weeds and pests

Team Lead: Wanyama Oduori Kenneth wanyama.kenneth8@gmail.com;

Member: Mugondi Kapel Jerome



Innovators have piloted and disseminated to some of the communities in Eastern Uganda (Iganga District) a dual strategy for inter-cropping that achieves optimum control of the nuisance Striga weed and a prominent weevil (the Maize stock-borer) in a near natural ecosystem (Improved push-and-pull) showing excellent results leading to thriving maize gardens. Both the weed and the weevil are highly prevalent in the low lying maize producing areas of Eastern Africa, especially where the soils are infertile. This approach to cropping can be extended to larger holdings, helping to increase crop yield without additional expenditure on chemicals and the excess labor needs of weeding.

Projects supported under the Resilience Innovation Challenge for Adverse Climate Effects (RIC4ACE) in the Eastern Africa Resilience Innovation Lab

1. KUNGULA' - Winnowing Maize Thresher

Team Lead: Stephen Ssekanyo sekanstephen@gmail.com,

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'KUNGULA' – Winnowing Maize Thresher; is an optimized post-harvest handling low cost technology for mechanized threshing and winnowing of maize. 'Kungula' is a local term meaning 'harvest'. The solution includes a mechanized thresher targeting large scale growers and a low-cost manual thresher for small scale farmers. This thresher differs from other existing machines on the market because

it incorporates a centrifugal winnowing fan that protects maize grain from external contaminants, releasing out chaff and dust from the final grain. It threshes 1 ton of maize in 1 hour using 1 liter of petrol. These innovators are also already reaping from market sales.



2. RAPID Solar Dryer

Team Lead: Dr. Robinah Kulabako
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Members: Dr. Philip Nyenje, Mr. Swaib Semiyaga, Mr. Mohammed Ssemwanga



RAPID is based on the idea of concentrating more solar energy in a controlled environment to achieve faster and efficient drying of a wide range of agricultural produce using locally available and cheap materials. The technology harnesses and concentrates solar energy using reflectors to quicken and improve the drying process. Reflective panels (concave mirrors), are placed at an appropriate solar angle and direction in order to concentrate extra solar radiation thereby providing extra solar heat to the system. The panels are adjustable so as to be positioned according to the sun's strength and movement, while offsetting excessive solar heat and prohibiting over-drying. This team of innovators have been involved in physically engaging the communities in Eastern and Central Uganda, giving them an opportunity to interact with the Solar Dryer so that they can actually purchase some pieces but also share additional feedback to inform further iteration if necessary.

3. Mushrooming Livelihoods

Team Lead: Mr. Gerald Kyeyune Muwanga
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Members: Dr. John James Okiror, Mr. Katende Stephen Sserunjogi, Mr. Muhereza Begumya David, Mr. Mivule Danson, Mr. Kigonya Allan and Mr. Mbowa Lutimba



Growing of high value crops like mushrooms on smaller holdings will provide an important livelihood option for rural farmers. Mushrooms are not widely grown in Eastern Africa yet are of high demand in hotels, hospitals and homes.

One of the key barriers to mushroom growing in the region is the requirement to use cotton-seed hulls as the medium for germinating and growing the mushroom plant. In addition, the cotton-seed hulls have to be sterilized, which is often done by roasting with firewood, yet it is increasingly scarce and greatly affects the environment.

These project innovators have developed, tested and piloted a new medium for mushroom growing using crop residues that are locally available in the target communities, instead of cotton seed-hulls. In addition, these innovators are using new methods of sterilizing the crop-residues - instead of relying on firewood. Plenty of these crop-residue materials are available on the farm without significant alternative uses. Secondly, use of soap and water has been employed as an alternative low-cost sterilizing method.

Farmers in parts of Central Uganda (Wakiso District) have adopted this approach enabling them to grow mushrooms regularly throughout the year unlike in the past when cotton seeds-hulls were scarce. Livelihoods have also improved.

'Solutions through Innovation'

4. B2K! Back to Millet:

Team Lead: Dr. Julius Gatune
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Members: Dr. Deborah Cohen, Ms. Patience Kikoni, George Wanjohi and Zainab Kangale



Traditional cereals and tubers like millet, sorghum, sweet potatoes, cassava and yams are slowly disappearing from the staple diets of many communities in rural Africa and beyond. Maize and rice have come up to claim a growing share of the dinner serving of many households. This is part of a globalization trend in which corn/maize and rice are becoming a global staple food.

Yet some traditional starches would provide similar aesthetic and dietary properties to rice and maize, while enabling a wider choice for consumers. This project uses novel recipes and aesthetics to re-define the taste of millet and other waning traditional starches like Sorghum, Cassava and Sweet potatoes.

New forms of processing, impurity removal, mixing, refinement and presentation of these foods will increase their palatability and taste, so that more people in rural and urban settings choose to consume them.

These innovators have implemented very simple formulations that can be scaled to the large quantities required to compete with maize, employing the existing unit processes used to process these cereals. The team has published a recipe dictionary for millet as a reference to several hotels, restaurants and homes.

‘Strengthening Resilience in target communities’

5. Village Egg Bank in Egg Currency (VEBEC) <http://www.nestedsavings.org>

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One of the barriers to saving among small holder farmers in rural areas is the lack of monetary currency to spur savings. This is because their small volumes of produce often attract small amounts of monetary gain. VEBEC introduces a new unconventional form of currency in which farmers contribute ‘an egg at a time’ into a village egg bank. Any farmer can contribute, regardless of whether they have one or several chicken.

These regular deposits of eggs ensure a constant supply, while the egg pool provides a mechanism for bulking the available eggs for better market leverage. The egg bank records each household’s contribution whenever an egg or more are delivered. The bank sells the eggs on behalf of the farmers, and earnings are deposited on an individual or group account opened at a commercial bank.

The bulked eggs provide formidable leverage in attracting buyers who are interested in bulk purchases while leveraging a good price for the farmers. This model has been piloted with 35 beneficiaries in Northern Uganda (Yumbes District) and livelihoods have been improved and a saving culture inculcated among farmers.

6. Better Farming Better Me!

Team Lead: Dr. Possy Mugenyi,

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This innovation reduces household dependency on tobacco by enhancing farmers' abilities to generate adequate food, and create a fora where public health and poverty eradication programmes can be promoted and scaled up. The intervention is implemented by the Centre for Tobacco Control in Africa (CTCA) in Western Uganda (Hoima District) with a high prevalence for tobacco growing and consumption. The model was piloted with 6 farmer groups in Hoima District and results indicated farmers' willingness to abandon the cumbersome tobacco growing and adopt the model. The intervention involves introducing Kroiler chicken and high yield maize as alternative enterprises to tobacco growing under the theme 'Diversification of Income for Improved Life for tobacco dependent communities in Uganda'. The innovation is using chicken litter as manure for maize gardens and maize brands as chicken feed hence promoting a well-balanced ecosystem as well as synergy between the two enterprises.

Projects selected for support under the RAN Youth Spark Innovation Grant (YSiG) under the Eastern Africa Resilience Innovation Lab (EA RILab)

Strengthening the Resilience of Livestock

Genetic improvement of livestock has been used for a long time to improve the resilience and production of livestock. The following programs are crucial for this improvement.

1. Novel Boar Semen Diluents for Upscaling Pig Artificial Insemination

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Artificial Insemination (AI) in pigs is carried out using liquid boar semen but this is only viable for 24 hours following its extraction from the boar. In order to extend the viability of boar semen, diluents are used.

There are currently a number of diluents available on the market and these vary in cost and can extend the lifespan of semen from between 3 to 7 days. In Uganda, short-term diluents are frequently used because of their low cost.

This however prohibits the transfer of genetically

superior traits to the livestock of farmers that live far from the AI centers. The team has developed a low-cost diluent that can extend the viability of boar semen by 10-14 days.

Semen stored under this diluent has been tested with 10 sows and monitoring is being done monthly to ascertain the gestation progress of these pigs.

This in turn will promote genetic improvement of pig herds, increase pig productivity and strengthen the resilience of pigs to adverse conditions.



Reducing Post-Harvest Losses

2. Low Cost Digital Grain Moisture Content Meter

Team Lead: Okumu Collins James
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Member: Calvin Kakeeto



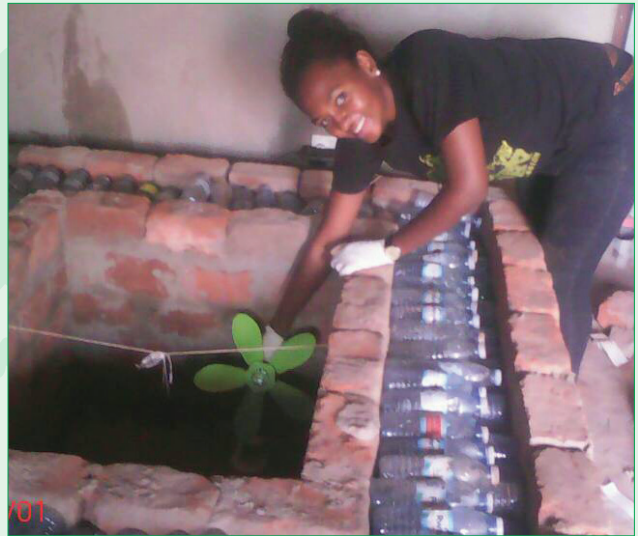
The drying process and moisture content of grains are two important factors to consider when trying to avoid Post-Harvest Handling Losses (PHHLs) as grain with high moisture content is often susceptible to mould, heating and other chemical changes. Current moisture content meters on the market cost between USD108 to USD629 and are often difficult to use, thereby prohibiting their use by local farmers. The team therefore seeks to develop a low cost, easy-to-read, digital grain moisture content meter that will help farmers determine the quality of their product and reduce PHHLs that result from high moisture content.

'Resilience Innovations'

3. Eco-Cold Storage Facilities

Team Lead: Hadijah Nantambi Ssekyondwa
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Inadequate or non-existent refrigeration facilities for horticultural products in Uganda often results in huge post-harvest losses. Low-cost cold storage facilities have been adopted in Cambodia, India, and Tanzania, but these use sand as the insulation material (Roy and Khurdiya 1983). This project is using PET bottles for insulation of an Eco-cold storage facility. The PET bottle insulation system allows room temperature to drop to 19°C with limited energy use. The technology extends the shelf-life of perishable goods, increase the revenue of farmers and reduce pollution by plastic waste.

4. Fruiti-Cycle, <http://www.fruiti-cycle.com/>

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Members: Opiyo Morris Ester, Rachel Aitaru



Olema, Kevin Akello Ojara and Ben Wokorach
 This project aims to reduce PHLs that result from poor transportation and storage of perishable fruits and vegetables. Bicycles and Motorcycles with poor packaging and low carrying capacities are used for 70% of the trips to transport fruits and vegetables to local markets.

The Fruit-cycle is a low-cost, biogas powered tri-cycle mounted with a 300kg carrying capacity refrigerated cabin for safe and convenient transportation of fruits and vegetable. The innovation not only reduces PHLs but will also enables farmers to carry more produce and carry out door-to-door sales to their customers and by so doing, increasing their revenues.

5. Biomass Dryer

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Drying is one of the most important processes in postharvest handling and processing of agricultural products. In Uganda, Agricultural produce are often dried by the sun yet this process is heavily dependent on the climate and often takes a long time. In the process, produce also stands the risk of being affected by dust, dew and contamination by animals and birds etc. This project has designed and fabricated a briquette-fired biomass dryer. The dryer aims to shorten the drying time of produce and maintain quality, thus reducing PHLs.

Addressing the Challenge of Climate Change in Agriculture

6. Mosfield's Irrigation Pumps

Team Lead: Moses Jonathan
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The issue of climate change poses a great challenge in many parts of Africa, particularly to those whose income is heavily reliant on the weather patterns. To cope, groups of farmers in Tanzania dig channels from water bodies to their farm land. This however has massive implications during heavy rains when these water bodies flood. This project aims to reduce these losses among small scale farmers in Tanzania through the creation of human powered irrigation pumps (Mosfield's irrigation pumps). The Pump has been tested at a lab scale and has shown capabilities of pumping water through a horizontal distance of 200 meters and further field tests are yet to be done.

7. Self-Regulating Irrigation System for Mixed Agricultural Farming

Team Lead: Atish Shah
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Often with manual irrigation, water supply to the crops is delayed causing crops dry out. Water shortage affects plant growth before visible wilting occurs and by so doing affects crop yields and results in sub-optimal economic gains for farmers. This project has designed a low cost, easy-to-use device to monitor irrigation by detecting the moisture level in the soil. By so doing, the project will revolutionize the irrigation system in the small-scale agriculture industry, especially in the rural areas of Tanzania.

Renewable Energy Sources

8. Quick-Lite Briquettes

Team Lead: Kizito Henry
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Member: Sam Mukasa

Kampala City alone generates over 28,000 tons of waste that is collected and delivered to a land fill every month and according to the Kampala Capital City Authority (KCCA), this represents less than 45% of the waste generated by the city. Meanwhile, a lot of the waste in the country remains uncollected and disposed indiscriminately. There is a need

to translate these waste materials into an alternative, environmentally friendly, sources of fuel. QUICK-LITE BRIQUETTES team has designed and fabricated a machine that produces robust briquettes that can burn longer and are less smoky. This machine mixes the char and the binder in right proportions and therefore cable of producing a well-balanced briquette.



9. Totonga

Team Lead: Kalala Ngongo Jonathan
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Bottles, bags and other plastic waste, domestic or industrial, are a major environmental concern in cities of the Democratic Republic of Congo. This is because plastic is non-biodegradable and are often disposed indiscriminately. The project aims to design a special oven that can heat these plastics and mold them into bricks, stone or concrete, building dykes, ditches or sealed tanks for rainwater. These products can then be sold at a low cost.

Health

10. BVKit, bokit.wordpress.com

Team Lead: Nanyombi Margaret
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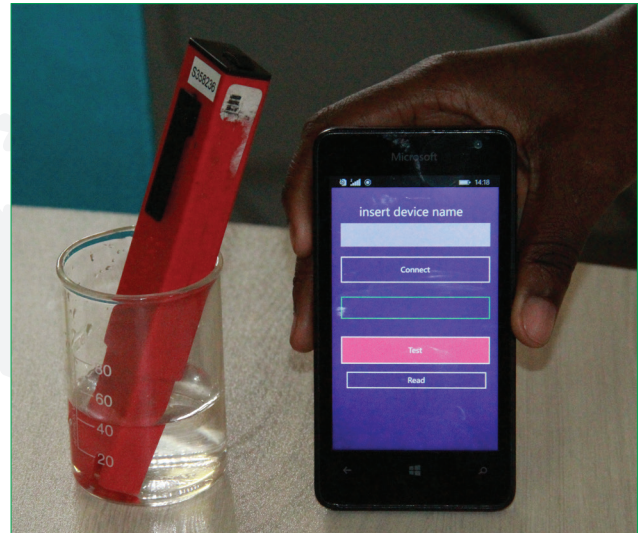
Members: Ndagire Esther, Nairuba Pauline, Namanda Jackline, Mendoza Bridget, Nafula Winfred

Bacterial Vaginosis (BV) is a condition that results from having increased amounts of certain bacteria and in turn affects the balance of chemicals in the vagina. If untreated, BV makes its patients susceptible

to Human Papilloma Virus (HPV) and therefore cervical cancer, sexually transmitted diseases, miscarriages during pregnancy and pelvic inflammatory disease that leads to difficulty in childbirth.

The BVKit provides an avenue for rapid screening and diagnosis of BV using a PH sensor unit. This unit is re-usable and when placed in a urine sample detects the PH value of the urine and sends the results to a freely downloadable 'vaginosis application' via Bluetooth.

The vaginosis application then provides a diagnosis of whether the person has healthy or unhealthy bacteria and will also provide information on the condition and directions to the nearest hospitals. The goal of the project is to empower women and girls to take charge of their health and avail them with a cheap tool to do so since the hardware would be reusable and the Mobile App free.



11. Wekebere, wekebere.com

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The World Health Organization (WHO) recommends that all pregnant women attend at least four antenatal care visits and that these visits are managed by a skilled health worker. In Uganda however, only 47% of pregnant women receive antenatal care and only 42% of births are attended by skilled health personnel. Wekebere is a hand-held self-diagnostic device that aims to help pregnant women monitor the state of their unborn babies irrespective of their location. The goal of the project is to increase the accessibility of antenatal care by providing a cheaper, mobile alternative for monitoring a pregnant woman, especially those in resource constrained environments.

12. The PedalTap, pedaltap.wordpress.com

Team Lead: Grace Nakibaala,
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Members: Molly Mbaziira Nannyonjo and Ssevume Isa



The PedalTap innovation is a retrofittable, adaptable, affordable hands free foot operated water dispensing system. It can be connected to any tap system anywhere and its designed to reduce the growth and frequency of potent and infectious diseases spread through opening and closing taps.

PedalTap was piloted and installed in toilets at Kampala Capital City Authority (KCCA)

(3 pedal taps), at Mulago national referral hospital (1 pedal tap), ResilientAfrica Network (RAN) (1 pedal tap) and Infectious Disease Institute (1 pedal tap). Following the pilots and disseminations at events, exhibitions and in the media, the team has had four (4) PedalTaps bought by individuals: 2 PedalTaps were installed in restaurants and the other 2 at a church with a congregation of about 10,000 people.

Additionally, KCCA will install PedalTaps at all their premises including schools, health facilities and public toilets. Another PedalTap was installed at Nakawa market (Kampala Central) and is being tested with the users there. With the 10 PedalTaps currently in the field the innovation is directly impacting over 10,000 people every day.

13. E-Health for Refugees (Tantine android app) <http://www.tantine.rw/>

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Members: Niyoyita Bonaventure, Uyisenga Gisele, Mutimukeye Clarisse, Uhirwa Sylvie



Refugee populations tend to have poorer health indicators than the communities from which they came. Refugees are usually at highest risk of mortality immediately after reaching their country of asylum, as they frequently arrive in poor health and are completely dependent on foreign aid. According to UNHCR, during this time, the most commonly reported causes of death are diarrheal diseases, measles, acute respiratory infections, malaria, malnutrition and STIs.

This project is led by a group from the University of Rwanda and aims to create a website to educate refugees about sexual and reproductive health to ensure they are taking the right measures to prevent the spread of STDs.

Tantine app which is one of our project's product is among the winners of iAccelerator program of UNFPA and Imbuto Foundation. The Innovators won USD 10, 000 mainly to expand this project in the Rwandan community and other refugee camps.

14. E-Musawo National Telemedicine System <http://emusawo.com/>

Team Lead: Denis Tumuhaise, denistumuhaise@yahoo.com

Members: Dr Ezati Daniel, Kasigazi Emmanuel, Paul Asiimwe, Roy Kalyebara, Kato Herbert, Cosmas Mwikirize and Alvin Kabwama

Mulago National Referral Hospital has a problem of overcrowding that results from unnecessary referrals from lower tier hospitals and health centers. Many times, cases could have been handled at the primary care level but doctors in these facilities lack the confidence and equipment to make these diagnoses.

E-Musawo offers a Telemedicine platform that will allow specialist physicians (here or abroad) to conduct low cost, real-time, remote consultations with doctors in hard-to-reach areas and by so doing bring modern healthcare to these places.

The e-Musawo platform will comprise of cloud-based software, comprehensive electronic health record (EHR) system, a patient portal, a health information exchange platform and a continuing medical education tool.

Preventing Gender Based Violence and Violence Against Children

15. Making Stepparents Aware of Proper Care and Protection of their Step Children

Team Lead: Subira O. Mumba, mamak2008@yahoo.com

Good child protection efforts require ensuring that community members (including parents and volunteers) know how to recognize and report any form of child abuse. As a number of child abuse acts in Tanzania are committed by step parents, the project educates this group on proper care and protection of their step children.

This project is creating awareness of local government authorities in 4 districts in Tanzania that are most affected by cases of Violence against Children. It also established a 'local village security committee', which was selected by the community members. This committee is responsible for reporting and holding village meetings regularly to discuss the progress of status of child abuse in the community.

The village security committee is also responsible for formulating by laws and

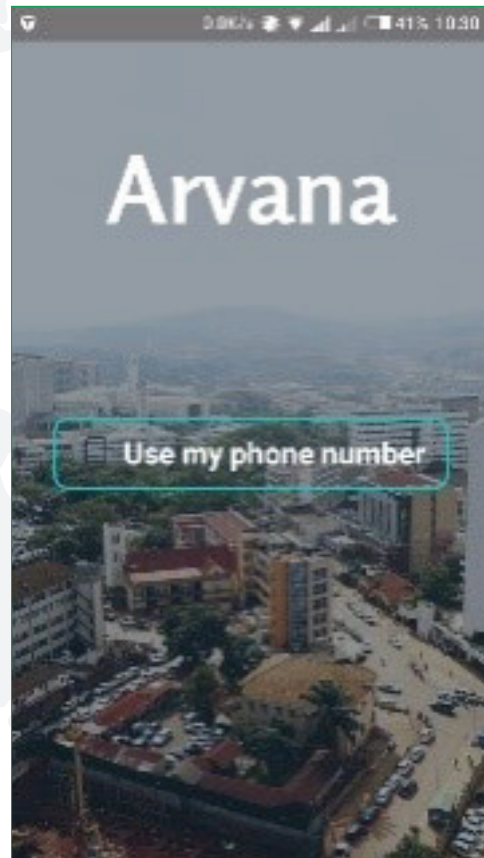
ensuring that they are enforced and holding disciplinary measures if any member violates the laws.

Wealth Creation

16. Arvana, www.arvana.io

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Members: John Kagga, Raymond Natukunda



Arvana seeks to address the fundamental issue of inaccessibility. This is an area with huge tidal potential; an improvement in accessibility will be felt across the full spectrum of industry. Arvana is transcending city planning issues and providing a physical address for any and every one registered on the platform. This has both social and economic implications. On the social front, individuals can expect improved delivery of quality services manifested in form of home deliveries of packages and mail, turn-by-turn navigation as well as ease of access to health care facilities like ambulances.

Arvana also has profound economic implications, especially where the delivery of goods and services is involved. Courier services like DHL and FedEx as well as the

fast-growing number of online businesses will be better placed to deliver more value to clients. The team is carrying out pilot tests with Plan International (Uganda) engaging 100-150 users across their youths in their SmartUp Factory Program in Kampala.

17. Snail shells for Tiles

Team Lead: Emmanuel Ahumuza, emmahumu@gmail.com

Members: Ssebbanja Junior, Kagwa Saddam



Agriculture and fishing are the main economic activities of inhabitants of Panyimur, Nebbi District. These activities are however, greatly affected by extreme adverse weather conditions. The project aims to diversify the income generating activities of residents of Panyimur Town who live along the shores of Lake Albert, through Snail shell collection. Snail shells can be used to produce animal and poultry feeds, in the manufacturing of tiles and ground shells and as a detergent to purify water.

2 communities around Lake Albert region have been taught to make different products from snail shells and 3 Snail Shell tile prototypes have been produced, these are being used to train other communities on how to manufacture tiles from Snail Shells.

18. Establishment of Entrepreneurship Clubs in Secondary Schools

Team Lead: Diane Iradukunda, dianeiradukunda87@gmail.com



Unemployment is a grave issue across East Africa. Individuals still struggle to find jobs even with secondary and university level education. The objective of this project is to create and introduce Entrepreneurship Clubs in Secondary Schools. This will expose students to the concepts of business at an early age and will facilitate discussions on past and current experiences in business while bringing together students, members of staff and speakers from a multi-disciplinary background.

Through this project, Entrepreneurship clubs have been established in 5 Secondary Schools and these have exhibited the potential to start up new projects for students to earn. Approximately 2,700 students have been engaged on this and the innovators plan to extend this to other schools.

19. Dark Weed Farming

Team Lead: Pancras Katunzi, katunzip@gmail.com



For better reproduction and growth of fish, a quality protein content of feeds is vital. However, availability of quality, reliable and affordable fish feeds is one of the major challenges facing the fish industry. In fish feed industry like poultry feed industry, access to sustainable and affordable protein sources is limited. Soybeans and fishmeal have long been used as source to supplement protein in fish feed and also supplement protein in human diet. This creates tension by which humans always end up winning but at an expense of rise in food prices sending most people earning less than 1\$ per day to extreme poverty.

Duckweed is an appropriate candidate to be used alternatively as protein sources in the fish feed industry. Duckweeds are among the smallest flowering plants found growing on water surfaces (aquatic plants) and forming blanket-like mats. Thus far, Dark weed gardens have been set up as prototypes at the Tanzanian Fisheries Research Institute to ascertain the breeding conditions. The Dark weed shall later be harvested and testes for protein content and grading for comparative analysis with the existing protein sources.

20. Shea Butter Project Value Addition

Team Lead: Loum Patrick,
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The aim of this projects is to improve livelihoods in conflict hit areas through enabling value addition to shea-nut products. The team has engaged a number of stakeholders including local government officials, Community based organizations and key opinion leaders. This innovation has also already realized some impact including; protecting of Shea nut trees, marking and labelling the trees for protection and support of cold pressed butter extraction.

Projects selected for support under the Resilience Innovation Challenge 4 Conflict (RIC4CONF) under the Eastern Africa Resilience Innovation Lab

1. Grand Nutrition (An Integrated Model to prevent malnutrition among mothers and children)

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Members: Dr. Gaston Ampe Tumuhimbise,
Dr. Ezekiel Mupere, Ms. Phellister Nakamya



The eastern central region of Uganda experiences erratic rainfall patterns, which predisposes the communities to droughts, floods and soil nutrient depletion. This has resulted into food insecurity and malnutrition shocks, especially among pregnant and lactating mothers and children below 2 years termed as the “1000 days’ critical window of opportunity”. In Namutumba district, the target population among 6-23 months’ children, 26.6% are stunted, 11.4% are underweight and 4.1% are wasted. Grand Nutrition is an innovative supplementary food product from local foods eaten as porridge in an addition to the daily diet of pregnant mothers, lactating mothers and children below 2 years to prevent malnutrition and optimize growth and development. So far it has demonstrated that households receiving

the Grand Nutrition supplement statistically significantly improved exclusive breastfeeding practices from 47 to 88% and Global Acute Malnutrition (GAM) levels reduced from 13% to 7%.

2. Akello Banker – Digital Financial Service Delivery www.akellobanker.com/ <http://www.tantine.rw>

Team Lead: Jean Anthony Onyait
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Members: Vincent Ocan, Sam Kwesiga, Patricia Kalungi, Justine Nahurira



Despite the spread of microfinance and the more recent proliferation of digital financial services, roughly five of seven persons globally remain financially excluded. This is especially true for the rural poor. The twin challenge confronting lenders and financial services providers in rural areas is liquidity problems, the lack of a reliable financial identity and the absence of credit information for assessing credit risk, credit capacity and creditworthiness. Akello Banker is a web and mobile based digital credit/loan and banking platform that interlinks rural financial service providers to deliver inclusive financial services to rural poor especially farmers so as to drive high levels of financial inclusion and enhance the ability of the poor to adopt environmentally friendly farming practices. The platform has integrated the digital lending and credit scoring system to the core banking software currently being used by over 7 interlinked SACCOS serving over 50,000 Farmers.

3. Enhancing the remedial common herbs for commercial production of Oral health care products (Smilex Herbal)

Team Lead: Dr. Isaac Okullo,
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Members: Norbert G Anyama, Dr Anne Ampaire Musika, Dr. Francis Ocheng, Prof. Anders Gustafsson

Poverty levels remain significantly high in Northern Uganda mainly due to the protracted war that ended a few years ago. The net effect is lack of basic necessities and services hence poor health. Oral health is critical and affects the quality of life, especially in the rural poverty-stricken settings.

The most common oral diseases, periodontal disease and dental caries, affect up to 60-90% of the Ugandan population with the rural communities bearing the brunt of the severe form of the diseases. The impacts of oral conditions ranging from tooth pain to tooth loss among the rural poor exacerbates the shocks and stresses from the conflict that further compromise the wellbeing of the communities.

This team of innovators is implementing an oral solution using locally available medicinal plants, such as *Ocimum gratissimum* and *Cymbopogon citratus*, for income generation, treatment and prevention of oral conditions. The focus of this intervention is to harness the pharmacognosy curriculum towards skills development and entrepreneurship that address stress related to poor oral health and poverty in communities from Northern Uganda. It is also implementing a curriculum component to train rural communities in commercial cultivation and production of medicinal plants from the plants for oral care.



4. Media Based Financial Literacy

Team Lead: Dixon Ampumuza, dampumuza@gmail.com

Member: Ms. Barbara Night Mbabazi Kaija

In Uganda the number of bank accounts is about Seven Million (7) representing 18% and some of the Village Saving Credit schemes are collapsing due to financial illiteracy.

This low financial penetration limits access to safe and sound financial services, which is aggravated by low financial literacy levels among individuals and households.

The team is implementing a unique approach in which the educational information is disseminated through multimedia platforms. Scheduled financial literacy information is published in the form of a well-designed weekly Education pull out in Media in Education, like Pakasa the inspirational pullout for entrepreneurs on a weekly basis (every Friday). This exposes young people to different entrepreneurial ideas, saving methodologies and different financial options to encourage them save and get alternatives in life after education. The educational approach in this project is three dimensional: Knowledge (awareness), attitude (conscious development) and practical skills. In the photo above, students are making liquid soap for wider supply.

Nyombi Catherine, Jamal Ahmad, Male Haruna, Bosco Amerit

At the end of the prolonged insurgence in Northern Uganda there were new challenges for the returnees related to re-occupation of the ancestral land which later occasioned land conflicts, increased Sexual and Gender Based Violence and a breakdown in the social structures to monitor accountability.

This project presents a platform that addresses the knowledge gaps in the areas of Governance and offers an opportunity for the target communities to revitalize cultural leadership and systems. The project also addresses increased conflicts through the provision of the relevant knowledge to guide effective homegrown or community-grown conflict solutions anchored on the cultural practices, systems and processes.

Fortunately, every tribe and locality in Uganda is known to pay allegiance to a particular cultural system and practices and this facilitates scalability of the project. The project supports the development of special curricular to train the various stakeholders in the community administration with a bias to incorporating the traditional set up into the conflict resolution mechanisms.

The training focuses on the provision of knowledge and best practice to deal with issues of land disputes and conflict resolution, Sexual and Gender based violence with emphasis on both traditional and legal mechanisms, economic, social and political accountability.

Through this project, community based leaders are empowered with the relevant knowledge to deal with Sexual and Gender Based Violence based on the preventive legal frameworks and cultural mechanisms.

The local communities develop capacity to effectively demand for accountability from their leadership based on the two core principles and best practice of answerability and enforceability.

26 NEWS WEEKEND, Friday, April 7, 2017

PAKASA

Students from 25 secondary schools have started financial clubs and ventured in projects



Lira students embrace entrepreneurship skills

Students of Lira Integrated are making soap from beads. Photos by JARRET CHOPRA

Projects

All four Generation members formed their initial project was a micro-venture in business. Club members are encouraged to start from the Top Tea food factory in Lira and other projects.

The financial club members are encouraged to acquire a 'side' job or start a business. The members started with 2000 beads which they used to buy soap. The members are currently running a business and earn an average of 2000 every month, 20% of which goes to the school as part of the social payment agreement.

All the members are encouraged to start a business. The club members are encouraged to start a business. The club members are encouraged to start a business.

Benefits of financial clubs

Some 1000 of 24 students in Lira Progressive SS and the club have formed a creation space. In the students, through their training, they have been able to start their own businesses. The club members are encouraged to start a business. The club members are encouraged to start a business.

Challenges

Members of the club are encouraged to start a business. The club members are encouraged to start a business. The club members are encouraged to start a business.

USAID

FOR THE AMERICAN PEOPLE

5. Platform for inclusive participation on good governance & best practice

Team Lead: Dr. Isaac Kayongo, isaackayongo@yahoo.com

Members: Prof. Waswa Balunywa, Dr. Nichodemus Rudhaheerawa, Dr. Muhammed Ngoma, Roscoe Dennis Sozi, Badebye Mutesi, Joy Aphia, Sserunkuma Faruku,

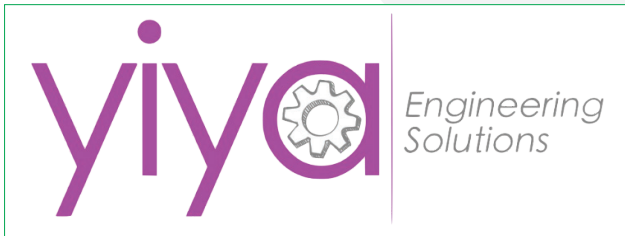


6. Yiya Engineering Solutions (YES!)

<https://yiyaengineeringsolutions.wordpress.com/>

Team Lead: Erin Fitzgerald, fitzgerald.erin.m@gmail.com

Members: Samson Wambuzi, Anthony Muzito, Marit Blaak, Joseph Kayizi



Yiya seeks to address two main resilience gaps in the targeted communities. The first is the lack of access to quality education and life skills, students do not see a strong connection between education and income generation, and do not understand the practical value of technical subjects such as mathematics and science. The other gap is the high levels of youth unemployment that lead to undesirable lifestyle choices such as over dependence on alcohol, illicit drug use and prostitution. The team is implementing a model that harnesses the tool of curriculum development in project-based education to build youth skills and entrepreneurship experience. The team is encouraging teachers to increase the human capital and potential of their students through implementing a series of engineering challenges such as designing solar cookers, charcoal briquettes from food waste, composting toilets, rainwater collection systems, water purification and filtration systems, bar and liquid soap, and alternative energy sources such as bicycle-powered cell phone charging systems or solar panel installation and repair. These lesson modules not only empower students and youth to take on and solve key challenges in their communities but also equip them with skills in designing tangible products that they can sell and generate an income from. This team have trained over 2, 500 students in five schools in Northern Uganda (Lira District), developed and shared a training curriculum.

7. Avocado value addition in Tanzania

Team Lead: Doreen Mloka, dmloka@yahoo.com

Members: John Linus Banzi, Veronica Kapesa Mugoyela, Febronia Christian Uiso,

Innocent Antony John Semali



Rombo and Dodoma are districts in Tanzania where small scale farming and animal husbandry are the main economic activities, land conflicts between farmers and pastoralists are common and communities are faced with inadequate income from their livelihoods. This team is supporting training for farmers in these areas in value addition of locally grown avocado fruits (*Persea Americana* (Mill) and rosella (*Hibiscus sabdariffa*).

This reduces recurrent losses from unprocessed agricultural products and creates opportunities for self-employment and income generation. Through training, farmers are able to produce more and better products that they can sell or use in their own households. Increased sales translate into better livelihoods and improved resilience of these communities. Trainings include value addition of locally available avocado and rosella to produce medicinal products, cooking oils, sanitary products and other income generating products. The train the trainer (TOT) approach used by the team ensures sustainability by creating ownership of the project in communities.

8. Solar Autoclaves for Health Disaster Relief in Conflict Hit Areas

Team Lead: Dr. Michael Lubwama, michaelubwama@gmail.com

Members: Enock Musasizi, Pius Jagwe



It is estimated that half the world's population is at occupational, environmental or public health risk from poorly treated medical waste. This problem is particularly serious in developing countries like Uganda where plastic materials are often treated in incinerators leading to emissions of dioxins and furans. Heavy metals like mercury, lead and used health-care supplies like syringes and needles when improperly disposed and poorly sterilized leads to significant numbers of hepatitis B, hepatitis C and HIV cases. The team has developed a solar powered and portable autoclave that uses both Hydro Electric Power (HEP) and solar to aid the management of medical waste in low resource settings. Lab tests have been done at the fabrication workshop in Kampala Central region.



Projects selected for support under the RAN Innovation Acceleration Program (RIAP) under the Horn of Africa Resilience Innovation Lab

1. Innovative Rainwater harvesting Technology to improve access to safe water in Borana zone, Ethiopia

Team Lead: Alemayehu Haddis a_had12@yahoo.com

Member: Esayas Alemayehu

The project involves designing and constructing an improved, low cost and sustainable rain water collection cistern at selected plots in Arero. The water tank capacity built underground is estimated from the number of dry seasons, family size and the per capita water consumption. Naturally growing grass is used as a filter media. The catchment surface is cultivated with grass that is used as animal feed. This innovation uses local filter like grass stones and gravel to improve the quality of rainwater hence minimizing cost but at the same time giving the best quality of water. It is also designed to avoid multiplication of mosquitoes



that transmit malaria. Contact of mosquitoes in the collected water is prevented by applying mesh wire on top of the pond. An oval dome like shape is created on top of the reservoir by using iron bars to support the mesh. Water loss due to evaporation is prevented by applying thatched roof over the pond and water loss due to percolation is minimized by applying plastic sheets or concrete in the collection reservoirs



Projects being supported under the Youth Spark Innovation Grants (YSiG) Innovation Grants in the Horn of Africa Resilience Innovation Lab

1. Removal of fluoride from drinking water using seeds of cabbage tree

Team Lead: Bisrat Feleke, bisratfeleke09@gmail.com

Over 80% of the children in the rift valley areas have developed varying degrees of dental fluorosis (TekleHaimanot et al 1987). The public health and economic importance of fluorosis is significant in many endemic areas in view of the occurrence of debilitating skeletal fluorosis. Thus, human sufferings due to dental and skeletal fluorosis; medical expenses to treat fluorosis, and untimely retirement of the productive members of the society can be

prevented by defluoridating drinking water. This project is working to develop new innovative fluoride removal technology from drinking water by using seed of *Moringa stenoptala* (cabbage tree).



3. Low Cost Portable Water Filtering Devise (LCWFD)

Team Lead: Tesfaye Gemed, hoarilab@ranlab.org

Member: Mr. Gelaneh Kuse,



Community consultation session

2. Pilot insecticidal spray

Team Lead: Fitsum Demisse, fitsumju2007@gmail.com

Member: Mr. Yibeltal Seraneh

The use of plants in traditional medicine has been well documented in many parts of the world. According to WHO, 65% of the world population have incorporated ethno medicine in their primary health care practice. The Ethiopian traditional healers use root of *Thalictrum Ryncho carpum* as an anti-malarial and repellent to prevent mosquitoes. This project is testing the insecticidal effect of *Thalictrum Rynhocarpum* on adult mosquitoes, which have already developed resistance to most insecticides. At completion of this project, pilot spray will be prepared based on results from further advanced research with senior faculty and experts in the field.

According to Action Aid (2010), approximately 1.2 billion people world-wide do not have access to safe drinking water which is linked to more than 6 million deaths of children due to diarrhoea annually.

The Borana and Gujii Pastoralist communities in which the innovation is being applied are highly dependent on surface water sources such as unprotected ponds, streams and rivers.

This team is developing a portable water filtering devise consisting of PET bottles containing filtering and antimicrobial agents. The devise is capable of producing potable water from surface waters (rivers, open walls, etc.)

The PET bottle filters are being manufactured and marketed to the communities which have no access to safe water supply or use surface water sources.

4. Domestication and Introduction of Backyard products for Sustainable Livelihood of Menja Women

Team Lead: Mulugeta Fisseha;
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The Menja community of Sheka zone have suffered from one of the worst form of exclusion for generations. They hardly use any social services including education and health facilities.

The women of Menja suffer from double marginalization: gender based and ethnic based marginalization. Backyard agriculture is not known or practiced by the Menja women. They go into the deep forests often risking their lifes to make charcoal and collect fire wood.

This project is building sustainable livelihood for the poor and disadvantaged Menja women living in the sheka area by introducing backyard agriculture. It includes developing the Menja women's skills, and supporting them to engage in backyard vegetable production and non-timber forest product yields (NTFP) like beekeeping.

5. Vermicompost technology for Decomposable Urban Waste management

Team Lead: Chore Simon Pete
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Urban conglomerations, with their ever-increasing population, industries and consumerist lifestyle generate voluminous solid wastes.

In many sub-Saharan African countries, considerable effort is being directed towards the collection and disposal of waste, while other

aspects of an effective waste management system are being ignored.

Vermiculture biotechnology, the breeding and propagation of earthworms and the use of its castings, has become an important tool of waste recycling.

This project, thus, addresses the twin-problems of the society: providing effective waste management system and availing organic fertilizer for peri-urban farmers that sustainably improves soil fertility.



6. Agricultural Extension Album for Small scale Farmers-Using Infographics

Team Lead: Ahmed Nor Hersi
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This project aims at creating an album for Extension Services using info-graphics: graphic visual representations of agricultural extension information such that poor farmers can get information quickly and clearly.

7. Promoting Climate Smart Agriculture Innovations through Open and Green Society

Team Lead: Tobias Okanda Recha
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The project aims at improving adaptation to climate change and enhancing the food and nutrition security of resource-poor farmers through the Open and Green Society models leading to higher incomes and greater food security for rural communities which in turn also improves their adaptive capacities.



Projects selected for support under the Youth Spark Innovation Grant (YSiG) under the West Africa Resilience Innovation Lab (WARILab)

1. Improving Access to Family Planning Services using Hairdressers and Tailors

Team Lead: Kelvin Abem Anne, kelvinane@yahoo.com

Member: Simon Baneke Afiipungu



Family planning is the conscious effort to regulate the number and spacing of birth through temporary, long term and permanent methods including emergency contraception and the treatment of infertility and sexually transmitted infections.

According to Crosette (2005), an unmet need for family planning refers to women capable of reproducing who are not using contraception but wish to postpone their next birth or to stop childbearing all together.

The focus of this project is to improve access to family planning services through the use of professional hairdressers, tailors and dressmakers in the Tamale metropolis as service providers to reach out to women who cannot easily access these services freely for fear of public stigma/ridicule. This group of vocational professionals form a large part of the informal sector and are constantly available and in touch with women of the reproductive age.

Promotion of family planning and ensuring access to preferred contraceptive methods for women and couples is essential to securing the well-being and autonomy of women while supporting the health and development of communities. Thus “shame” associated with accessing family planning services at designated clinics is reduced since entering into a hairdressing saloon or seamstress’ shop will mean different things.

2. Cashew Nut Apple Fruit Juice

Team Lead: Jerry John Cobbinah jerryjohncobbinah@gmail.com

Member: Josephine Efua Gyaiduwah Baffoe



This project is a replica of how students use their creativity, passion and knowledge to create innovative solutions that are contributing to strengthening resilience of community members. Leveraging creativity of students and the power of competition to drive innovation, the Cashew Nut Apple Juice Production project was “born” by a group of students who had lived and grown in Cashew production areas and saw the need to add value to the long time cash crop of their fathers.

The cashew trees produce a lot fruits and when they are ripped, the nuts are taken off, dried and sold to buyers. The apple fruits are left to rot on the farms. Small holder cashew farmers have little knowledge of the importance of the cashew fruit and its nutritional value in contributing to the health of the farmers. This innovation is addressing the post-harvest losses in cashew production and the value addition in respect of the fruits in order to boost farmer’s income.

Thus processing the cashew fruits into juice adds value and provides some form of income and skill to the youth while preventing them from migrating to the urban centers for none existent jobs.

3. Girl Empowerment through Hair Dressing

Team Lead: Juliana Asantewaa,
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Member: Mavis Amusah



Being a victim of societal neglect and coming from a background where female education is not embraced coupled with large family sizes, the female-led project, “the Girl Empowerment through Hairdressing”, observed that Population growth and rapid urbanization in several parts of West Africa are synonymous with the youth. Teenage pregnancy is increasing at an alarming rate in almost every community, district or region, and the most victims are Primary, Junior High and Senior High school students.

This is further worsened by statistical indications that these categories of people have no employable or entrepreneurial skills, making them to live a life of uncertainties thereby rendering them vulnerable. Institutions such as the Social Welfare responsible for providing support to these vulnerable groups have failed in their duties and more often than not are in-adequately resourced or lack capacity to do so. As part of a contribution to addressing this menace of unemployment and reduce the rate of teenage pregnancy within the surrounding communities, this project provides some employable skills for the girl-children who have dropped out of school, the destitute and vulnerable ladies in society thereby causing

positive change or making them resilient to stress and shocks.

4. Grass Fuel

Team Lead: Gregory Titi Adebah,
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gregorytitiaddebah@gmail.com

Members: Tijani Babatunde, Noel
Adjuawukey and Gloria Ajegelu



This is one of the projects with the potential to provide extra income and reduce the burden on women and children in the northern part of Ghana. The northern part of Ghana has the poorest populations in the country. Agriculture is rain fed with continuously intermittent rainfall patterns. The effects of climate change therefore have serious implications on livelihoods in this part of the country yet people are desperate to survive. The communities therefore resort to cutting down trees as fuel wood (Charcoal) to earn a living as a coping strategy/ measure. However, given that this is part of the savannah zone, Northern Ghana has massive grass cover which makes it potent to severe bushfires and air pollution. Various grass types are naturally grown in abundance and flourish well annually in this area and beyond. With an appropriate technology to harvest and create grass markets for the production of fuel, lies the country’s opportunity to curb the troubles that bush fires bring including the destruction of food crops on the farms by fires causing post-harvest losses.

The innovative aspect of this project lies in the compacting of free and abundant, quick renewable raw material; Grass, baobab and kapok fruit shells as an alternative to woody trees, in producing fuel for domestic use. This grass, which hitherto would have been burnt in a destructive manner to the environment

through bushfires, is modeled to be used as fuel. This could create vibrant and sustainable micro-economic stability to larger populations in a pro poor society like northern Ghana and beyond if supported.

5. On-farm Evaluation of Maize Productivity using Indigenous Organic material for soil restoration

Team Lead: Philip Ghanney, ganistroy@gmail.com

Members: Forster Kofi Addai



To sustain increases in crop production and food security, soil nutrient and water resources need to be properly managed and conserved. The fertility status of soils in sub-Saharan Africa is generally believed to be poor due to poor inherent soil quality and inappropriate soil management practices. The ever increasing human population together with destructive practices such as slash and burn, and the recent proliferation of surface mining has endangered shifting cultivation as practiced in the past, resulting in temporal losses of soil productivity. Besides, human-associated factors that drive long-term degradation of soil and vegetation are reflected in unsustainable farming practices and keep increasing with increased population growth and pressures.

As population continues to grow, there is need to find alternative ways to maintain productive soils and improve the health of degraded soils that will enhance crop yields in order to meet the food needs of the increasing population.

This is further worsened by the fact that over 70% of the poor live in rural areas, a pattern that is likely to continue for several years. This group of people derive a greater part of their livelihood from agriculture as a vital means to poverty reduction.

Food crop production in the sub-Saharan

Africa is low because smallholder farmers who constitute greater percentage of the working force in agriculture are unable to meet their production target. However, there is an alternative means by which smallholder farmers can boost crop production without using inorganic fertilizers. Organic materials such as rice husk, corn cobs, groundnut husk and maize stovers are abandoned by the smallholder farmers after harvesting and processing of produce.

These indigenous materials can be converted into organic amendment called biochar to facilitate soil fertility management. The product (Biochar) has the potential of improving the water holding capacity of the soil, soil nutrient retention capacity, and sustainable carbon storage, thus reducing greenhouse gas emissions as enablement to the environment. The innovation is aiding curbing the problem of rural-urban drift on the part of the youth and other social vices in which the jobless youth engage.

6. Rural Agro Resource Development for Livelihood Diversification Project (Northern Ghana)

Team Lead: Bismark Adzah, bismarkadzah@gmail.com; bismark.adzah14@uds.edu.gh

Members: Edna Abaloo and Felix Effa Yaw Afofah



Katui-Saa community is predominately a farming community who are into subsistent food crops farming but depend solely on the weather or rainfall patterns. The output (yield) level of these crops is very low due to the erratic changes in rainfall patterns, inadequate viable seeds, lack of irrigation facilities and extension services among others. These factors have led to limited job opportunities and low income levels of the people.

The community is however endowed with abundant natural resources such as economic wild fruits; baobab, dawadawa, and shea, which could be tapped into to address the fortunes in these communities especially those affecting women and children. Based on this premise, the Rural Agro Resource Development for Livelihood Diversification Project therefore seeks to empower rural people especially women who are the most vulnerable in society through social mobilization and participation.

This project promotes the economic and social wellbeing of the people through sustainable use of abundance natural agro resources by value addition and also enhancing the nutritional diet of the people. Through effective implementation of the idea, more job opportunities are expected to be created for the youth and elderly in the community as an alternative source of income during the lean seasons. It further reduces the incidence of rural-urban migration in the community and deforestation.

▶ **Projects selected for support under the Resilience Innovation Acceleration Program (RIAP) under the West Africa Resilience Innovation Lab (WARILab)**

1. The Black Soldier Fly Project

Team Lead: Dr. Kosi Courage Setsoafia Saba
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Members: Stephen Wilson Kpordze and Atanyiwoein Brusah

This project innovators are working to collect organic waste from the markets and city centers and decompose it with the larvae of a harmless fly called black soldier fly. The decomposed organic waste is used as a fertilizer while the larvae produced is used as a cheap source of protein for animal or fish production. The project is producing a cheaper source of protein (Larvae) for feeding poultry and fish, produce bio fertilizer for soil amendments as well as help clean the environment of organic wastes.

2. Eco-safe Energy Cook-stove for low-income users

Team Lead: Eng. Moses Pumpuni,
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Member: Ali Anankpieng

In 2006, Ghana signed the ECOWAS White Paper for Regional Policy on Access to Energy Services. The policy had an objective of achieving 100% access to modern cooking facilities including improved stoves by 2015. The rational among other things is to reduce indoor air pollution from wood smoke, reduce deforestation and improve living standards of women and children.

The Eco-Safe Energy Cook-stoves use less fuel wood for cooking an average household meal. The UN measured value for a household meal using firewood is six kilograms (6 kg). However, for the same effect Eco-Safe Energy Cook-stove; Uses just two kilograms (2 kg) which preserves the carbon sink by four kilograms (4 kg) per meal for a household and eliminates smoke emissions as it burns purely by wood gasification. This also reduces smoke inhalation and thus any possible causes of cardiovascular diseases. Additionally, it leaves only resins at the base of the cooking pot and not black soot. This saves the household's time washing the cooking utensils which in turn last longer. The Eco-Safe Energy Cook-stove additionally expands the technological options in clean and efficient energy use.

▶ **Projects selected for support under the Resilience Innovation Challenge for Food Security and Improved Income Generation (RIC4FIG) under the Southern Africa Resilience Innovation Lab (SA RILab)**

1. Trust Insects for Food (TIFF), <http://www.csir.co.za>

Team Lead: Dr. Luke Mehlo,
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Members: Prof. Bongani Ndimba; Mr. CobusKotze; Dr.Nemera Shargie

This project has developed an "out-of-the-box" farming system, commercially producing grain sorghum and development of enterprise value chains from a single crop. Sorghum is the most ideal foundation of the innovation. Its adaptability to harsh conditions is a plus in efforts for combating climate change and ensuring food security.

The sorghum crop and this project is a vehicle for the inclusive participation of resource poor communities in agriculture because it is among the few crops that can be grown without sophisticated knowledge and irrigation in areas receiving 700 mm or less of summer rainfall.

2. Food Security for Every Family

Team Lead: Christopher Adare
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Members: Joseph Monosile, Bernadetta Adare,

The project is introducing technology and farm management methods that provide a means to grow food and earn income throughout the year. The target population is small-scale irrigation farmers and fabricators in Chikwawa district.

3. Baobab fruit for dollars in Beitbridge (B4D)

Team Lead: Dr. Alice Maredza
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Members: Killian Mutiro, Ms D Shumba, Ms V Sibanda, Ms S Kurebgaseka and A Muchawona,

The project is directed towards diversifying and increasing household incomes and employment in Beitbridge through value addition on natural forestry products using baobab fruit as a test case. Natural forestry product value chains provide immense potential for diversifying and increasing rural incomes if the communities are capacitated to undertake processing, value addition and brand development for the products.

4. Goat Value Chain for Prosperity, <http://raein-africa.org/>

Team Lead: Doreen Mnyulwa
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Members: Christo Venter, Ben Smit, Dr D.B. Afful and E.M Lestaolo

The project innovators have developed a profitable goat value chain involving; goat and milk production, cheese processing and goat milk and cheese advertising and marketing business in Digkale community. The project activities address challenges associated with

limited opportunities for income generation in the local economy, low incomes for rural smallholder farmers and food insecurity. Primary beneficiaries are the communal goat producers willing to run small to medium scale milk production, processing and marketing enterprises.

5. Mobile Solutions for Marginalized Communities (MOSMAC)

Team Lead: Leon Gwaka,
sarilab@ranlab.org

The major aim of this project is to introduce farmers, especially in marginalized areas, to Information Communication and Technology (ICT) and e-business for improved income generation and food security at household level. This is being achieved through improved knowledge sharing with small scale farmers and community members facilitated by the dissemination of information through mobile telephones. The project is also critical in improving current communication infrastructure within Beitbridge.

6. Mopane Worm for Nutrition and Income Generation in Zimbabwe (MW4NIG) <http://www.ruzivo.co.zw/>

Team Lead: Dr. Prosper Matondi
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Members: Dr Easter Chigumira, Sheila Chikulo, Aaron Marufu, Chipso Gono

The project is facilitating training and capacity strengthening to increase Mopane worm productivity. Group formation and dynamics are being achieved through facilitation by the experts in the team developing a training curriculum at multiple levels including: developing manuals for group formation, technical production processes on Mopane worms, conservation of the natural habitat, health and safety of harvesters and collaboration with institutional actors.

7. Improved life and entrepreneurial skills through the self-help group approach, <http://www.sinamandla.org.za/>

Team Lead: Xolile Manyoni
sarilab@ranlab.org

Members: Nokulunga Khumalo and Phil Donnell Sinmandla

The SHG project is strengthening resilience through food security, improved life skills, entrepreneurial skills development, livelihood diversification and community initiatives with joint ownership. The project is being implemented through the establishment of SHGs in Pyramid and Ga-Dikgale by local NGOs who are capacitated and supported by Sinamandla.

Projects being supported under the Youth Spark Innovation Grants (YSiG) Innovation Grants in the Southern Africa Resilience Innovation Lab

1. Each 1 Tshwara 1 Re-integration Services

Team Lead: Tsholanang Seakamela
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Drug consumption in South Africa is twice the world norm. 15% of South Africa's population have a drug problem costing the country R20-billion a year and could pose a bigger threat to the country's future than the AIDS pandemic. One Rand in four in circulation in SA is linked to the substance abuse problem.¹ According to the South African Police Services (SAPS) figures, 60 percent of crimes nationally were related to substance abuse. The perpetrators of these crimes were reported to be either under the influence of substances, or trying to secure money for their next fix. Between 2% and 6% of those admitted to drug rehabilitation centres are hooked on prescription medications. Most drug rehabilitation centres have a success rate of less than 3%. Against the backdrop of the current and potential challenges of drug abuse, it is important that research focuses its attention on improving the rehabilitation success rate and the development of programmes that can help build life and entrepreneurial skills among former drug users.

This project's operations focus on efforts to improve Food Security and achieve improved income generation. The project seeks to identify factors influencing drug user rehabilitation success rate and establish an entrepreneurial and life skills training programme for rehabilitated former drug users in order to effectively reintegrate them into society.

The goal is to combat the scourge of substance abuse, particularly Nyaope addiction, and enable former drug users become functional members in the society. We want to help them recognize and achieve their full potential.

2. Improved Cook-stoves in Malawi

Team Lead: Joyce Grevulo
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There is low adoption of firewood efficient improved cookstoves (ICS) in Malawi. ICS low adoption is as a result of people not using the owned ICS extensively but the traditional inefficient stoves for cooking some meals. Therefore, long use to odd ways of cooking which are fuel inefficient and produce more smoke, results in slow adoption of firewood improved cookstoves in Malawi. Furthermore, researchers and practitioners claim that current ICS technologies are not widely adopted because they do not conform to user preferences and local cooking environment (Lewis and Pattanayak, 2012; Whittington et al., 2012). Therefore, a full knowledge of consumer preference for ICS through research is essential in developing suitable prototype of ICS that can be sold at low cost.

This project aims to reduce deforestation and household air pollution through increased adoption of improved cookstoves (ICS) in Malawi. ICS are energy efficient cooking technologies that allow a more complete combustion of firewood (Malinski, 2008). The complete combustion minimizes the emission of black carbon particles that are detrimental to human health and environment (Inayatullah, 2011). The improved cook stove project also seeks to gather knowledge of consumer preference for ICS that will be used to develop suitable prototypes of ICS that can be sold at low cost. The low cost prototypes can therefore up-scale the use of ICS in Salima district hence reduce the problems of deforestation and household air pollution.

3. Magnon - a new way of generating electricity

Team Lead: Kedumetse Motloutsi
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South Africa faces an energy crisis that is manifested through load shedding while some parts of the rural communities do not even have electricity supply. The demand for electricity has increased due to the growing economy.

Most rural and some peri-urban communities rely on fossil fuels for power which causes health problems with harsh environmental impact in the context of climate change. South Africa has the potential to generate electricity through various ways that include nuclear power, wind energy, solar energy, fuel generators and fossil fuels.

However, most of these alternative options including use of generators are expensive for most of the rural communities. There is therefore need to explore other cheaper and greener ways of producing electricity for increased access by poor rural communities. These innovators are developing a device (Magnon) that will produce electricity cheaply without having any impact on the environment.

It is a design that is not based on perpetual motion but borrows various concepts that have been created by various scientists and engineers to create a viable solution to South Africa's electricity crisis.

4. Potential use of biological soil crusts and silicate on the rehabilitation of gold mine tailings

Team Lead: Richard Whande, richard.whande@gmail.com

Mine dumps negatively impact the environment and public health in various ways. One of the direct impacts is loss of arable land which can affect food security because of the reduction

in grazing and farming land. Other impacts include air and water pollution and siltation of rivers and loss of biodiversity. Mine dumps are usually devoid of vegetation resulting in wind and water erosion from their exposed surfaces. Mining and their resultant TSFs often leads to the development of acid mine drainage (AMD) also known as acid rock drainage (ARD). AMD is a result of the oxidation of iron pyrites and other sulfur-rich minerals that normally are found at great depth, but are now exposed to surface oxygen and water. This project seeks to identify beneficial micro-organisms that occur naturally within the dumps' ecosystem and encourage them to grow so as to be able to establish seral succession as quickly as possible. Previous studies have focused on studying these communities of organisms (called biological soil crusts), in extreme environments such as desert soils. None has looked at these organisms in mine dumps.

The focus to improve health of people or communities living within the vicinity of the mine dumps. This project seeks to identify beneficial micro-organisms that occur naturally within the dumps' ecosystem and encourage them to grow so as to be able to establish seral succession as quickly as possible.



5. Nubrix- Recycling waste paper to create affordable quality bricks

Team Lead: Elijah Djan, elijah@nubrix.co.za



The burning and dumping of waste paper causes air, soil and water pollution. Discarded paper is a major component of many landfill sites accounting for about 35% by weight of municipal solid waste. On the other hand, lack

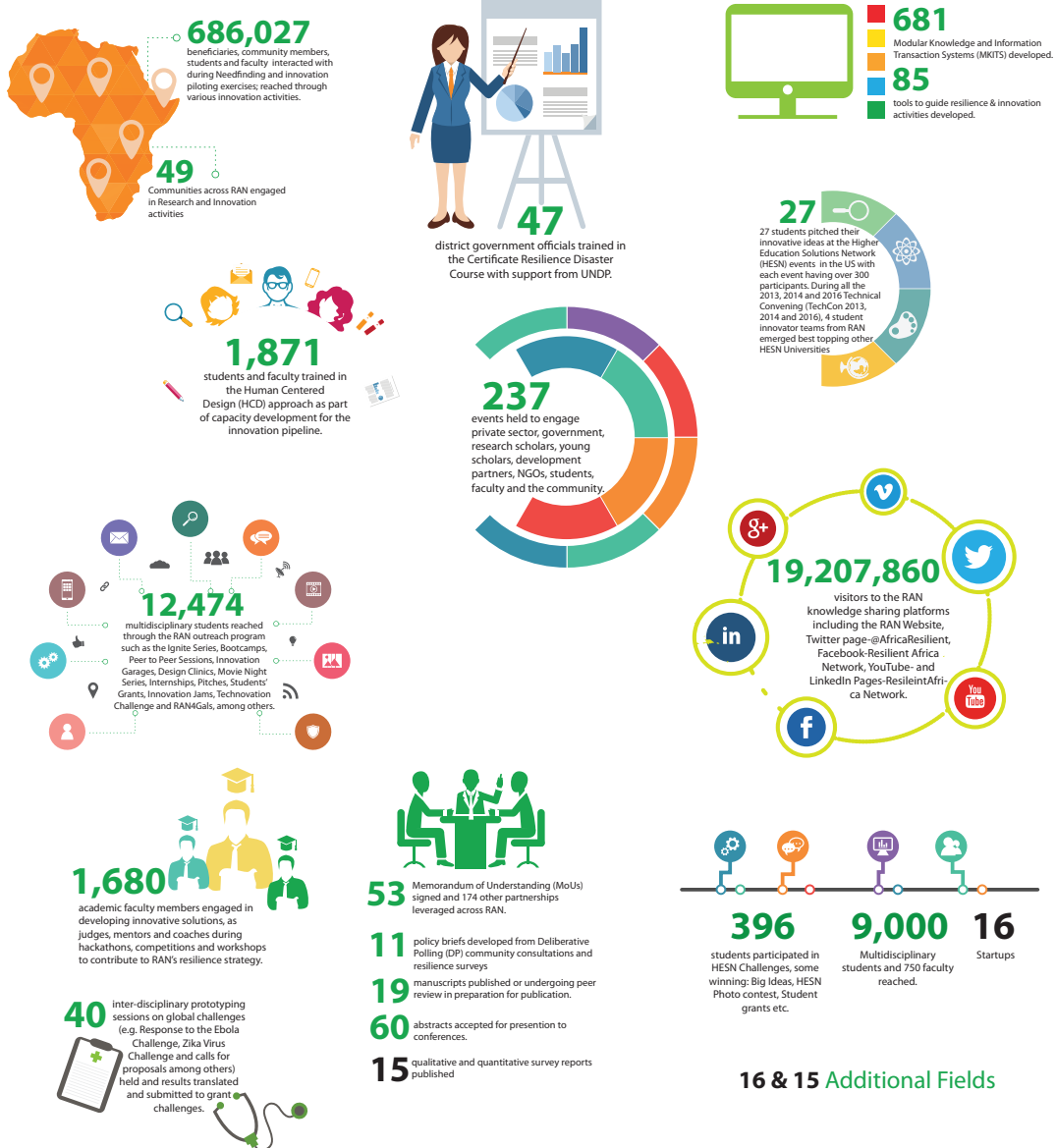
of affordable quality housing results in people living in shacks. About 1.2 million South Africans live in shacks. There has been an increase in shack fires in South Africa in the last few years leaving thousands of people homeless and some dead. NUBRIX innovation idea is expanding on an already developed and tested model of producing bricks from paper- the first in Africa. The bricks have already been produced and their strength and durability against water, fire and pressure also tested. They can withstand up to 10,2Mpa. These innovators' focus is to improve Food Security and Income Generation. Nubrix seeks to solve the increase in shack fires by creating affordable bricks so that people can afford houses and thus not live in shacks any more.

6. Asthma Grid- medical diagnostic instrument

Team Lead: Moses Kebalepile, moseskebalepile@gmail.com

Accurate medical diagnostics and shortage of diagnostic equipment is a challenge in the developing world. This is even truer for management of chronic diseases like asthma. Asthma induction and exacerbation is not clearly understood and has been a challenge to model and predict. As a result, cases of exacerbated and life threatening asthma are increasing. The Asthma Grid is an electronic medical device with the capacity to predict eminent Asthma attacks.

SUMMARY OF KEY LAB ACHIEVEMENTS






As at June 2017-Full Profiles accessible on www.ranlab.org



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